Adolescent Medicine and General Pediatrics I

Concurrent Session

12:45 PM

Thursday, January 26, 2017

1 SOCIAL PARTICIPATION AMONG YOUTH WITH PHYSICAL DISABILITIES TRANSITIONING TO ADULTHOOD

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Purpose of Study Participation in social activities is an essential developmental activity, especially among youth transitioning to adulthood. However, individuals with physical disabilities (PD), can have barriers to participation that are not experienced by their peers who have learning disabilities (LD). This research examined social participation during adolescence and adulthood among individuals with PD and LD using a nationally representative, longitudinal study and identifies adolescent factors which affect participation.

Methods Used We performed a secondary data analysis of the National Longitudinal Transitional Study 2, a nationally representative longitudinal cohort study. We measured frequencies of social participation youth with and PD and LD in adolescence and young adulthood. Multivariate logistic regression was utilized to determine factors which affect risk of poor social participation with a weighted complex samples analysis.

Summary of Results Population sample estimates: LD (n=1,019,630) and PD (n=80,230). In both adolescence and adulthood, individuals with PD had significantly lower social participation than individuals with LD. Higher social participation: PD adolescent=47.2%, Confidence Interval (CI)=37.8–56.9, PD adult=43.5%, CI=33.3–54.3. LD adolescent=80%, CI=76.1–83.4, LD adult=72.2, CI=72.3–81.4.

Factors that increase risk of poor social participation in adolescence among individuals with PD include trouble communicating (OR=3.1, 95% CI=1.9–5.0). Living in a medium sized city compared to a large city increased risk of lower social participation for both LD and PD in adulthood (OR=19, 95% CI=1.8–204; OR=2.1, 95% CI=1.0–4.6) respectively). For individuals with PD high

functional mental skills and higher self-care skills in adolescence lowered risk of poor social participation in adulthood ((OR=.78, 95% CI=.69–.90) (OR=.70, 95% CI=.55–.89) respectively).

Conclusions Individuals with PDs are at higher risk of social isolation than individuals with LDs. Among adolescents with PD transitioning to adulthood, activities of daily living, communication, and independence appear to be associated with social success for this population. These factors have potential to inform clinical care, community interventions and advocacy.

2 ASSESSMENT OF PROVIDER GUIDANCE AND PARENTAL KNOWLEDGE AND ATTITUDE REGARDING CHILD PASSENGER SAFETY

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10.1136/jim-2016-000365.2

Purpose of Study Motor vehicle accidents are the leading cause of death in children greater than 4 years old. Proper safety seats reduce the risk of injury by up to 82% and risk of death by 28%. This investigation sought to establish the frequency at which providers discuss passenger safety at well child visits as it relates to parent literacy and attitudes.

Methods Used Surveys were given to all families at all well child checks at an outpatient, resident-run clinic for one week. English or Spanish surveys were available and anonymous. All data was included for analysis.

Summary of Results 72 surveys were returned. 60% were English speakers. Most surveys were for families at the 0–12 month well child check. Providers excelled at discussing car seat safety postpartum and at the newborn visit at a rate of 95%. Only 66% of families reported their provider talking about car seat safety at later visits. More Spanish speaking respondents reported no discussion of car seat safety at more than one visit. The majority of English speaking respondents reported car seat safety was not a concern and did not want follow up. However, child passenger safety knowledge was mediocre. Spanish speakers' safety knowledge was poor for all questions. However, they felt car seat safety to be important. Most indicated interest in wanting more information and would be willing to have their car seats evaluated.

Conclusions Motor vehicle accidents are a leading causes of pediatric morbidity and mortality. Proper use of restraints reduces injury and death. However, provider education significantly drops off past the newborn period,

Abstract 2 Table 1 Child Passenger Safety Parent Literacy

	Total Percent Correct	English Speaking Families Percent Correct	Spanish Speaking Families Percent Correct
Proper placement of infant car seat (<2 years old)	59.6%	83%	57%
Transition to forward facing car seat	35.3%	38%	30%
Car seat use after a MVA	15%	82%	23%
Proper use of booster seat	65.5%	64%	62.5%
When a child is able to transition to regular seat	66%	69%	61%
When a child is able to sit in the front seat	96.8%	95%	92%

especially for non-English speaking patients. Language barriers may prohibit providers from relaying education and thus, poor safety knowledge. Parental attitudes that no further information is wanted/needed may be perceived due to a lack of frequent physician engagement. Thus, there is a strong need for continuing education during routine healthcare visits from birth to adolescent.

3 DOES EARLY ORTHOPEDIC CONSULTATION IN UNCOMPLICATED ACUTE HEMATOGENOUS OSTEOMYELITIS DECREASE LENGTH OF STAY IN THE PEDIATRIC POPULATION?

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10.1136/jim-2016-000365.3

Purpose of Study Acute hematogenous osteomyelitis (AHO) is one of the most common bone infections in the pediatric population. The diagnosis is made clinically with fever as the most common sign, focal tenderness and limitation of function in the affected extremity. Care of patients with osteomyelitis requires multidisciplinary collaboration including orthopedic surgery and infectious disease. Patients with the diagnosis of AHO are shown to have long hospital stays which not only subjects them to nosocomial infections but places strain on medical costs. Our aim is to measure whether early orthopedic consultation defined as less than 24 hours will decrease length of stay.

Methods Used This was a retrospective single center study using chart review between 2011 and 2016 using ICD-9 and ICD-10 coding for acute osteomyelitis. Data collected included demographics and timing between admission and orthopedic consultation. Clinical and laboratory findings were also obtained in an attempt to determine severity of disease. Treatment related data and timing between admission and imaging were also obtained. Our study was divided into three groups, early orthopedic consultation defined as less than 24 hours, orthopedic consultation at more than 24 hours and cases where orthopedics were never consulted. Within the early orthopedic consultation group we obtained percentage of those which needed orthopedic surgical intervention.

Summary of Results Interim analysis of 54 cases showed a distribution of 68%, 13% and 18% of those consulting orthopedic services early, more than 24 hours and those in which orthopedics were never consulted respectively. Of the 68% with early orthopedic consultation 59% needed surgical intervention. Unadjusted mean length of stay was 12.8 days (95% CI 10–15) for early orthopedic consultation, 13.1 days (95% CI 9–17) for late orthopedic consultation and 11.6 days (95% CI 9–14) for the cases where the orthopedic team was never consulted.

Conclusions Interim data analysis suggests that early orthopedic consultation in acute hematogenous osteomyelitis in the pediatric population may not be associated with a decreased length of stay. Further work will include analysis of data after adjusting for potential confounders including age, gender and severity of disease.

4 SEX AND WEIGHT STATUS ARE ASSOCIATED WITH BASELINE DISORDERED EATING BEHAVIORS IN NEW MEXICO ADOLESCENTS

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10.1136/jim-2016-000365.4

Purpose of Study To evaluate the association of sex and weight status with baseline disordered eating behaviors in adolescents screened for weight management and prevention intervention.

Methods Used Anthropometric measurements were collected for 1049 teens (mean age=15.3 years, 86% Hispanic, 55% female) at 8 school-based health centers. Participants completed the Eating Attitudes Test (EAT 26) to screen for eating disorder risk (ACTION PAC; ClinicalTrials.gov Identifier: NCT02502383). Relationships were assessed using Fisher's exact and Chisquare tests, and multivariate linear models, as appropriate.

Summary of Results The prevalence of underweight, normal weight, overweight or obese was 2.6%, 57.7%, 19.7% and 20.0%, respectively. The prevalence of EAT-26 scores >20, indicating the need for additional eating disorder assessment, increased steadily by weight status category, from 0.0% (underweight), 3.0%, 5.1% to 8.8% (obese) (p=0.02). In a multivariate model including sex, weight status, Hispanic ethnicity and age, female sex (p<0.0001), overweight (p=0.01) and obesity (p<0.0001) were associated with a significantly higher total EAT-26 score. In bivariate analysis, adolescents with a BMI ≥85th percentile had a significantly higher prevalence of reporting body image and weight related guilt and preoccupation, vomiting to control weight (7% vs. 3% prevalence; p=0.02) and using laxatives, diet pills or diuretics to control weight (8% vs. 2% prevalence; p<0.0001) compared to adolescents with a BMI<85th percentile.

Conclusions Programs promoting healthy weight management skills for overweight and obese adolescents need to screen for disordered eating behaviors prior to beginning intervention, secondary to the increased risk in this population.

5 METABOLIC, CARDIOVASCULAR, AND BEHAVIORAL FACTORS ASSOCIATED WITH ORAL HEALTH IN URBAN AMERICAN INDIAN AND CAUCASIAN YOUTH

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10.1136/jim-2016-000365.5

Purpose of Study American Indian (AI) and Alaska Native (AN) adults have increased rates of periodontal disease (PD). Early intervention is important while it is still reversible. More severe dental caries is reported in AI/AN youth, as are increased rates of obesity-associated metabolic syndrome (MetS) and diabetes. However, less is known about early stages of PD, especially in the increasingly urban setting in which AI youth now live. In this exploratory study, we collected data on precursors of PD in AI/AN vs. Caucasian

urban adolescents, as well as the relationship between oral health and potential contributors.

Methods Used We obtained demographics, fasting labs, anthropometrics, questionnaires about oral health knowledge and behaviors, and a dental and periodontal examination.

Summary of Results AI/AN youth had higher dental pain, decayed/missing/filled teeth and surfaces, calculus, gingival bleeding and pocket depth, especially among females. Despite no differences in oral health knowledge or diet, AI/AN adolescents had less teeth brushing, dental insurance, and higher tobacco use and MetS characteristics. Several MetS characteristics related to oral health, including BMI, diastolic blood pressure, triglycerides, HbA1c, fasting glucose and estimated insulin sensitivity, as did tooth brushing, smoking, insurance, and time of last dental visit. BMI was only independently correlated with pocket depths.

Conclusions Compared with Caucasians, AI/AN adolescents have worse dental health and more signs of progression to early PD, showing the need for interventions to interrupt this process. Potential areas for PD prevention identified included BMI, home oral care, smoking, and access to dental care, arguing for collaboration between pediatric and dental providers.

6 EXCESSIVE SLEEPINESS IN A TEENAGER

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10.1136/jim-2016-000365.6

Case Report Two-thirds of adolescents have poor nighttime sleep leading to daytime sleepiness. A small minority of these adolescents may have an unrecognized sleep disorder as specific sleep-related questions are infrequently asked during the physician's visit. We present an unusual case of excessive daytime sleepiness.

A 14-year-old male presented to the urgent care clinic with a 1-month history of increasing fatigue and daytime sleepiness. He was falling asleep in class despite sleeping for 8 hours overnight. He denied anxiety, depression, or drug use. On physical exam, he was a healthy adolescent with normal vital signs. His laboratory studies including CBC, biochemistry, thyroid function, and urinalysis were normal. Additionally, monospot, throat culture, and urine drug screen were negative. His fatigue, as a result, was attributed to poor sleep hygiene. He was seen two additional times with unchanged symptoms. Three months later, he developed slurred speech at school and his parents brought him again to the urgent care clinic for evaluation. He was found to be mildly dysarthric with an otherwise normal physical exam. He reported that when he became extremely tired, it was difficult for him to walk or speak clearly. Further review of his illness course revealed that when he laughed, he would drop whatever he was holding in his hand. This new finding of sudden onset muscle weakness associated with strong emotions, also known as cataplexy, initiated a narcolepsy workup. A polysomnogram with multiple sleep latency test (MSLT) revealed a mean sleep latency of 4.8 minutes (normal >15 minutes) with sleep-onset REM in three of the four naps, which confirmed the diagnosis of narcolepsy.

Daytime fatigue is a common complaint. Obtaining a thorough history is essential to differentiate inadequate

sleep from medical and sleep disorders. Diagnosing narcolepsy, a chronic non-progressive sleep disorder, can be challenging and a delay in diagnosis of up to 5 to 15 years has been previously reported. Undiagnosed, narcolepsy can lead to school failure, isolation, and poor quality of life as seen in our patient. Appropriate testing with polysomnography followed by MSLT facilitates the diagnosis of narcolepsy. This case demonstrates the importance obtaining a detailed sleep history when evaluating excessive daytime sleepiness.

Cardiovascular I Concurrent Session

12:45 PM

Thursday, January 26, 2017

7 REAL-TIME CLASSIFICATION OF ECG RHYTHM DURING RESUSCITATION: IMPLICATIONS FOR TREATMENT OR PROGNOSIS?

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Purpose of Study Current treatment for out-of-hospital cardiac arrest (OHCA) is based on ECG rhythm snapshots that occur at fixed 2-minute intervals. This approach ignores intervening dynamic rhythm changes because the ECG cannot be interpreted due to CPR-induced electrical artifacts. Advances in technology now enable ECG rhythm classification algorithms that can "read-through" CPR. We described how the rhythm changes during CPR following the initial shock for ventricular fibrillation (VF) and associated the rhythm profile with outcome.

Methods Used We investigated a cohort of 109 VF OHCA cases treated by King County EMS using defibrillator ECG recordings linked to a clinical registry. The ECG was classified as VF, asystole, or organized for each second during the first 2 minutes following the initial shock. Rhythm distribution over time was produced for each patient and compared to survival to hospital discharge.

Summary of Results There was a spectrum of time-dependent ECG rhythm patterns. Immediately after the shock 27% (n=29) had persistent VF, 33% (n=36) were organized, and 40% (n=44) were asystole. Of the 109 cases, 42% (n=46) presented a single rhythm following the shock (VF 27% (n=29), organized 9% (n=10), asystole 5% (n=6)). Of the remaining 58%, at least one rhythm transition occurred, most often from organized to VF (n=20) and asystole to organized (n=20), followed by asystole to VF (n=15) and organized to asystole (n=5). Overall survival was 40%, but was substantially different according to rhythm profile. The best survival was observed among those transitioning from organized to VF (survival 75%) and worst among organized to asystole (survival 0%).

Conclusions Time-dependent rhythm profiles vary substantially following shock, with different rhythm profiles potentially portending different likelihoods of survival.

These findings invite the possibility of using more directed treatments based on the evolving rhythm profile, which may help improve survival from OHCA.

8 INDICATIONS FOR LATE PRETERM AND EARLY TERM BIRTH IN NEONATES WITH COMPLEX CONGENITAL HEART DISEASE

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10.1136/jim-2016-000365.8

Purpose of Study Our objective was to describe the prevalence and indications for delivery at <39 weeks of gestation in neonates with complex congenital heart disease (CCHD).

Methods Used All neonates with CCHD admitted to Loma Linda University (LLU) Children's Hospital NICU from 2011 to 2015 were included in this study. Retrospective review of electronic medical records from January 01, 2011 to December 31, 2015 was performed to collect data regarding demographics, CCHD lesion, maternal medical conditions, and indication for delivery at less than 39 weeks of gestation. Pregnancies complicated by twin gestation and placenta previa were excluded, as were outborn neonates with limited data about maternal medical conditions and prenatal course. Indications for delivery were summarized by categories: preterm birth <34 weeks gestational age (GA), late preterm birth (34–36 6/7 weeks GA), and early term birth (37–38 6/7 weeks GA). Descriptive statistics were used to compare the groups.

Summary of Results There were a total of 330 neonates admitted to the LLU NICU with CCHD during the study period with 129/330 (39%) born at <39 weeks GA. The majority, 81/129 (63%) were born at early term, 34/129 (26 %) were late preterm births and 14/129 (11%) were born prior to 34 weeks of gestation. Pregestational and gestational diabetes complicated 34/129 (26%) of the pregnancies, while hypertensive disorders of pregnancy (PIH) and intrauterine growth retardation (IUGR) were present in 18/129 (14%) and 13/129 (10%) of pregnancies, respectively. Vaginal and cesarean section deliveries accounted for 53% and 47% of the cases respectively. Repeat cesarean

sections with and without labor (38%), non-reassuring fetal heart rate patterns (21%) and breech presentation (20%) were the main indications for cesarean delivery.

Conclusions Delivery at <39 weeks of gestation is common in neonates with complex congenital heart disease and more likely reflective of preterm labor or maternal medical conditions rather than elective delivery

9 OUTCOMES FOR TRANSTHYRETIN AMYLOID PATIENTS>70 YEARS OF AGE WHO UNDERGO HEART TRANSPLANTATION

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10.1136/jim-2016-000365.9

Purpose of Study Transthyretin amyloid (TTR) commonly affects patients (pts) in their 60s and 70s when developing severe symptomatic restrictive cardiac physiology. Older TTR pts appear more stable and have a less aggressive course compared to immunoglobulin light chain amyloid pts. These pts might be better candidates for heart transplantation (HTx) as they have no previous sternotomies and rarely require biventricular support. To assess HTx outcomes of these pts, we compared older TTR HTx pts to other HTx pts.

Methods Used Between 2011 and 2015 we assessed 450 HTx recipients and identified 21 pts with TTR. These pts were compared to a cohort of non-TTR pts who underwent HTx in the same period. Pts were then divided into the following groups: Group A=TTR>70 yr, Group B=no TTR>70 yr, Group C=TTR<70 yr, Group D=no TTR<70 yr. Outcomes included 1-yr survival, 1-yr freedom from cardiac allograft vasculopathy (CAV)≥30% by angiography, Non-Fatal Major Adverse Cardiac Events (NF-MACE: myocardial infarction, new congestive heart failure, percutaneous coronary intervention, implantable cardioverter defibrillator/pacemaker implant, stroke), any-treated rejection and dialysis. ICU stay and history of prior sternotomy were also evaluated.

Summary of Results Both TTR groups (A & C) had better or comparable outcomes to the non-TTR groups (B & D). Specifically, there was no significant reduction in 1-year

Abstract 9 Table 1

Endpoints	Group A TTR>70 yr (n=9)	Group B No TTR>70 yr (n=36)	Group C TTR<70 yr (n=12)	Group D No TTR<70 yr (n=393)	P-Value
1-Year Survival	100.0%	94.1%	100.0%	88.0%	0.357
1-Year Freedom from CAV	88.9%	79.6%	91.7%	94.9%	0.003
1-Year Freedom from NF-MACE	77.8%	88.3%	100.0%	87.2%	0.509
1-Year Freedom from Any-Treated Rejection	100.0%	77.9%	100.0%	83.3%	0.249
1-Year Freedom from Acute Cellular Rejection	100.0%	80.4%	100.0%	92.3%	0.074
1-Year Freedom from Antibody-Mediated Rejection	100.0%	94.4%	100.0%	95.8%	0.766
1-Year Freedom from Biopsy Negative Rejection	100.0%	100.0%	100.0%	92.9%	0.310
1-Year freedom from Dialysis	100.0%	88.4%	100.0%	86.7%	0.398
Previous Sternotomy (%)	0.0% (0/9)	52.8% (19/36)	8.3% (1/12)	49.1% (193/393)	0.001
ICU Stay, Mean Days±SD	4.7±2.2	6.5±5.4	5.1±2.2	7.9±10.1	0.473

Abstracts

survival, 1-yr freedom from CAV, NF-MACE, and acute cellular rejection in either TTR group. Previous sternotomies and ICU days were less with TTR pts than both non-TTR groups.

Conclusions Older TTR pts greater than 70 years of age appear to be reasonable candidates for HTx due to their low risk characteristics.

10 LONG-TERM OUTCOME OF RENAL SPARING PROTOCOL AFTER HEART TRANSPLANTATION: IS IT VIABLE?

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10.1136/jim-2016-000365.10

Purpose of Study Long-term use of calcineurin inhibitors (CNIs) has been associated with renal dysfunction due to nephrotoxicity of the drug. A renal sparing protocol (RSP) has been utilized in heart transplant recipients to spare the patient from CNIs. Specifically, for the RSP, CNIs are gradually withdrawn with the concomitant addition of a proliferation signal inhibitor (PSI) which are added to the existing mycophenolate mofetil. There are several reports of efficacy of this protocol, however, it is not clear as to its long-term viability. Therefore, we sought to evaluate the long-term outcome of our patients placed on a RSP.

Methods Used Between 1994 and 2011 we identified 100 heart transplant patients who underwent an RSP. 2-year endpoints included subsequent survival, freedom from cardiac allograft vasculopathy (CAV) $\geq 30\%$ by angiography, Non-Fatal Major Adverse Cardiac Events (NF-MACE: myocardial infarction, new congestive heart failure, percutaneous coronary intervention, implantable cardioverter defibrillator/pacemaker implant, stroke) and any-treated

rejection. Serum creatinine and glomerular filtration rates (GFR) were also evaluated post-RSP initiation.

Summary of Results RSP was successfully achieved in 65.0% (65/100) of the patients. However, 6.2% (4/65) who successfully completed the RSP resulted in return to CNI for various reasons (infectionx2, deep vein thrombosis, non-compliance). Of the patients who were maintained on the RSP for one year, the median time to RSP post-transplant was 5.8 years. Subsequent 2-year survival, the development of CAV, NF-MACE or any-treated rejection results were within expected rates as compared to historical data (see table). The change in GFR was slightly improved in these patients as opposed to an expected decrease.

Conclusions RSP late after HTx has lower success rate but does not appear harmful. For those successful patients on the RSP, long-term outcome appears acceptable.

11 THE RELIABILITY AND PREDICTABILITY OF THE NEW ISHLT PGD GRADING SCALE IN HEART TRANSPLANTATION

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10.1136/jim-2016-000365.11

Purpose of Study Primary graft dysfunction (PGD) in the past has been ill defined. Most recently, a consensus conference was held which define PGD in terms of mild, moderate and severe for the left ventricle (LV), and all inclusive of the right ventricle (RV). The new defining scale has not been tested in terms of its reliability and predictability of outcomes. In our large single center, we sought to test this hypothesis.

Methods Used Between 2011 and 2015 we evaluated 517 heart transplant patients for the development of PGD. PGD was predicated on the newly defined ISHLT criteria. Patients were categorized into LV PGD-mild, LV PGD-moderate and LV PGD-severe. These patients were then compared to non-PGD control within the same era. The specific types of therapy were included. Outcomes for each group included 30-day survival, 1-year survival, 1-year freedom from any-treated rejection, 1-year freedom from cardiac allograft vasculopathy (CAV) $\geq 30\%$ by angiography and 1-year freedom from Non-Fatal Major Adverse Cardiac Events (NF-MACE: myocardial infarction, new congestive heart failure, percutaneous coronary intervention, implantable cardioverter defibrillator/pacemaker implant, stroke).

Abstract 10 Table 1

Endpoints	RSP (n=59)
Subsequent 2-Year Survival	92.8%
Subsequent 2-Year Freedom from CAV	94.8%
Subsequent 2-Year Freedom from NF-MACE	96.3%
Subsequent 1-Year Freedom from Any-Treated Rejection	100.0%
GFR at RSP Initiation, Mean $\pm$ SD	34.3 $\pm$ 17.0
GFR 1-Year Post RSP, Mean $\pm$ SD	37.8 $\pm$ 17.0

Abstract 11 Table 1

Endpoints	No PGD (n=476)	LV PGD-Mild (n=5)	LV PGD-Moderate (n=22)	LV PGD-Severe (n=14)	Log-Rank P-Value
30-Day Survival	97.5%	100.0%	95.5%	71.4%*,***	<0.001
1-Year Survival	88.0%	100.0%	88.2%	53.8%*,***	<0.001
1-Year Freedom from CAV	93.3%	100.0%	90.0%	74.1%	0.268
1-Year Freedom from NF-MACE	89.8%	100.0%	77.0%	36.7%*,***	<0.001
1-Year Freedom from Any-Treated Rejection	85.2%	40.0%	89.2%	44.2%*,***	<0.001

*p<0.05 compared to No PGD group

**p<0.05 compared to LV PGD-Mild group

*** p<0.05 compared to LV PGD-Moderate group

Summary of Results The LV PGD-severe group had significantly reduced 30-day survival, 1-year survival and 1-year freedom from any-treated rejection compared to the no PGD and LV PGD-Moderate groups. There was also a significant reduction in 1-year freedom from NF-MACE in LV PGD-severe group compared to all groups. There was no significant difference in 1-year freedom from CAV for all groups.

Conclusions The ISHLT PGD scale appears to predict outcome with the most severe PGD resulting in the worst outcome (ie survival). Further investigation is warranted with a larger population to confirm these results.

12 THE SAFETY AND EFFICACY OF TACROLIMUS/PROLIFERATION SIGNAL INHIBITOR (PSI) VS CYCLOSPORINE/PSI AFTER HEART TRANSPLANTATION

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10.1136/jim-2016-000365.12

Purpose of Study The combination of cyclosporine (CsA) and PSI (sirolimus or everolimus), has been demonstrated to be effective and safe in heart transplant (HTx) patients. In large randomized trials, CsA/everolimus has been found to decrease the development of cardiac allograft vasculopathy (CAV) by intravascular ultrasound (IVUS). Since all the randomized trials were performed with CsA, it is not clear as to whether tacrolimus (TAC)/PSI has the same benefit and/or side effect profile compared to CsA/PSI.

Methods Used Between 2007 and 2014 we evaluated 65 HTx patients who have been treated with a PSI in the first year post-transplant. Patients were divided into those being treated with TAC vs CsA. 1-year subsequent outcomes were obtained which included survival, CAV $\geq$ 30% stenosis by angiography, Non-Fatal Major Adverse Cardiac Events (NF-MACE: myocardial infarction, new congestive heart failure, percutaneous coronary intervention, implantable cardioverter defibrillator/pacemaker implant, stroke), freedom from infection, any-treated rejection, and discontinuation of the PSI. Subsequent renal function was also assessed.

Abstract 12 Table 1

Endpoints	CsA+PSI (n=8)	TAC+PSI (n=57)	P-Value
Subsequent 1-Year Survival	87.5%	98.1%	0.102
Subsequent 1-Year Freedom from CAV	100.0%	96.3%	0.597
Subsequent 1-Year Freedom from NF-MACE	100.0%	98.1%	0.700
Subsequent 1-Year Freedom from Any-Treated Rejection	100.0%	94.5%	0.511
Subsequent 1-Year Freedom from Treated Infection	87.5%	66.8%	0.311
Subsequent 1-Year Change in GFR	20.0 $\pm$ 31.9	11.1 $\pm$ 20.2	0.349
PSI Discontinuation	50.0% (4/8)	35.1% (20/57)	0.454

Summary of Results Patients on TAC/PSI appear to have similar 1-year subsequent outcomes compared to CsA/PSI. Efficacy was similar in terms of 1-year subsequent survival, development of CAV, NF-MACE, any-treated rejection and change in GFR. Drug tolerability (PSI discontinuation) appeared to be slightly better in the TAC/PSI group, although this was not statistically significant.

Conclusions The combination of TAC/PSI and CsA/PSI appears to be comparable in terms of 1-year subsequent outcomes. Larger numbers will need to be included to confirm these findings.

13 LARGE NATIVE MITRAL VALVE THROMBUS

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10.1136/jim-2016-000365.13

Case Report After an elective cystectomy a patient develops post-operative atrial fibrillation, revealing a surprising new finding and a challenging diagnosis.

The 77 year old man had a subacute history of enterococcus bacteremia but no cardiovascular symptoms or prior cardiac history. Physical examination revealed a diastolic murmur at the upper left sternal border and a holosystolic murmur at the apex. Transesophageal echocardiogram identified a 2.2 $\times$ 1.5 cm mass on the mitral valve (MV), 3+ aortic valve (AV) regurgitation, and 2+ MV regurgitation with intact ejection fraction. A presumptive diagnosis of AV Enterococcus endocarditis with infiltration to the MV causing a large aneurysm was made. Therapy with vancomycin was started.

Cardiac surgery confirmed a large polypoid, encapsulated mass on the anterior mitral leaflet which was successfully excised. There was no gross evidence of endocarditis and blood and valvular cultures were negative, ruling out endocarditis. The pedunculated appearance of the mass aroused suspicion for cardiac malignancy or myxoma. However, surgical pathology revealed that the MV mass was an intramural thrombus.

We present a complex case of an elderly man that presented with post-operative atrial fibrillation after elective surgery who was found to have a large MV thrombus on his native MV. This case is an example of an unusual type of native valve mass and emphasizes the necessity of considering uncommon as well as common causes. Physicians infrequently encounter thrombi of native valves and treatment

Abstract 13 Figure 1

Abstract 13 Figure 2

strategies remain controversial. We share an example of a successful surgical excision in a medically complex patient.

14 COMPARISON OF OUTCOMES AND COSTS FOR PROTEIN LOSING ENTEROPATHY FOLLOWING SINGLE VENTRICLE PALLIATION FOR RIGHT AND LEFT VENTRICLE MORPHOLOGY

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10.1136/jim-2016-000365.14

Purpose of Study Single ventricle (SV) congenital heart defects (CHD) occur in 5 of 100,000 births. Patients are born with a single morphologic right ventricle (RV), e.g. hypoplastic left heart syndrome (HLHS); or single morphologic left ventricle (LV), e.g. Tricuspid Atresia (TA). Palliation includes staged surgery, typically over the first 4 years of life, culminating in a Fontan procedure. Protein losing enteropathy (PLE) is a potentially deadly lymphatic complication following the Fontan. We examined the difference in the frequency of developing PLE in patients with single RV vs single LV and compared outcomes and costs between patients with and without PLE.

Methods Used After IRB approval, we performed a retrospective review of the University Health System Consortium Clinical Data Base/Resource Manager from 2012 to 2015 for patients aged 2–30 years. This age range was chosen to maximally capture patients after Fontan. SV patients were identified by an ICD-9 diagnostic code for either HLHS (746.7), TA (746.1), or common ventricle (745.3). Admissions with PLE were identified by the diagnosis of “Other specified intestinal malabsorption”. Primary diagnosis, age at admission, length of stay (LOS), direct hospital costs, ICU admission rate, mean ICU LOS and mortality rate were collected. Outcomes and costs were compared between admissions with and without PLE using independent *t*-test for continuous variables and χ -square or Fisher’s exact test, as appropriate, for categorical variables.

Summary of Results Of 2726 total SV admissions, 1456 (53.4%) had HLHS and 642 (23.6%) had TA; of the HLHS and TA admissions, 150 (10.3%) and 44 (6.9%), respectively, had PLE. Admissions with PLE had longer total and ICU LOS, more complications, higher in-hospital mortality and higher costs. The rate of PLE and costs were higher in HLHS compared to TA ($p < 0.001$ and $p < 0.012$ respectively).

Conclusions In review of a national database, single RV morphology CHD was associated with a higher rate PLE. In addition, the associated hospital morbidities and costs were higher in RV vs LV SV CHD.

15 EXTRACORPOREAL MEMBRANE OXYGENATION (ECMO) TO MECHANICAL CIRCULATORY SUPPORT (MCS) AS A BRIDGE TO TRANSPLANTATION: LIFE SAVING

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10.1136/jim-2016-000365.15

Purpose of Study ECMO is used for cardiogenic shock as a bridge to heart transplantation (HTx) or MCS. Currently, ECMO is considered the highest urgency group for donor heart allocation (DHA) in the US. Patients (pts) on ECMO after HTx have been reported to have poor outcomes. The outcome of pts who undergo ECMO then MCS and proceed to HTx appear better than ECMO directly to HTx but is not well established. We sought to assess the outcomes of ECMO to direct HTx vs ECMO to MCS followed by HTx especially in light of the new DHA scheme.

Methods Used Between 2010 and 2015 we identified 20 pts who developed cardiogenic shock and underwent ECMO. We divided pts who went directly to HTx and those who went to MCS then HTx. Non-ECMO Pts who went from MCS to HTx were designated as a control. Outcomes for these three groups post-Tx included 1-yr survival, 1-yr freedom from cardiac allograft vasculopathy (CAV) as defined by stenosis $\geq 30\%$ by angiography, 1-yr freedom from Non-Fatal Major Adverse Cardiac Events (NF-MACE: myocardial infarction, new congestive heart failure, percutaneous coronary intervention, implantable cardioverter defibrillator/pacemaker implant, stroke) and 1-yr freedom from any-treated rejection (ATR).

Summary of Results Pts who underwent ECMO directly to HTx have poor survival compared to pts who underwent ECMO to MCS to HTx or went directly from MCS to HTx (control). Risk factors including renal and liver function were worse in ECMO to HTx compared to the other two groups. Other outcomes including 1-yr freedom from CAV, NF-MACE and ATR were not significantly different among groups (see table).

Conclusions Heart failure pts who develop cardiogenic shock and are placed on ECMO appear to have increased post-Tx mortality if they go directly to HTx as opposed to MCS and then HTx. This places into question having ECMO (directly to HTx) as the highest status as opposed to stabilization with MCS prior to HTx. More pts are needed to confirm these observations.

Abstract 15 Table 1

Endpoints:	ECMO			Log-Rank P-Value
	ECMO to HTx (n=4)	to MCS to HTx (n=16)	MCS to HTx (n=114)	
1-Year Survival	50.0%	87.5%	96.5%	0.504
1-Year Freedom from CAV	75.0%	85.7%	90.7%	0.201
1-Year Freedom from NF-MACE	100.0%	79.8%	87.1%	0.598
1-Year Freedom from Any-Treated Rejection	50.0%	85.6%	82.1%	0.634
1-Year Freedom from Dialysis	100.0%	100.0%	88.9%	0.329

Endocrinology and Metabolism I

Concurrent Session

12:45 PM

Thursday, January 26, 2017

16 CUSHING SYNDROME: A RARE AND DEADLY CASE

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10.1136/jim-2016-000365.16

Case Report 18-year-old female with polycystic ovarian syndrome (PCOS) and hypertension presented with 1.5 months of worsening bilateral pedal edema resulting in difficulty ambulating. She initially presented to her PCP with bloating, abdominal pain, acne, hirsutism, stretch marks on her abdomen, and generalized weakness. Her menstrual cycles had been regular. On exam, she was obese with a buffalo hump. She had acne, facial hirsutism, hepatomegaly, abdominal striae, and bilateral +4 pitting edema with weeping over her ankles. Echocardiogram showed normal cardiac function.

Cushing syndrome was suspected. A 1 mg dexamethasone suppression test showed non-suppressible cortisol of 48.5 mcg/dL, which was followed by an 8 mg suppression test, which showed non-suppressible cortisol level of 56.9 mcg/dL ruling out Cushing's disease. She had elevated 17 hydroxyprogesterone (17OHP) 738 ng/dL, dehydroepiandrosterone sulfate (DHEA-S) >1000 ug/dL, and testosterone 71.4 ng/dL. These combined with CT images showed right suprarenal mass with significant metastases to the liver led to the diagnosis of adrenocortical carcinoma (ACC). This was confirmed on liver biopsy. She was placed on treatment ARAR0332 with Cisplatin, Etoposide, and Doxorubicin and oral Mitotane. Metyrapone was initiated for medical management of Cushing syndrome. Unfortunately, her disease progressed rapidly and within three weeks of her admission to the hospital, she passed.

The differential for virilization of an adolescent female includes Cushing's syndrome, hyperprolactinoma, hypothyroidism, congenital adrenal hyperplasia, adrenal tumor, virilizing ovarian tumor, and exogenous exposure. Laboratory testing with DHEA-S, 17OHP, testosterone, prolactin, and TSH can narrow the diagnosis. In our patient, the extremely elevated DHEA-S and elevated cortisol were indicative of ACC. ACC is a rare malignancy with an incidence of 1–2 per 1 million cases per year. Both glucocorticoid and androgen production can increase in ACC, thus presenting as Cushing syndrome with acne, hirsutism, purple striae, virilization, and a buffalo hump. Five-year survival for all stages is 22–34%. Our patient's disease was aggressive, which highlights the importance of laboratory evaluation in hyperandrogenism to differentiate from its more common benign presentation.

17 RECURRENT HYPERPARATHYROIDISM IN A PATIENT WITH MEN 1 AFTER MULTIPLE PARATHYROIDECTOMIES AND REMOVAL OF PARATHYROID IMPLANT

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10.1136/jim-2016-000365.17

Classic multiple endocrine neoplasia type 1 (MEN1) is a genetic disorder with an autosomal dominant inheritance pattern. It is characterized by a predisposition to tumors of the parathyroid glands, anterior pituitary, and pancreatic islet cells although tumors may be found at other sites. The prevalence of MEN1 is approximately 2 per 100,000. Primary hyperparathyroidism (HPT) is the most common component, and multi-gland disease is common. Debate exists regarding the type of surgery recommended. In some cases, the recurrence rate has been greater than 50%.

We describe a 52 year-old woman with MEN 1 that first manifested in her 20's with HPT and a prolactinoma. She underwent an open parathyroidectomy with removal of an adenoma in 1986. She developed recurrent HPT in the 1990s and had two additional neck surgeries removing the remaining identified parathyroid glands with implantation into her right forearm. In 2000, she was diagnosed with a gastrinoma, recurrent HPT, hypercalciuria, and nephrolithiasis. Parathyroid hormone levels (PTH) were checked proximal to her implant and in the opposite arm without lateralization. A neck ultrasound demonstrated a mass inferior to the right lobe of the thyroid while a sestamibi scan showed uptake in this area as well as over the right forearm. Selective venous sampling determined that the source of her PTH was from the right neck mass. She subsequently underwent her fourth neck surgery with removal of a parathyroid adenoma. Two years later, she redeveloped HPT with intermittent hypercalcemia. A neck ultrasound and sestamibi scan were both negative. PTH sampling localized the source to the implant, with all identified tissue removed. She continues to have intermittent symptomatic hypercalcemia with elevated PTH levels complicated by nephrolithiasis with hydronephrosis and chronic kidney disease, stage 3. Localization studies including a sestamibi scan with SPECT-CT, neck ultrasound, and venous sampling have failed to localize the source of her PTH.

In this presentation, we will discuss hyperparathyroidism associated with MEN 1. We will review in more depth, this patient's complicated course, localization modalities for the source of PTH, potential etiologies for this patient's HPT, and treatment strategies.

18 LOW-DOSE ANDROGEN SUPPLEMENTATION POSITIVELY EFFECTS BODY FAT PERCENTAGE IN BOYS WITH KLINEFELTER SYNDROME

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10.1136/jim-2016-000365.18

Purpose of Study One in 600 boys are born with an extra X chromosome, known as Klinefelter syndrome (KS). KS results in testicular failure, androgen deficiency, and cardiometabolic morbidity and mortality. Previous studies have shown boys with KS have a high percent body fat (%BF), but androgen supplementation in childhood is not standard of care. Our objective was to determine if androgen supplementation improved %BF in prepubertal boys with KS.

Methods Used 93 boys with KS age 4–12 years were randomized 1:1 to receive oxandrolone (0.06 mg/kg/day) or placebo for 2 years. Investigators and subjects were blinded

Abstract 18 Figure 1

to allocation. Primary outcome was %BF standard deviation score (SDS) by skin folds at 2 years. Secondary outcomes included additional measures of cardiometabolic health and safety.

Summary of Results %BF SDS was lower in the treatment group (0.29 ± 0.76 SDS) compared to placebo (0.81 ± 0.72) after adjusting for age and baseline %BF SDS ($p=0.009$). The treatment group also had lower triglycerides ($p=0.04$) and a trend toward lower fasting blood glucose ($p=0.084$), however oxandrolone treatment did have the unintended effects of lowering HDL, increasing height SDS, and advancing bone age.

Conclusions Two years of low-dose androgen supplementation had positive effects on measures of cardiometabolic health in pre-pubertal boys with KS. Treatment was overall well tolerated, however did lower HDL and advance skeletal maturation. The long-term effects of low-dose androgen treatment in boys with KS warrant further study.

19 METABOLIC EFFECTS OF ANDROGEN-ASSOCIATED BODY MASS IN KLINEFELTER SYNDROME

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10.1136/jim-2016-000365.19

Purpose of Study Patients with Klinefelter Syndrome (KS) are at increased risk for diabetes and cardiovascular disease. While the anabolic effects of androgen replacement therapy may be associated with weight gain in such patients, the metabolic effects of this weight gain are unknown. Since KS represents a natural model of androgen deprivation, we hypothesized that KS patients who are receiving androgen replacement would have an unhealthier metabolic risk factor profile, as well as an increased Body Mass Index (BMI), than patients who were not receiving androgen replacement.

Methods Used Using de-identified data collected from Health Facts (a national, consolidated, relational database of Electronic Health Records), we identified 1712 adult

Abstract 19 Table 1

Variable	Androgen Receiving (n=74)	No Androgen (n=178)	p-value
BMI (kg/m ²)	34.7±9.3	31.4±7.6	0.007
Age (years)	41±14	40±13	0.34
A1C (%)	7.1±2.3	6.9±2.1	0.66
Total Chol (mg/dl)	173±38	176±49	0.78
HDL Chol (mg/dl)	40±8	40±13	0.80
LDL Chol (mg/dl)	104±32	96±31	0.28
Triglycerides (mg/dl)	200±189	225±248	0.65
SBP (mmHg)	144±21	145±25	0.68
DBP (mmHg)	85±16	89±16	0.08

patients with an ICD-9 diagnosis code for KS. Of these, 252 patients had a full dataset that included anthropometrics, metabolic profiles, and information about androgen replacement. Multiple linear regression analysis was performed using BMI as the dependent variable in a model that included age, androgen replacement therapy (yes or no), A1C, blood pressure, and fasting lipids. Post-hoc comparisons were made using the unpaired Student's *t*-test.

Summary of Results There were 74 patients with KS who received androgen replacement and 178 who did not. In multiple regression, only androgen therapy was positively and significantly associated with BMI while adjusting for other risk factors ($p=0.03$). As shown in the Table, *post-hoc* comparison of metabolic risk factors revealed no other differences between patients who received androgen replacement and those who did not (Mean±SD).

Conclusions Androgen replacement therapy in Klinefelter Syndrome is associated with increased BMI, but this increase does not appear to exert a detrimental effect on other metabolic risk factors in this condition.

20 DETERMINING IF THERE IS AN ASSOCIATION BETWEEN CLINICAL MEASURES AND THE NUMBER OF SEVERE CO-MORBIDITIES IN PATIENTS WITH TYPE 2 DIABETES

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10.1136/jim-2016-000365.20

Purpose of Study Type 2 diabetes affects 9.3% of the US population. Conflicting results were reported between the association of glycated hemoglobin A1c and comorbidities. This study aimed to identify the association between the number of moderate-severe comorbidities and clinical measures (HbA1c, low density lipoprotein (LDL), blood pressure (BP), nephropathy, retinopathy, neuropathy, dentition, and Body-Mass Index (BMI)).

Methods Used A retrospective chart review was conducted based on patients who visited the Western Diabetes Institute between 6/1/2014 and 6/30/2016. The number of

moderate-severe comorbidities were categorized into “low (0–2)”, “intermediate (3–4)” and “high (5–8)” based on the Diabetes Cross-Disciplinary Index (DXDI). The clinical measures were categorized into three categories, “mild (1–2)”, “moderate (3)” and “severe (4–5)” based on the DXDI score.

Summary of Results Among the final 161 patients with type 2 diabetes included in the final analysis, half (56.5%, $n=91$) were female, 81.9% ($n=127$) were Hispanic, and the average age was 56.5 (SD 12.3) years. A statistically significant association was detected between the number of moderate-severe comorbidities and LDL ($p=0.0372$), BP ($p=0.0465$), nephropathy ($p=0.0153$), retinopathy ($p=0.0014$), neuropathy ($p=0.0698$), and BMI ($p=0.0497$). There is also a statistically significant difference in the duration of type 2 diabetes among the number of moderate-severe comorbidities groups ($p=0.0191$).

Conclusions The number of moderate-severe comorbidities was associated with worse clinical measures, such as LDL, BP, nephropathy, retinopathy, neuropathy, and BMI, but not HbA1c and dentition. Future cohort research is needed to establish a causal relationship between the number of moderate-severe comorbidities and clinical measurements.

21 REPROMETABOLIC SYNDROME MEDIATES SUBFERTILITY IN OBESITY

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10.1136/jim-2016-000365.21

Purpose of Study Studies of multiple measures of reproductive health in obese and normal-weight women show that reproductive dysfunction and obesity go hand-in-hand. In addition, previous research has identified dysregulation of the pituitary-ovarian axis as a possible cause for the observed decrease in fecundability of obese women. To investigate whether experimentally controlled high levels of free fatty acids (FFAs) and insulin in normal women are necessary and sufficient to bring about a transient decrease in pituitary sensitivity to gonadotropin-releasing hormone (GnRH), similar to that seen in obese women.

Methods Used We will recruit 10 regularly cycling, non-diabetic, normal-weight women, and each will receive infusions of FFAs and insulin over a period of 6 hours. Pituitary sensitivity will be assessed by measuring the pulsatility and levels of luteinizing hormone (LH) and follicle stimulating hormone (FSH) in frequent blood samples taken during infusions, and after a single bolus of GnRH.

Summary of Results Results are pending completion of the study. Women who have taken part so far have tolerated the experimental treatment well, and results from their frequent blood samples are currently being assayed for LH and FSH.

Conclusions If hyperinsulinemia and elevated FFAs are necessary and sufficient experimental conditions to elicit

pituitary dysregulation in normal weight women, we expect to see decreases in the amplitude, but not frequency, of LH and FSH peaks over time, as we have seen in obese women and in our pilot studies. We also expect to see decreases in the LH and FSH response to a single bolus of GnRH.

22 ADENINE DOSE STUDY MODELING CHRONIC KIDNEY DISEASE FOR ONE MONTH IN OLDER MALE AND FEMALE BALB/C MICE

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10.1136/jim-2016-000365.22

Purpose of Study Chronic kidney disease (CKD) causes mineral loss in bone but gain in cardiovascular and renal tissues and may cause early death. Our target patient population is mature adults; therefore, we desire a method suitable for modeling CKD in older mice. Bone changes occur slowly; therefore, we desire a model in which animal survival is robust despite renal damage. Adenine added to the mouse diet precipitates in the kidney and induces damage. This method has been used to model CKD in younger mice. However, it has never been applied to older mice. This preliminary study tests different doses of adenine in the diet, given over a one-month period, in older male and female mice.

Methods Used Male and female BALB/c mice were obtained from the NIH/NIA aged rodent colony at 24 weeks of age (analogous to ~30 year-old humans). All animals received the base casein diet for the first seven days. Then, four different doses of adenine (in the casein diet) were administered in a 7-day induction phase followed by a 21-day maintenance phase. The four doses were 0.30% induction / 0.20% maintenance; 0.30% / 0.15%; 0.20% / 0.15%; and 0.20% / 0.10%. Control was the base casein diet. Mice were individually housed ($N=10$ total, 1 mouse/sex/diet). Body masses were measured three times per week until death or euthanasia due to low body mass. Kidneys were sectioned at 5 μm and analyzed via H&E, PAS, and von Kossa staining.

Summary of Results All adenine treated mice lost body mass >30% and most died before study end. Females died faster than dose-matched males. The lowest dose of adenine led to abnormal kidney histology. Alterations included dilated tubules and Bowman's spaces, peritubular leukocytes, and mineralization of tubular structures. Control mice did not lose body mass and had normal kidney histology.

Conclusions Adenine can be used to model CKD – induced through tubulointerstitial nephropathy—in older mice; however, a low dose of adenine should be used. A low dose of 0.2% adenine for seven days followed by 0.1% adenine for 21 days is sufficient to model CKD but may result in early death.

Health Care Research I

Concurrent Session

12:45 PM

Thursday, January 26, 2017

23 GLYCATED HEMOGLOBIN BY POINT-OF-CARE ANALYZERS: COMPARING RESULTS FROM TWO PORTABLE DEVICES VERSUS HOSPITAL LABORATORY RESULTS

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10.1136/jim-2016-000365.23

Purpose of Study Due to inaccuracies in 7 recent results of glycated hemoglobin (HbA1c) measured by a Point-of-Care (POC) analyzer, we made direct comparisons of results from a hospital laboratory (HL) versus those from two POC analyzers.

Methods Used Healthy nondiabetic healthcare staff (N=60, age 24–81, 19% male) agreed to give 5 ml of venous blood at the same time as lancet fingertip samples while seated in non-fasting status after giving informed, IRB-approved consent. Known hemoglobin variants and hemolytic or other anemias were exclusions. Lancet samples were analyzed immediately by POC-A and POC-N devices. Venous blood went promptly to the HL for HbA1c measurement. Discordant results were deemed those which were 0.3 percentage points away from the HL value, either above or below. Results were compared by t-tests, linear correlation, and Bland-Altman (B-A) plots.

Summary of Results Evaluable sets (N=56) of HbA1c by the 3 analyzers were obtained. Mean values agreed closely – POC-A: 5.37+0.74 SD; POC -N: 5.40+0.86; HL: 5.39 +0.80. Linear correlation r values were: POC-A vs. POC-N, 0.916; POC-A vs. HL, 0.960; POC-N vs. HL, 0.942. HbA1c results were discordant in 6 POC-H values: 4 lower (mean -0.4) and 2 higher than HL (mean +1.1, misclassifying as diabetic). Results were discordant via POC-A for 3 participants: 2 less than HL values (mean -0.4) and 1 higher (+1.0, but not misclassifying). B-A plots are pending. One participant was newly diagnosed with diabetes (HbA1c=10.2HL, 10.2, 10.4).

Conclusions This pilot study found close agreement of mean values of HbA1c from two POC analyzers compared to a HL in blood samples healthy, non-diabetic volunteers, similar to persons who participate in wellness programs of employers and community health groups. Six discrepancies (10.7%) were found with the POC-N analyzer, lower by 0.1 in four persons, but 1.1 higher in two. The 3 discrepancies (5.4%) in POC-A results included 2 lower (mean 0.4) and 1 higher (1.0). The cause(s) of the disparate results

are unclear, warranting investigation in larger groups. Careful technique using such portable POC analyzers can yield accurate HbA1c results in the above settings.

24 HOW CLINICIANS ANTICIPATE/PERCEIVE THE IMPACT OF WHOLE GENOME SEQUENCING ON ICU CARE CHOICES

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10.1136/jim-2016-000365.24

Purpose of Study NIH is putting considerable funding towards whole genome sequencing (WGS) with the idea that every newborn could have their genome sequenced at birth and it could be used throughout the rest of the child's life to guide prevention and be more alert to early manifestations of a disease, replacing current neonatal screening tests. However, the impact of WGS on acute care decisions is unknown. Given the complexity of disease and the highly invasive and costly procedures required for children with congenital heart disease (CHD), the care of this patient population often involves difficult clinical decisions, end of life care questions, and rationing discussions among clinicians and families. We sought to determine how the knowledge derived from WGS might alter clinician attitudes towards different potential bedside care choices for critically ill children with CHD.

Methods Used We used a qualitative approach, conducting open-ended, in person interviews with physicians and nurses involved in the care of critically ill children with CHD at a high-volume pediatric heart center. Interviews were audio-taped, transcribed, coded and analyzed as the data was being generated, incorporating methods from grounded theory, until saturation was reached.

Summary of Results 38 clinicians were interviewed. Themes include: WGS in determination of futility; WGS for prognostication; implications of WGS for care optimization (eg pharmacogenomics); pre-natal or pre-conception WGS and impact on care; WGS and liability; WGS guided rationing of scarce resources.

Conclusions Clinicians already ration scarce resources in children by the genetic information we currently have both for solid organ transplantation as well as heroic resources, like extra-corporeal membrane oxygenation (ECMO). Interviewed clinicians anticipate WGS derived knowledge has the potential to expand the findings that may be used as justification to withhold certain therapeutic options, to decide the futility of others and to ration scarce resources, such as organ transplantation, to one patient over another. Whether this should be considered a benefit or a burden of WGS may vary for different patients and different care situations. Informed consent for WGS testing, given its perceived potential impact on clinical care in the form of justification of rationing and futility, will be very important.

25 MULTIDISCIPLINARY CLEFT PALATE PROGRAM AT BC CHILDREN'S HOSPITAL: ARE WE MEETING THE STANDARDS OF CARE?

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10.1136/jim-2016-000365.25

Purpose of Study Orofacial clefting is one of the most common congenital anomalies in North America. Multidisciplinary clinics create treatment plans for patients based on team expertise and recommendations from the American Cleft Palate-Craniofacial Association (ACPA). The cleft palate program (CPP) at BC Children's Hospital is composed of the craniofacial (CF), cleft palate (CP), and jaw clinics. To date, no evaluation has been conducted of the CPP to determine if standards of care are being met. Our objective was to characterize current CPP practices and evaluate appointments with respect to timeliness according to ACPA population guidelines and CPP patient specific recommendations.

Methods Used A retrospective review of CPP patient appointments from November 2012 to March 2015 was done. Data was analyzed using descriptive and inferential statistics.

Summary of Results 1214 appointments were considered in the analysis, including syndromic and non-syndromic patients of 0 to 27 years of age. Our results show patients five years and younger or non-syndromic were more likely to be seen on time ($p < 0.001$). No relationship between the timeliness of an appointment and specific patient diagnoses or distance to clinic was found. With the exception of nursing (97% of appointments were on time), all disciplines had less than 45% of appointments on time with 51% of appointments meeting ACPA guidelines for timeliness and 32% of all appointments meeting CPP recommendations.

Conclusions Timely care for the cleft/craniofacial patient populations represents a challenge for the CPP. Although half of patients may meet the general ACPA guidelines, only 32% of patients are meeting the CPP patient specific recommendations. To provide better patient care, future adjustments are needed, which may include improved resource allotment and program support.

26 EFFECT OF SYSTEM CHANGES ON NEONATAL OUTCOMES IN A NEWBORN UNIT IN RURAL KENYA

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10.1136/jim-2016-000365.26

Purpose of Study Neonatal mortality rate in Kenya remains a challenge with 56% of infant deaths in Kenya occurring in the first month of life, most of them occurring in health facilities. The objective of this study was to determine the effectiveness of a multifaceted quality improvement intervention (QI) in a newborn unit (NBU) in a rural hospital in Kenya over a period of three years.

Methods Used The study took place at Naivasha Sub-county hospital, Kenya between Oct 2013 and Aug

Abstract 26 Figure 1

2016. At inception we performed an audit of NBU outcomes to determine causes and quantity of neonatal deaths. The hospital formed a multidisciplinary QI team (nurses, clinicians, hospital and county health administrators) who engaged in monthly root cause and systems analysis meetings and completed a benchmarking visit to a tertiary facility. NBU staff completed training courses including Helping Babies Breathe, and Emergency Obstetric Care and participated in weekly problem based small group training sessions. The hospital created high risk rooms for ill mother and babies, a triage room for new admissions and introduced antibiotics for sepsis to at-risk mothers and babies. We abstracted aggregated monthly NBU mortality data from the hospital database (Baseline/QI intervention phase: Oct 2013-Jul 2015; post-intervention/maintenance phase: Aug 2015- Jul 2016).

Summary of Results A total of 3968 children were admitted to the NBU, 2209 and 1759 during pre- and post-intervention periods respectively. The mean monthly patient count in the NBU increased from 100 (range: 40–143) to 146 (range: 94–180) per month between time periods ($p < 0.05$). Monthly mean all-cause neonatal mortality rates in the NBU decreased from 13% to 7% ($p < 0.05$) between periods (Figure 1)

Conclusions Improvement in neonatal outcomes is achievable when consistent efforts to improve the care processes are made. Involvement of stakeholders has been key factor in achieving these successes.

27 IMPROVING THE EFFECTIVENESS OF A MALNUTRITION TREATMENT PROGRAM IN GUJARAT, INDIA

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10.1136/jim-2016-000365.27

Purpose of Study Malnutrition affects almost half of India's children under 5 years of age and is a major contributing factor to childhood mortality. In response, the government of India has launched child malnutrition programs across the country for facility based management of severe acute malnutrition (SAM) in child malnutrition treatment centers (CMTC), which has resulted in variable success. The purpose of this study is to assess the impact of a quality improvement intervention in a CMTC on weight and health outcomes in children completing a facility based treatment course for SAM.

Methods Used This study took place in Mota Fofalia Pediatric Center and CMTC in Vadodara district in rural

Gujarat, and included all children admitted for SAM between July 1 2011–Oct 31 2012 (pre-intervention baseline) and Sept 1 2014–Feb 28 2016 (post-intervention). All children were treated according to the national standard CMTC protocol for nutritional rehabilitation. Between the pre and post-intervention studies, a group of India and University of Utah pediatricians developed specific operational guidelines for the CMTC based on the national standard protocol, developed tools to facilitate best practice (standardized medical record, standardized treatment orders with decision support, medication administration sheet), and provided standardized training to staff and patients. Demographics as well as pre- and post-intervention nutrition and health outcomes were abstracted from the medical record at the CMTC.

Summary of Results CMTC treatment outcomes of 138 children in the pre-intervention and 137 children in the post-intervention study were analyzed. Between the baseline and post-intervention studies, average weight gain during CMTC treatment improved from 260 g or +0.26 SD in the weight-for-age growth chart to 554 g or +0.54 SD ($p < 0.01$). In the pre-intervention study, only 2/138 or 1.5% of children achieved the target weight gain of 10%. In the post-intervention study, 34/137 or 24.8% of children achieved target weight gain ($p < 0.05$).

Conclusions Supporting government guidelines and clinical service delivery with an educational and operational intervention resulted in improved nutritional outcomes of children admitted for SAM.

28 THE ADVOCACY ROLE OF PHYSICIANS IN UGANDA

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10.1136/jim-2016-000365.28

Purpose of Study Physicians have many roles in patient care, including patient advocacy. In Uganda, 70% of health care expenses are out of pocket, and cost is a major barrier to accessing health care that may impact medical care. The Uganda Medical and Dental Practitioners Council (UMDPC) regulates standards of practice, but there are minimal resources regarding physician roles and a paucity of research on these roles in Uganda. This study aims to gain deeper insight into what physicians at Soroti Regional Referral Hospital (SRRH) feel their role is regarding patient advocacy in the context of inability to pay for medical investigations. Specifically, we examined the factors limiting physicians' roles as a health advocate.

Methods Used A qualitative study was completed consisting of focus groups, semi-structured interviews, and questionnaires of physicians at SRRH. Information was collected regarding patients whose medical investigations were foregone due to lack of funds.

Summary of Results There were 22 interns and 8 specialists ($n = 30$) who participated in a total of 7 focus groups and 12 semi-structured interviews. A thematic analysis was undertaken which produced nearly 40 codes. The major themes regarding doctors' advocacy were 1) personal/individual level 2) lobby government officials 3)

administration/assembly 4) education of patients. The themes with respect to health advocate limitations included 1) fear of persecution 2) lack of formal education 3) ineffective avenues for advocacy. It was estimated that radiologic investigations and basic blood labs were most often foregone due to lack of funds. These investigations should be covered publicly but were often unavailable due to machine dysfunction, causing patients to seek care at private institutions. Finally, 93% of doctors had paid for an investigation out of their own pocket for a patient.

Conclusions Physicians at SRRH have similar perceptions regarding their roles as health advocates. The roles do have some overlap with High Income Countries but stark differences can be seen in the limitations of being a health advocate. The UMDPC could utilize the findings of this study to take action to reduce the barriers for being an advocate. Furthermore, the UMDPC can begin to define the role of a physician to fit the cultural context of Uganda.

29 PERCEIVED BARRIERS TO DIABETES DIETARY ADHERENCE: DIVERGENCE BETWEEN PATIENTS AND PROVIDERS

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10.1136/jim-2016-000365.29

Purpose of Study Diet plays a key role in diabetes self-management. Adherence to dietary goals is strongly influenced by barriers to self-management, especially among low income minority populations. Patients in health care settings receive dietary education from a range of health care providers, including physicians, nurses, dietitians, diabetes educators, and other staff, yet little is known about whether patients and providers perceive these barriers similarly.

Methods Used To improve the effectiveness of dietary education in a single, large safety net health center serving predominantly low-income minority patients in South Los Angeles, we undertook a survey of providers/staff (PS; $n = 53$) and patients (Pa; $n = 100$) to identify barriers to dietary adherence. Pa (58.5 $\pm$ 8.3 y, 69% female) surveyed at scheduled clinic visits were primarily Hispanic (H, 65%) and African American (AA, 34%). Questionnaires were tested for basic language and cultural competency prior to use.

Summary of Results 41% of Pa acknowledged the presence of ≥ 5 barriers; only 6% of patients cited no barriers. The survey revealed that for Pa, difficulty giving up unhealthy food (74%), expense of healthy food (54%), and difficulty accessing nutrition education (46%) were the 3 most frequently identified barriers to meeting dietary goals. No difference was observed in the top 3 barriers between H and AA Pa. However, H Pa reported a greater total number of barriers than AA Pa (4.12 $\pm$ 2.46 vs. 3.85 $\pm$ 2.31, $P < 0.0001$). When comparing Pa and PS perceptions of barriers to meeting dietary goals, markedly divergent perceptions of the importance of 12 out of 13 barriers ($p < 0.05$ – 0.001) was observed. PS failed to identify

the most common barriers that their Pa reported, with the exception of difficulty giving up unhealthy food (82%), which P/S also identified as the top barrier perhaps because it is a barrier that is universally understood.

Conclusions In summary, many barriers acknowledged by Pa were anticipated, but the divergence between Pa and PS perception of their importance was not. We conclude that preconceived ideas of barriers to dietary adherence do not match actual Pa perception, with the possible exception of barriers that may be universal.

30 BEYOND AN ACADEMIC EXERCISE: EXPANDING THE ROLE OF STUDENT HOME VISIT PROGRAMS TO EVALUATE PATIENTS' EXPERIENCE OF CARE

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10.1136/jim-2016-000365.30

Purpose of Study Bringing the patient's voice into quality improvement is a critical step in promoting patient-centered care. Patient feedback is often gathered in surveys, but numerical data do not always convey patient priorities. Although resource-intensive, patient interviews are an effective way to identify strategies to improve care.

Methods Used UC Davis first-year medical students completed three home visits, including one in which they administered an open-ended quality improvement (QI) questionnaire. Students reflected on their patients' answers and submitted a 1–2 page de-identified narrative. We collected 102 narratives for analysis. Themes were identified and patient feedback was summarized.

Summary of Results 264 quotes were abstracted from 102 essays and coded by content analysis into thematic categories describing ideal healthcare based on the Institute of Medicine's quality domains: Patient-Centered (120), Equitable (50), Efficient (30), Effective (24), Timely (21), and Safe (19). Themes abstracted from the narratives identified the patients' values and priorities, most commonly patient-centered care (46% of the quotes). Emotional support, trust, and respect for patients' values were especially appreciated within patient-centered care. Equitable care, including for age, ethnicity, and socioeconomic status, was also highly prioritized (19%). Fewer patients mentioned efficiency, effectiveness, timeliness, or safety.

Conclusions In conclusion, medical student home visit narratives provided valuable qualitative data on patients' experiences of care. Our patient feedback highlights how critical patient-centeredness is to excellent medical care. The specific examples and patient-generated solutions from the narratives will be used to develop more targeted quality improvement initiatives. The effectiveness of these initiatives in changing clinician behavior and hospital practices can then be evaluated.

31 STUDENT SATISFACTION AND THE VALUE OF PARTICIPATION IN A STRUCTURED MEDICAL STUDENT RESEARCH PROGRAM

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10.1136/jim-2016-000365.31

Purpose of Study In this study we seek to understand student satisfaction and the value that medical students receive by participating in a funded and mentored medical student research program at the University of Washington School of Medicine, the Medical Student Research Training Program (MSRTP).

Methods Used From 2004–2016 the MSRTP program funded 549 projects. This study sought survey participation from students and alumni who completed the MSRTP project during this time period. Survey solicitation was via email and respondents completed an online survey, designed by this study's investigators, and delivered on the Survey Monkey platform. The survey response rate was 48% (n=160) among verified recipients of the survey invitation (n=336).

Summary of Results Survey respondents demonstrated satisfaction with their MSRTP experience and the value they received from participating in the MSRTP program, in three areas: critical thinking ability, mentorship quality, and career preparation. In response to questions about critical thinking ability, 78% of respondents' report that the program increased their critical thinking ability, with additional improvements in clinical competence and the ability to practice evidence based medicine. Showing high satisfaction in mentorship quality, 93% of survey participants report that MSRTP mentors met or exceeded expectations and 88% reported that they had ownership of their project. In the area of career preparation, 80% of survey respondents felt that the program had made them better prepared to produce research/scholarly work and 94% would recommend the program to medical students interested in a medical career with research/scholarly work. Additional survey questions showed an increased motivation to produce scholarly work and an increased ability to compete for residency placement.

Conclusions The MSRTP program at the University of Washington is a medical student research program with high student satisfaction, that provides value to medical students in the area of improved critical thinking, mentorship, and career preparation.

Immunology and Rheumatology I Concurrent Session

12:45 PM

Thursday, January 26, 2017

32 CURRENT REGULATIONS ON THE MOST COMMON CONTACT ALLERGEN: HOW THE UNITED STATES COMPARES TO EUROPE

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10.1136/jim-2016-000365.32

Case Report Nickel Allergic Contact Dermatitis is a type IV hypersensitivity reaction. Nickel containing objects release nickel which penetrate into the skin and are sequestered by dendritic cells. These cells present the nickel epitope to T-cells which, over time, become more and more sensitive to nickel, causing dermatitis at the site of contact. Nickel is the number one cause of patch test

positive reactions, with 20–33% of tested children having reactions to nickel. The European Union (EU) has enacted legislation to prevent nickel release in certain objects with prolonged, direct contact with the skin and subsequently have seen prevalence decrease. For example, the prevalence rate decreased in Danish children from 24.8% down to 9.2% between 1985 and 1998. The North American Contact Dermatitis Group [NACG] has found that positive patch test rates have nearly doubled in the US between 1985–1990 and 2003–2004 from 10.5% to 18%.

The US lacks the same legislative protections that the EU has adopted to reduce the prevalence of nickel sensitization. Notably, the Clean Air Act recognizes that nickel is a toxin and one of the 33 most hazardous air pollutants in urban areas but legislation regarding nickel is yet to be developed. The Toxic Substances Control Act, designed to protect citizens from chemicals that are hazardous or pose unreasonable risk, does not provide protective regulation for the use of nickel. Other entities, such as the Consumer Product Safety Commission or the Food and Drug Administration, also do not offer guidelines for nickel release. The Environmental Protection Agency (EPA) report in 2005 outlining the toxicological profile of nickel estimates that 10–20% of the US population is sensitive to nickel, and still no regulation is in place to protect the general population. Nickel allergic contact dermatitis is estimated to cost \$5.7 billion US per year. Clearly, guidelines for allowable nickel release and exposure are needed in the US.

33 PAINLESS OPHTHALMOPLÉGIA: AN UNUSUAL PRESENTATION OF A RARE SYNDROME

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10.1136/jim-2016-000365.33

Case Report A 15 year old male presented with new onset diplopia. He denied headache, facial pain, or signs of pituitary dysfunction. Evaluation included negative laboratory studies and a head CT consistent with sinusitis. He was discharged on antibiotics and ophthalmology follow up. At follow up, he had skew deviation of the right eye, increasing diplopia, ptosis, and pupillary dilation. He was admitted and had a brain MRI. It was significant for increased enhancement in his right cavernous sinus. Differential diagnosis included tumor, autoimmune disorder, infection, or cavernous sinus thrombosis. Laboratory work up was consistent with inflammation but otherwise normal. Brain biopsy was also consistent with an inflammatory process. He was diagnosed with Tolosa Hunt Syndrome. Steroids were started with improvement of symptoms. Steroids were weaned with complete resolution. He had three relapses treated with steroids. Due to a fourth relapse, he began Methotrexate.

Tolosa Hunt Syndrome is seen in 1:1,000,000 patients per year. Classically presents with constant severe eye pain occurring up to a month prior to ophthalmoplegia. Pain is unilateral and associated with ipsilateral headaches. Ophthalmoplegia involves cranial nerves 3,4, and 6. This is caused by autoimmune inflammation of the cavernous sinus. It is very responsive to steroid treatment but can

Abstract 33 Figure 1

resolve on its own in ~8 weeks. Rarely, steroid therapy is insufficient and immunomodulators are required. This syndrome may have a relapsing and remitting course or be a singular episode.

34 EFFECT OF SUBCUTANEOUS METHOTREXATE ON DURATION OF METHOTREXATE THERAPY IN RHEUMATOID ARTHRITIS

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10.1136/jim-2016-000365.34

Purpose of Study Rheumatoid arthritis (RA) is a progressive chronic inflammatory disease. Treatment with disease-modifying antirheumatic drugs (DMARDs) slows RA progression and reduces symptoms. Methotrexate (MTX) is an anchor of DMARD therapy. Oral MTX is often used at initiation of therapy and subcutaneous (SC) MTX considered in patients with adverse effects or lack of response. Our study aims to determine whether use of SC MTX is associated with prolonged MTX use and lower incidence of hepatotoxicity in RA patients on MTX monotherapy and multiple DMARD therapy.

Methods Used We conducted a retrospective cohort study using national administrative databases of the Department of Veterans Affairs. Subjects were seen between 9/30/1999 and 10/1/2009 and had been diagnosed with RA and treated with MTX. Outcomes of interest were the length of time on MTX monotherapy before addition of another DMARD and length of time on multiple DMARD therapy until addition of biologic agents. We performed Cox regressions to determine the association between use of SC MTX and risk of therapeutic change/addition of biologics and created Kaplan-Meier curves to compare therapeutic

duration of oral and SC MTX. We performed a chi square analysis for the relationship between abnormal LFTs and SC MTX use.

Summary of Results MTX monotherapy: SC MTX was associated with a significantly lower likelihood of therapeutic change (HR 0.64, 95% CI 0.52–0.78).

Multiple DMARD therapy: SC MTX was not significantly associated with adding a biologic (HR 1.13, 95% CI 0.97–1.31).

Liver enzymes: There was no significant association between use of SC MTX and abnormal LFTs ($p=0.09$ for ALT, $p=0.924$ for AST).

Conclusions Use of SC MTX is associated with longer duration of MTX monotherapy before addition of other DMARDs or biologic agents in RA patients. Use of SC MTX is not associated with duration of multiple DMARD therapy before addition of biologic agents. This may be because patients on multiple DMARD therapy have more severe disease and it is more likely that patients switching from oral to SC MTX are refractory to MTX. Finally, use of SC MTX is not significantly associated with decreased frequency of elevated LFTs.

35 KIMURA'S DISEASE: CHRONIC INFLAMMATION AND CERVICAL LYMPHADENOPATHY MIMICKING LYMPHOMA IN A CHINESE MALE

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10.1136/jim-2016-000365.35

Purpose of Study To describe a case of a rare, benign mimic of Lymphoma which is underdiagnosed, particularly in susceptible Asian populations.

This is a 37-year-old Chinese male with no known past medical history who presented to clinic reporting a mass in the right ear area which has fluctuated in size over the last 20 years, and a right jaw mass for one year. Vital signs were within normal limits. Physical examination was notable for a right ear 3 cm×2 cm oblong postauricular mass that was mobile and nontender. A laryngoscopy performed was negative.

Methods Used Case study; no statistical analysis was performed.

Summary of Results A CBC showed absolute eosinophil count of 4100; IgE was 7183. A CT scan of the neck showed a 3 cm parotid mass, focal soft tissue swelling with ill-defined areas of enhancement in the right post auricular region, with an increased number of lymph nodes in the neck bilaterally. An FNA biopsy of both masses showed atypical clusters of lymphocytes. Immunohistochemical stains showed positive for CD3, CD20, and BCL-6. Subsequent right cervical excisional lymph node biopsy was performed; pathology was consistent with Kimura's lymphadenopathy.

Conclusions Here we described a patient presenting with eosinophilia and multiple masses in the postauricular and parotid areas, masquerading as a possible malignancy. Kimura's Disease is a clinicopathological diagnosis and should be suspected in those presenting with lesions in the head and neck, particularly if the patient is from an East Asian background.

Abstract 35 Figure 1 This 40X high-power image shows an area within the lymph node that contains abundant polyclonal plasma cells and eosinophils.

36 ENGINEERING VIRUS-LIKE PARTICLE-BASED VACCINES FOR CHLAMYDIA TRACHOMATIS

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10.1136/jim-2016-000365.36

Purpose of Study *Chlamydia trachomatis* (Ct) is the most common sexually transmitted infection. Because of its high prevalence and potentially severe female reproductive sequelae, including pelvic inflammatory disease and infertility, developing a vaccine to prevent infection is a high priority. The Major Outer Membrane Protein (MOMP) is an attractive candidate for a Ct vaccine but is highly variable among the Ct serovars, and previous efforts to develop MOMP-based Ct vaccines have been unsuccessful. Here, we describe the identification of a region of MOMP to target for a Ct vaccine, and generate synthetic peptides corresponding to this region for Ct serovars D/E, F, G, H, the most common urogenital serovars. These peptides were then displayed on bacteriophage Qbeta VLPs and tested for their immunogenicity in mice.

Methods Used We engineered four VLPs, each displaying a MOMP peptide. Synthetic peptides were chemically conjugated to Qbeta VLPs by using SMPH (succinimidyl 6--((beta-maleimidopropionamido)hexanoate)) to link a free sulfhydryl group on the synthetic peptide to primary amines on the surface of the VLPs. These VLPs were then used to generate a multicomponent vaccine consisting of 5 mg of each VLP. Five BALB/c mice were immunized twice, three weeks apart, and serum was collected three weeks after the second immunization. Antibody titers against the peptides were assessed by ELISA.

Summary of Results We were able to successfully generate a multicomponent VLP-based vaccine targeting the Ct MOMP antigen for serovars D/E, F, G, and H. The vaccine elicited high titer antibodies in mice against the peptides.

Conclusions Future experiments will assess the ability of our VLP-based Ct vaccine to elicit antibodies that neutralize infection in cell culture and protect against Ct infection and pathology in a mouse model.

37 EVALUATION OF A BASOPHIL ACTIVATION FLOW CYTOMETRIC ASSAY AS AN ALTERNATIVE TO ORAL FOOD CHALLENGE FOR DETERMINING PEANUT ALLERGY

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10.1136/jim-2016-000365.37

Purpose of Study To evaluate a functional basophil activation test (BAT) as a potential alternative to oral food challenge (OFC) in discriminating peanut allergy versus sensitivity. Peanut allergy is one of the most prevalent and deadliest food allergies resulting in 100–200 fatal anaphylactic reactions per year in the United States. OFC is the current gold standard test for determining true peanut allergy, but may cause severe acute allergic reactions making the in-vitro BAT a potentially safer alternative.

Methods Used A flow cytometric BAT using CD-63 as an activation marker and whole peanut, Ara h 1, Ara h 2 and Ara h 8 antigen extracts as stimulants was compared to traditional peanut diagnostic methods including OFC, skin prick testing (SPT) and specific IgE to whole peanut and peanut components.

Summary of Results Using traditional non-BAT diagnostic methods and clinical assessment, forty-seven patients were recruited from an allergy clinic and classified by a physician into three groups based on severity of symptoms: mild, moderate and severe. Seven atopic, non-peanut allergic controls were also included in this study. Mean specific IgE concentrations for whole peanut were 19.5, 75.9, 41.6 kU/l for the mild, moderate and severe groups respectively, compared to 3.6 kU/l for the atopic control group. The mean percent BAT activation for whole peanut extract was 28.1, 40.7, and 62.2 for the mild, moderate, and severe symptom groups, respectively. There was a statistical significance difference ($p=0.04$) between patients classified with mild symptoms compared to those with severe symptoms.

Conclusions This study indicates that basophil activation testing can improve allergy diagnosis and would be a beneficial tool for physicians. BAT showed a clear distinction between the peanut-allergic patients and controls as well as distinguishing between patients with mild versus severe peanut allergies.

38 NUP98 AND ITS ROLE IN TRANSCRIPTIONAL REGULATION OF THE TYPE I INTERFERON RESPONSE

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10.1136/jim-2016-000365.38

Purpose of Study The type I interferon (IFN) response is an innate immune response for host defense against viruses. When a virus enters a cell, cellular pattern recognition receptors bind to viral structures leading to transcription of type I interferons such as IFN- β ultimately resulting in viral clearance¹. Although well studied, many

components of the type I IFN response are still being deciphered.

Nup98 is a nuclear pore protein that facilitates the movement of molecules between the cytoplasm and nucleus. It has roles in cell cycle regulation, and as new research suggests, may influence transcriptional induction of the host antimicrobial response^{2–4,6}. For example, Nup98, is itself induced during the type I IFN response and may contribute to the regulation of this pathway³. In *Drosophila*, Nup98 facilitates transcriptional regulation during development and heat shock^{2,4}. Furthermore, poliovirus causes the rapid proteolysis of Nup98 and inhibits the type I IFN response⁵. Cumulatively, these findings lead us to hypothesize that Nup98 contributes to the transcriptional induction of the IFN- β signaling pathway in response to viral infection.

Methods Used To determine if Nup98 is required for induction of the type I IFN response, HeLa cells were transfected with small interfering RNA to knock down Nup98. Protein was then harvested and analyzed by western blot to confirm down regulation of Nup98 protein levels. The impact of Nup98 knockdown on the Type I IFN response was assessed by treating cells with dsRNA and analyzing IFN- β mRNA levels using quantitative real time PCR (qRT-PCR).

Summary of Results Western blotting showed that siRNA knockdown of Nup98 worked effectively with levels of Nup98 protein reduced 55–86% compared to control. qRT-PCR analysis revealed that knock down of Nup98 reduced IFN- β mRNA levels to 9–71% of that observed in control cells.

Conclusions This project tested the hypothesis that Nup98 contributes to the transcriptional induction of the IFN- β promoter, a critical component the Type I IFN response and host defense against viruses. Although preliminary, the results indicate that Nup98 is needed for full activation of the IFN- β promoter and likely contributes to the transcriptional induction of the type I IFN response.

Infectious Diseases I Concurrent Session 12:45 PM Thursday, January 26, 2017

39 HEME OXYGENASE-1 DEFICIENCY INCREASES THE SEVERITY OF SEPSIS IN A PRETERM MOUSE MODEL

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10.1136/jim-2016-000365.39

Purpose of Study Sepsis in preterm infants is characterized by an initial bacterial invasion followed by a systemic inflammatory response. The mortality rate of preterm sepsis is extremely high; though its pathophysiology has not been well elucidated. Heme oxygenase-1 (HO-1), a stress-response protein, can affect physiologic and pathologic conditions during the newborn period by its anti-inflammatory, antioxidative, and anti-apoptotic properties. Thus, we investigated the effect of a partial deficiency in HO-1 using a preterm sepsis model.

Methods Used To induce sepsis, the non-surgical cecal slurry (CS) model was applied to 4d-old mouse pups, whose age is equivalent to that of human preterm infants. In brief, adult cecums were harvested and contents were diluted in PBS-glycerol to 100 mg/mL for CS stock preparations. HO-1 heterozygote (Het, HO-1^{+/-}) and wild-type (WT) mice were given CS intraperitoneally at a dose of 2.0-mg/g (LD₄₀ for WT mice, Fujioka *et al*, *Shock*, in press, 2016), and then survival monitored for 7 d. To study the protective role of HO-1, 30-μmol heme/kg was given subcutaneously to 3 d-old pups of both genotypes 24 h prior to sepsis induction and survival monitored. Liver HO activity was determined via gas chromatography, and gene expression profiles were measured using PCR arrays and then compared between all groups for both genotypes.

Summary of Results Treatment with 2.0-mg CS/g caused a significantly higher mortality in Het (85.0%, n=20) than in WT pups (40.9%, n=22, p<0.01). 24 h after heme administration, liver HO activity increased 64% and 55% over age-matched controls in both WT and Het pups (496 ±85, n=10, and 328±36, n=13, p<0.01, respectively). Most importantly, pre-treatment with heme significantly reduced mortality to 6.3% in WT (n=32) and to 23.5% in Het (n=17) pups. In addition, gene expression profiles revealed significant increases in cytokines, pattern recognition receptors, and other immune-related genes in both genotypes 6 h post-sepsis induction. These increases were attenuated in pups of both genotypes pre-treated with heme.

Conclusions Because HO-1 deficiency is associated with an increase in mortality following sepsis induction and heme treatment significantly reduces mortality, we conclude that the induction of HO-1 confers protection against sepsis in preterm infants.

40 T CELL RESPONSE TO PRIMARY GENITAL HERPES SIMPLEX VIRUS TYPE 1 INFECTION

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10.1136/jim-2016-000365.40

Purpose of Study While herpes simplex virus type 1 (HSV-1) is most commonly associated with herpes labialis, it is now the leading cause of newly diagnosed genital herpes infections in young adult women. Genital HSV-1 leads to fewer recurrences and less genital shedding than genital HSV-2; thus understanding the development of the T cell immunological response to primary genital HSV-1 may lead to insights about effective immune responses.

Methods Used Ten HIV seronegative participants with laboratory-documented primary genital HSV-1 were enrolled into a prospective study. Peripheral blood mononuclear cells (PBMCs) were collected at serial time points for at least one year. Daily self-collected oral and genital secretions were collected at 8–12 weeks and 48–52 weeks, and herpes recurrences were reported. PBMCs from the 52-week time point were tested for reactivity to HSV-1 peptides using IFN-γ ELISPOT. Reactivity was tested in each of 3 peptide pools from a collection of CD8 HSV-1 epitopes.

Positive pools were deconvoluted to specific reactive peptides. PBMCs from a participant with HLA A*0101 were tested with flow cytometry for CD8+ T cells using two fluorescently labeled A*0101 specific UL48 tetramers containing epitopes in HSV-1 protein VP16. The percentage of tetramer binding CD8+ T cells was calculated over time to track the dynamics of HSV-1 specific CD8 cells.

Summary of Results All participants had HSV-1 reactive CD8+ T cells detected. Epitopes in multiple open reading frames were identified in the proteins encoded by UL48 (VP16), UL40, UL46, ICP0, UL21, UL49, UL27, UL46, and U47. In the intensively studied HLA A*0101 participant, between 0.15 and 0.2% of CD8 cells were specific for discrete epitopes in VP16 at week 8. The abundance of circulating cells specific for these HSV-1 epitopes declined over time and became undetectable at 2 years. This participant did not have any HSV-1 shedding or recurrences during the observation period.

Conclusions Participants with primary genital HSV-1 infection have CD8+ T cells with reactivity to specific HSV-1 peptides. In one subject without genital HSV-1 reactivation, circulating CD8+ T cell reactivity to HSV-1 declined over time. Ongoing analyses of T cell responses will characterize immunologic memory to genital HSV-1.

41 ENHANCED NITRIC OXIDE PRODUCTION IN MONOCYTES OF CHRONIC GRANULOMATOUS DISEASE PATIENTS WITH AND WITHOUT EXPOSURE TO INTERFERON GAMMA

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10.1136/jim-2016-000365.41

Purpose of Study The purpose of this study was to evaluate NO production in monocytes of Chronic Granulomatous Disease (CGD) patients with and without exposure to recombinant interferon gamma (IFN-γ) compared to healthy controls.

Methods Used Whole blood from CGD patients (n=4) and healthy controls (n=2) was incubated with or without human recombinant IFN-γ (Actimmune; Horizon Pharma) and stimulated with either phorbol myristate acetate (PMA) or Heat-killed *Staphylococcus aureus* (HKSA). Cells were stained with Diaminofluorescein-2 Diacetate (DAF-2DA), which freely permeates cell membranes, is sequestered inside cells, and is converted to fluorescent DAF-2T, in the presence of NO. Cells were stained with fluorescent antibodies and flow cytometry was utilized to identify DAF-2T positive monocyte populations.

Summary of Results All CGD patients (three variant X-linked and one classic X-linked) had greater percentages of DAF-2T positive monocytes (indicative of NO production) compared to healthy controls following incubation with IFN-γ alone. Additionally, each CGD patient showed increased percentages of DAF-2T positive monocytes upon stimulation with HKSA or PMA alone. Three patients, all with variant X-linked CGD, also showed increases in

DAF-2T monocytes when their cells were incubated with IFN- γ and stimulated with HKSA or PMA.

Conclusions Nitric oxide production in monocytes was increased in CGD patients upon stimulation with HKSA or PMA, suggesting that NO is likely an important means of pathogen killing for these patients whose ability to create a respiratory burst can be deficient. In addition, CGD patients had increased percentages of NO-producing monocytes following IFN- γ incubation alone. These data suggest that CGD patients' monocytes may have elevated baseline production of NO. IFN- γ appears to enhance NO-producing monocytes in CGD patients and offers an explanation for the decreased number of serious infections reported when using this therapy.

42 FREQUENT CMV SHEDDING IN BREASTMILK IN CMV-SEROPOSITIVE HEALTHY WOMEN PERSISTS UP TO 17 WEEKS POST-PARTUM

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10.1136/jim-2016-000365.42

Purpose of Study Cytomegalovirus (CMV) is a ubiquitous virus that can cause severe disease in premature or very low birth weight infants. Mother-to-child CMV transmission can occur in the postnatal period via breastmilk. Our study characterized patterns of CMV shedding in breastmilk and at other anatomic sites in postpartum women.

Methods Used Healthy CMV-seropositive postpartum women were enrolled. We measured CMV by polymerase chain reaction (PCR) in breastmilk, vaginal fluid, saliva, urine, and plasma. Over 8 weeks, plasma was collected weekly and participants self-collected remaining samples daily for one week periods every other week. CMV shedding rates were calculated as number of days with positive results divided by number of days with samples collected. Generalized estimating equations were used to determine associations between shedding at different sites.

Summary of Results Nine participants a median of 7 weeks postpartum (range 5–15 weeks) self-collected samples for a median of 28 days (range 26–31 days). CMV was detected in breastmilk in 7 women, vaginal secretions in 3 women, and oral secretions in 2 women. CMV was not detected in urine or plasma samples. CMV was found in most breastmilk samples (171 of 253, 67.6%). CMV shedding in breastmilk persisted up to 17 weeks postpartum. CMV was less frequently detected in the vagina (39 of 258, 15.1%) and saliva (53 of 258, 20.5%). On days with oral CMV shedding, the risk of CMV vaginal detection was increased (RR=26.1, 95% CI=3.9 to 176.0). Higher breastmilk CMV quantities were significantly associated with simultaneous oral CMV detection (RR=4.1, 95% CI 1.9 to 8.8).

Conclusions Through daily sampling, we found a high frequency and quantity of CMV in breastmilk among CMV-seropositive healthy women to 17 weeks postpartum. CMV shedding in vaginal fluid and saliva was less frequent. Oral CMV shedding is associated with increased risk of vaginal CMV shedding and increased quantities of CMV in breastmilk. These data suggest concurrent CMV reactivation

at multiple sites in some postpartum women. Our findings may be relevant for the practice of sharing raw breastmilk in the community, particularly for pre-term infants.

43 CONGENITAL SYPHILIS PRESENTING AS FEVER IN A NEONATE

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10.1136/jim-2016-000365.43

Case Report A 19-day-old infant was admitted due to fever and concern for sepsis. The baby was born term with an uncomplicated pregnancy and unremarkable prenatal labs. At time of admission, the infant was fussy but non-toxic appearing, with a pink macular rash on extremities. Labs revealed thrombocytopenia, direct hyperbilirubinemia, coagulopathy, hypoglycemia, and elevated CRP. Blood culture and LP were obtained prior to empirically starting ampicillin, cefotaxime, and acyclovir. Infectious disease specialists were consulted and recommended obtaining a head ultrasound, T. pallidum Ab, parvovirus PCR, quantitative Ig's, HIV testing, and HSV cultures. On the 3rd day of admission, the T. pallidum antibody test returned as reactive. RPR was also reactive with titer of 1:128. Penicillin was started and other antibiotics discontinued. CSF VDRL testing was nonreactive. Plain films revealed periosteal reaction and metaphyseal lucencies in all extremities, consistent with congenital syphilis. The infant's rash resolved with subsequent desquamation. The patient was discharged after completing a 10-day course of IV penicillin with planned follow up testing based on CDC recommendations. Parents were also referred for testing and treatment.

Congenital syphilis is a relatively rare diagnosis with 11.6 cases per 100,000 live births. Prenatal testing is mandated in most states and generally is obtained at the first prenatal visit. If syphilis is contracted during pregnancy, the mother may unknowingly pass the infection on to her baby. For this reason, the CDC recommends repeat maternal testing at 28–32 weeks' gestation and again at delivery for high-risk women and those who live in areas with high prevalence rates. Congenital syphilis has significant morbidity and mortality and is considered a sentinel event according by the CDC, "reflecting numerous missed opportunities for prevention within public health systems". With thorough prenatal screening, congenital syphilis is a preventable disease.

This case demonstrates the importance of maintaining a broad differential when a neonate presents with a fever. When interpreting prenatal lab results and overall infant risk, the timing of the labs must be considered. If repeat testing was not obtained at time of delivery, congenital syphilis should be considered in any ill appearing neonate.

44 SEVERE GROUP G STREPTOCOCCUS PYOGENIC ARTHRITIS IN A 10-YEAR OLD GIRL

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10.1136/jim-2016-000365.44

Case Report A 10 year-old girl with a history of hereditary sensory and autonomic neuropathy type 5 and subsequent charcot arthropathy of the right knee presented with 2 days

Abstract 44 Table 1 Summary of Published Cases of Group G Streptococcal Septic Arthritis in Children

Author	Year	Age	Gender	Joint	Outcome
Brahmadathan	1989	1.5 Years	Male	Knee	Recovered 1
Brahmadathan	1989	30 days	Female	Not stated	Recovered 1
Tuazon	1980	7 years	Male	Ankle	Recovered 2

1=Treatment not stated

2=Received 2 weeks of parenteral penicillin

of fever, emesis and worsening of a chronic right knee effusion. White blood cell count was normal, but the erythrocyte sedimentation rate (ESR) was elevated to 76 mm/hr and her C-reactive protein (CRP) was elevated at 38.6 g/dL (normal <0.3 g/dL). Contrasted magnetic resonance imaging of the right knee revealed a large effusion. She underwent 7 arthrotomies over a 34-day period, which all demonstrated purulent synovial fluid. The first 3 surgeries (over 5 days) produced growth of Group G *Streptococcus* (GGS) on synovial fluid cultures despite receipt of antimicrobial therapy (vancomycin and ampicillin). Though subsequent cultures were sterile, she continued to be febrile with elevated inflammatory markers (ESR=22 and CRP=1.3 after 82 days of treatment, despite a history of normal inflammatory markers prior to admission). After 8 weeks of ampicillin therapy, she was discharged home on a prolonged course of amoxicillin therapy.

Literature Search A search of PubMed and Web of Knowledge (WOK) on June 30th, 2016 utilizing the terms 'Septic arthritis' or 'Pyogenic arthritis' or 'arthritis' and 'Group G *Streptococcus*' without any filters produced 129 publications. Review of all articles produced two publications describing 3 cases in children. A review of references from these articles and references from the 4 systematic reviews of Group G *Streptococcus* found produced no additional reports. Citation tracker on WOK was utilized for the two articles, but did not produce any additional cases.

Conclusion Our patient is only the fourth reported case of GGS septic arthritis in a child. Contrary to previous cases, our patient exhibited a prolonged and complicated clinical course. This may be attributable to her pre-existing charcot arthropathy, a phenomenon which has been described in adults.

45 ERYTHEMA SWEETOBULLOSUM; NOT VERY SWEET-LOOKING

Abukamleh H, Chahine H, Patel J, Heidari A. *Kern Medical, Victorville, CA.*

10.1136/jim-2016-000365.45

Purpose of Study To describe a case of a rare skin manifestation in acute coccidioidomycosis infection

Methods Used Patient is 45 year old male who presented to ER with worsening blistering rash over his bilateral forearms that started 5 days prior. Rash was described as diffuse macular, painful, pruritic, localized mostly to the forearms and associated with fever. It had increased in size as well as forming blisters, no drainage reported. He worked for a "tree spraying company". Physical exam is significant for multiple tense bullae with central crusting covering bilateral forearms, worse on posterior forearms; anterior forearms had multiple erythematous macules

Abstract 45 Figure 1

Summary of Results Labs were significant for WBC 12.3 with 800 eosinophils, ESR>100, and CRP 4.35. Lesions were thought to possibly be due to occupational exposure vs. autoimmune disorder. Patient was started on Vancomycin and Zosyn, chest X-ray was normal, skin biopsy showed subepidermal vesicular dermatitis with lymphocytes and histiocytes, negative stains. Coccidioidomycosis fungal serology showed reactive IgM with titers <1/2. Patient was started on fluconazole and lesion regressed significantly within 2 days

Conclusions Erythema Sweetobullosum is a rare manifestation of acute Coccidioidomycosis infection that is not Erythema nodosum or Multiforme. It is a third entity that was discussed in the past and called toxic erythema. It is a parainflammatory skin eruption presenting with erythematous plaques and pseudoblistering on face, chest, neck, and extremities in a striking photo distribution. Diagnoses is made clinically, histology is changed based on when the patient is seen. Earlier on its lymphocytic, later neutrophilic then histiocytic and sometimes granulomatous.

46 BEYOND MICROCEPHALY: OTHER MANIFESTATIONS OF NEONATAL AND INFANTILE CONGENITAL ZIKA VIRUS

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10.1136/jim-2016-000365.46

Purpose of Study While microcephaly may be considered the most common manifestation in neonates and infants

Abstract 46 Table 1

Reference	# Patients Studied	Method of Diagnosis	Timing of infection in Mother	Microcephaly Frequency	Other CNS findings	Non-CNS findings
Martines, 2016	5 neonates (includes 2 miscarriages)	ZIKV-positive PCR from brain matter or placental tissues	Symptoms developed during first trimester	3/3 (100%) neonates; inconclusive in aborted fetuses (report on other 2 neonates not available)	2/5 (40%)—combination of lissencephaly, parenchymal microcalcification, degenerating glial cells	1/5 (20%)—genital malformation; 2/5 (40%)—combination of death, arthrogryposis, pulmonary hypoplasia, craniofacial malformations
Vasco Aragao, 2016	23 neonates	Paired serology of mother and newborn	17 mothers reported having rashes in the first trimester, 5 in the second, and 0 in the third; 1 recalled having rash, but forgot when	20/23 (87%) neonates microcephalic based on head circumference (HC); other 13% had normal HC but microcephaly on brain imaging	30/30 underwent brain imaging, and all (100%) showed calcification between cortical and subcortical white matter, 19/22 (86%) who had CT scan had ventriculomegaly; 7 of 8 (88%) who underwent MRI had enlarged cisternae magna	18/23 (78%)—craniofacial disproportion 7/23 (30%)—exuberant external occipital protuberance 12/23 (52%)—redundant scalp skin
Brasil, 2016	42/70 fetuses had in-utero ultrasounds (U/S)	ZIKV-positive serum and urine PCR in 70 mothers with clinical findings c/w Zika infection	6 to 35 weeks of gestation among the 42 women in whom fetal ultrasonography was performed	14/42 had abnormal in utero U/S 2/14 stillbirth 6/14 were born and 2/6 were normal at birth 1/6 had microcephaly 2/6 still in utero had microcephaly 21% fetuses had microcephaly and cerebral calcifications (utero)	3/6 still in utero—cerebral calcifications with or without microcephaly 2/6 still in utero—abnormal or severely blocked middle cerebral artery 1/6 still in utero—ventriculomegaly 1/6 still in utero—mega cisterna magna 1/6 born with cerebral calcifications	5/12—intrauterine growth restriction 2/14—stillbirth 1/12—club foot 1/6 born—poor sucking reflexes at birth
Leal, 2016	69 infants	ZIKV-positive serum in CSF	54 (86%) of 63 mothers reported rashing during the first trimester	Information needed to determine degree of microcephaly was available for 65 (93%) infants, among whom 44 (68%) had severe microcephaly	Not mentioned	4/69 (6%)—sensorineural hearing loss also had microcephaly
Calvet, 2016	2 neonates	Amniotic fluid at 28 weeks pregnancy	Signs of fetal malformation began via U/S at 21 and 25 weeks of gestation for Mother A and B, respectively	2/2 (100%) neonates	2/2 (100%)—hypoplasia of cerebellar vermis (utero); ventriculomegaly 1/2 (50%)—absent cerebellar vermis 1/2 (50%)—enlarged posterior fossa	1/2 (50%)—arthrogryposis in arms and legs, cataract, microphthalmia

infected with Zika Virus (ZIKV), recent studies have documented rarer CNS and non-CNS findings of ZIKV in infected children. The aim of our study was to describe these other findings.

Methods Used We used search engines such as PubMed and Google Scholar in our preliminary literature review. Studies included in our review must have satisfied the following criteria: A) reported both CNS and non-CNS findings; B) studied subjects aged *in utero* up to infants less than 1-year-old; C) included more than one case report, and were related to the recent epidemic; and D) documented that a diagnosis of ZIKV was confirmed in either the mother or infant via a laboratory test.

Summary of Results Of the 20 articles initially found, 5 satisfied our inclusion criteria. Our findings are summarized in table below.

Conclusions While microcephaly is a very common finding in patients with congenital ZIKV infection, our review of the

literature demonstrates other major findings include ventriculomegaly, enlarged cisternae magna, brain calcifications, hearing loss, arthrogryposis, and craniofacial anomalies. By noting the existence of manifestations other than microcephaly, our study aims to assist physicians to better interpret manifestations of ZIKV infection and be able to pinpoint the diagnosis in a neonate with a potential congenital infection.

47 PULMONARY COCCIDIOIDOMYCOSIS AND TUBERCULOSIS COINFECTION

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10.1136/jim-2016-000365.47

Purpose of Study Coccidioidomycosis is endemic in the Southwest US, South and Central America. San Joaquin Valley accounts for two third of the reported cases in

California and majority of these patients were from Kern County. *Mycobacterium tuberculosis* infection is virtually found all over the world. In the US, California remains in the top 5 states with highest incidence of tuberculosis. Tuberculosis (TB) and *Coccidioidomycosis* share many similarities in clinical presentation, radiologic characteristics, demographics, and risk factors. Therefore, co-infection of TB and *coccidioidomycosis* can be overlooked which can lead to under diagnosis and underreporting of these cases. This is an update of our previously reported data. The objective of this study is to describe the clinical, epidemiologic, laboratory, and radiologic features of pulmonary TB and *Coccidioidomycosis* coinfection. We have reported our data in 2010 and this is an update

Methods Used This is a retrospective review of medical records of patients in Kern Medical. All patients with diagnosis of pulmonary TB or *Coccidioidomycosis* were identified and matched for coinfection. Patient's demographics, radiologic, serologic, microbiologic and laboratory results were reviewed.

Summary of Results Fourteen patients with pulmonary TB and *Coccidioidomycosis* coinfection were identified. All patients were immigrants from Mexico and Philippines. Majority of the patients were male (85%) and Hispanics (85%). *Coccidioidomycosis* and pulmonary TB were diagnosed at the same time on (64%) of the cases. On 14% of the cases, *Coccidioidomycosis* was diagnosed first before TB, and in 21% of the cases TB was diagnosed before *Coccidioidomycosis*. We had one reported mortality due to massive hemoptysis. Risk factors and co morbidities associated with the confection were diabetes, HIV positive, alcohol, tobacco, field worker, and homelessness. Majority of the patients had apical or bi-apical lesions (50%), the rest presented as miliary, mediastinal, left or right lower lung infiltrates and cavitation.

Conclusions Pulmonary tuberculosis and *Coccidioidomycosis* coinfection can occur. Patients from geographic areas with endemicity of both infections with predisposing conditions such as diabetes, history of immigration, positive HIV, alcohol and tobacco abuse should be screened for both TB and *Coccidioidomycosis*.

Neonatal Pulmonary I Concurrent Session

12:45 PM

Thursday, January 26, 2017

48 EXPOSURE TO THIRDHAND SMOKE RESULTS IN OXIDATIVE DAMAGE, INCREASED APOPTOSIS, AND ALTERED DIFFERENTIATION IN FETAL LUNG FIBROBLASTS

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10.1136/jim-2016-000365.48

Purpose of Study Thirdhand smoke (THS), the residual tobacco smoke remaining in the environment after tobacco has been smoked, represents an underestimated public health hazard. THS contains a large number of

constituents, but the effect of composite THS exposure on the developing lung has not been reported. Given the toxic nature of the many of its constituents, we hypothesized that THS results in oxidative damage, increased apoptosis, and myogenic differentiation when exposed to lung fibroblasts, which are key determinants of lung development.

Methods Used Using standard methods, embryonic day (e) 19 lung fibroblasts were isolated from Sprague Dawley rat pups. At 80–90% confluence, these cells were exposed for either 24 or 72 h to composite THS (0.1x, 0.25x, 0.5x, 1x), which was generated according to previously described methods (Hang et al, *Mutagenesis*; 28:381–91; 2013). Oxidative damage [qRT-PCR for hypoxanthine phosphoribosyltransferase 1 (*HPRT*) and polymerase β (*POLB*) genes]; cell proliferation (thymidine incorporation), cell apoptosis (Bcl-2, Bax, and p-Caspase 3 by Western analysis), mesenchymal markers of differentiation (fibronectin, calponin, peroxisome proliferator-activated receptor (PPAR- γ), lymphoid enhancer binding factor-1 (LEF-1), and activation of nicotinic acetylcholine receptor (nAChR) $\alpha 3$ by Western analysis) were determined.

Summary of Results Compared to the control group, the THS group showed 1) dose-dependent oxidative damage ($\downarrow$ RT-PCR products of *HPRT* and *POLB*); 2) decrease in cell proliferation ($\downarrow$ thymidine incorporation) and increase in cell apoptosis ($\downarrow$ Bcl-2/Bax ratio and $\uparrow$ p-Caspase); 3) dose dependent alterations in mesenchymal differentiation markers (PPAR- γ , fibronectin, and calponin), indicative of myogenic differentiation; and 4) nAChR stimulation ($\uparrow$ in nAChR $\alpha 3$ protein levels).

Conclusions THS causes oxidative damage, cell apoptosis, and differentiation to a myogenic phenotype in fetal rat lung fibroblasts. These data indicate a potentially disruptive effects of THS on alveolar epithelial-mesenchymal paracrine signaling, setting the stage for chronic lung damage in THS exposed infants. [Grant Support: HL27137; HD71731; TRDRP: 23RT-0018].

49 MATERNAL TOBACCO SMOKE EXPOSURE ALTERS MRNA LEVELS OF WNT SIGNALING GENES IN NEWBORN RAT LUNG

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10.1136/jim-2016-000365.49

Purpose of Study Fetal exposure to maternal tobacco smoke (MTS) causes growth restriction and alters lung development in humans and animal models, with sex-divergent outcomes. Lung development depends upon Wnt signaling and expression of Wnt target genes. We previously demonstrated that surgically induced fetal growth restriction impaired Wnt signaling and output of Wnt target genes in the rat lung, also in a sex-divergent manner. However, the effect of MTS on Wnt signaling and expression of Wnt target genes in the rat lung is unknown. We hypothesized that MTS causes sex-divergent changes in mRNA levels of Wnt transducers *Lef1*, and *Tcf4*, and Wnt target genes, *MMP-9*, *MMP-12*, *AXIN2*, and *TGF β 1* in the newborn rat lung.

Methods Used Pregnant rats were exposed to room air (Control) or tobacco smoke (MTS) from gestational day 11

to term. Newborn pups were killed and lung collected. Female and male pups were studied as separate groups (n=6/group). We used real-time RT-PCR to measure mRNA transcript levels of Lef1, Tcf4, MMP-9, MMP-12, AXIN2, and TGFb1 in newborn rat lung.

Summary of Results mRNA levels of Wnt transducer Lef1 were unchanged in MTS female and male newborn rat pups. Tcf4 levels significantly increased in MTS female ($300 \pm 27\%$) and male ($200 \pm 31\%$) rat pups compared to age- and sex-matched controls. mRNA levels of Wnt target gene MMP-9 were significantly decreased in MTS female ($4 \pm 2\%$) and male ($3 \pm 1\%$) rat pups. MMP-12 levels were significantly increased in MTS female ($575 \pm 120\%$) pups. AXIN2 levels significantly decreased in only female ($25 \pm 0.4\%$; $p < 0.05$) pups, while male pups were unchanged. mRNA levels of TGFb1 were significantly decreased in both females ($14 \pm 3\%$) and males ($11 \pm 2\%$) compared with age- and sex-matched controls. * $p < 0.001$

Conclusions Fetal tobacco smoke exposure causes sex-divergent changes in mRNA levels of Wnt transducers and target genes in newborn rat lung in a sex-divergent manner. Given the importance of WNT signaling in lung outcomes, an understanding of the origins of sex-divergent responses to MTS and to fetal growth restriction are important. We are currently examining the role of sex-hormones in sex-divergent WNT signaling in the MTS rat lung.

50 **IN UTERO EXPOSURE TO MATERNAL TOBACCO SMOKE ALTERS ELASTIN ALTERNATIVE SPLICING AT EXON 31 IN THE RAT LUNG**

Locklear BA, Wang H, Joss-Moore L. *University of Utah, Salt Lake City, UT.*

10.1136/jim-2016-000365.50

Purpose of Study *In utero* exposure to maternal tobacco smoke (MTS) results in deficits in offspring lung function in humans and animal models. We showed that MTS produces alterations in lung function and lung elastic fiber assembly in female, but not male rat lung. Assembly of elastic fibers depends on the expression of alternatively spliced elastin mRNA transcripts. We previously showed that alternative splicing of exon 7 (E7) of the elastin gene occurs in rat lung and the ratio of alternatively spliced E7 transcripts to total elastin transcripts is effected by sex, lung development and MTS. Furthermore, RNA-seq data suggests an additional elastin variant with alternative splicing of exon 31 (E31). However, the effect of MTS on expression of E31 transcripts is unknown. We hypothesize that the rat lung expresses elastin transcripts containing E31 and alternatively spliced E31. We further hypothesize that the ratio of alternatively spliced E31 transcripts to total elastin transcripts (E31:T) is effected by sex and MTS exposure.

Methods Used Pregnant rats were exposed to room air (Control) or tobacco smoke (MTS) from gestational day 11 to term. Offspring was studied at term birth (d0-immature lung), and at day 21 (d21-mature lung). The ratio of E31 lung elastin transcript to total elastin transcript (E31:T) was measured using RT-PCR and sequencing.

Summary of Results PCR of lung elastin between exons 30 and 35 reveal bands consistent with elastin containing

all exons, and with E31 spliced out. Sequencing confirmed the presence of total elastin transcripts containing E31 and with E31 spliced out. In male rat lung at d0, E31:T was not effected by MTS, however at d21 MTS significantly decreased E31:T ($127 \pm 54\%$). In female rat lung at d0 ($479 \pm 270\%$) and d21 ($711 \pm 592\%$) MTS significantly increased E31:T.

Conclusions The rat lung expresses mRNA transcripts containing all exons between 30 and 35 as well as an elastin variant transcript with E31 spliced out. MTS exposure effects E31:T in a sex-dependent manner. We speculate that in female rat lung, increased E31:T may contribute to the disruption of elastin fiber assembly.

51 **CAFFEINE BLOCKS HYPEROXIA-MEDIATED EFFECTS ON PULMONARY ENDOTHELIAL CELL PROLIFERATION AND DIFFERENTIATION**

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10.1136/jim-2016-000365.51

Purpose of Study Bronchopulmonary dysplasia (BPD), characterized by blunted pulmonary vascular and alveolar development, continues to be a major contributor to morbidity and mortality in premature infants. Although early caffeine administration has been suggested to decrease the incidence of BPD, the underlying mechanism (s) remains unclear. Since exposure to hyperoxia, a well-established contributor to BPD, has been shown to decrease alveolar vascularization, a key component in BPD pathogenesis, we hypothesize that caffeine blocks the effects of hyperoxia on pulmonary endothelial cell proliferation and differentiation and these effects are mediated via caffeine's effects on pulmonary endothelial Yap-1 signaling.

Methods Used Mouse primary pulmonary microvascular endothelial cells (Cell Biologics, Inc. Chicago) were cultured using standard methods in extracellular matrix supplemented conditions. At 80–90% confluence, cells were exposed to either normoxia (21% O₂) or hyperoxia (95% O₂) ± caffeine (10^{-11} to 10^{-6} M) for 24h. Subsequently, cell proliferation (thymidine incorporation and Western analysis and immunocytochemistry (IC) for VE-cadherin and VEGF), and Yap activation [Western analysis and IC for total (t) and phospho (p)-Yap-1 and Akt] were determined.

Summary of Results Caffeine supplementation resulted in 1) increased cell proliferation during normoxia, as determined by thymidine incorporation and VE-cadherin, VEGF, and p/t-Yap protein determination via Western analysis and IC, dose-dependently ($p < 0.05$ vs. control, for all parameters); and caffeine supplementation blocked hyperoxia-induced increase in PEC proliferation, also dose-dependently ($p < 0.05$ vs. control).

Conclusions Exposure to hyperoxia (95% O₂) resulted in increased PEC cell proliferation, which was blocked by caffeine supplementation. Previous studies from our laboratory have shown biphasic effects of hyperoxia on PEC proliferation and differentiation, i.e., initial proliferation followed by later stunting. Caffeine seems to have protective effect on pulmonary vasculature by increasing PEC proliferation in normoxia and block the initial uncontrolled

proliferation during hyperoxia, possibly blunting the subsequent decrease in alveolar vascularization. [Grant Support: HL27137, HD71731; TRDRP:23RT-0018]

52 CARDIAC STRUCTURAL REMODELING IN FORMER CHRONICALLY VENTILATED PRETERM LAMBS

Allen K, Abdullah O, Hicks R, Wang Z, Dahl M, Yoder B, Albertine K. *University of Utah, Salt Lake City, UT.*

10.1136/jim-2016-000365.52

Purpose of Study Many infants born prematurely require invasive mechanical ventilation (IMV) with oxygen-rich gas to survive due to respiratory failure. Physiologically, pulmonary hypertension develops that becomes refractory to treatments, such as inhaled nitric oxide. The pathogenesis of persistent pulmonary hypertension (PPHN) is unknown. Our studies of former preterm lambs (FPT) show structural features of persistent pulmonary hypertension at weaning from milk (2–3 months' corrected postnatal age, cPNA; ~1–2 years' cPNA in humans) and 5 months' cPNA (~6 years' cPNA in humans). Our new report used confocal imaging to characterize architectural features of normal postnatal lamb hearts at both postnatal ages (Abdullah 2016). The latter results serve as basis for testing the hypothesis that hearts of FPT have persistent architectural changes that are manifestations of PPHN.

Methods Used Preterm lambs (~128 d gestation (term~150 d); equivalent to ~28 w gestation in humans), treated with antenatal steroids and postnatal surfactant and caffeine citrate, were managed by IMV for 3 d, weaned to non-invasive support for 3 d, and subsequently weaned from respiratory support and lived for 2 or 5 months' cPNA. Control term lambs lived for 2 or 5 months, respectively. Hearts were fixed at ventricular diastole and cut in cross-section. Thick sections (20 microns) were triple-stained for immunofluorescence (wheat germ agglutinin to visualize extracellular matrix, griffonia isolectin to visualize vasculature, and Topro-3 to visualize nuclei).

Summary of Results Cardiac myocyte architecture in situ appeared different between FPT compared to control lamb groups. Cardiac myocytes in the FPT groups were shorter and less rectilinear, and had fewer profiles of capillaries, compared to the respective control groups.

Conclusions Our confocal imaging results suggest that hearts of FPT have persistent architectural changes that may be manifestations of PPHN. We are relating these results to diffusion tensor imaging of the same hearts, as well as to direct measures of pulmonary artery pressure, cardiac output, and pulmonary vascular resistance to identify impacts of PPHN on the heart later in life. Supported by T35 HL07744, R01 HL110002

53 ANTENATAL PPAR-GAMMA AGONIST PIOGLITAZONE STIMULATES FETAL LUNG MATURATION EQUALLY IN MALES AND FEMALES

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10.1136/jim-2016-000365.53

Purpose of Study Antenatal steroids have been shown to accelerate fetal lung maturation, reduce the incidence of respiratory distress syndrome, and significantly decrease mortality in preterm infants. However, sex-specificity, i.e., being ineffective in males, is a significant limitation. The differential sex response to antenatal steroids is believed to be mediated via lung fibroblast response to dihydrotestosterone. Since PPAR- γ agonists accelerate fetal lung maturation by stimulating fetal lung epithelial-mesenchymal interactions, independent of fetal sex, we hypothesized that the effect of PPAR- γ agonist pioglitazone (PGZ) would be sex-independent.

Methods Used Time-mated Sprague Dawley rat dams were intraperitoneally administered diluent, dexamethasone (DEX) (0.25 mg/kg), or PGZ (0.3 mg/kg, 1 mg/kg, 3 mg/kg) in 100 μ l volumes on embryonic day (e)18 and e19. At e20, pups were delivered by cesarean section. Lungs were harvested and processed for markers of fetal lung maturation, i.e., surfactant protein B (SP-B), surfactant protein C (SP-C), cholinephosphate cytidylyltransferase- α (CCT- α), and peroxisome proliferator-activated receptor gamma (PPAR- γ) via Western blotting analysis. Rates of [3 H] triolein uptake and [3 H]choline incorporation into saturated phosphatidylcholine were used as markers of the rate of surfactant phospholipid synthesis. Genomic DNA was processed for Y-chromosome by PCR.

Summary of Results Compared to the control group, both DEX and PGZ exposed e20 lungs showed enhanced makers for lung maturation, i.e., dose dependent increases in PPAR- γ , SP-B, SP-C, CCT- α , and surfactant phospholipid synthesis ($p < 0.05$ for all). However, in contrast to DEX, which showed differential increases in lung maturation markers in females, the PGZ treated group showed equal increases in these markers in both males and females.

Conclusions Our results suggest that antenatal PGZ improves surfactant production and accelerates lung maturation like DEX. However, unlike DEX, the effects of PGZ are not sex-dependant. We speculate that PPAR- γ agonist administration is an effective and even a superior alternative to antenatal DEX for accelerating lung maturity in both males and females. [Grant Support: HL27137, HD71731; TRDRP: 23RT-0018]

54 EXTRAUTERINE GROWTH RESTRICTION DECREASES SERUM DHA IN MALE RATS AND LUNG PPAR γ PROTEIN IN MALE AND FEMALE RATS

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10.1136/jim-2016-000365.54

Purpose of Study Extrauterine growth restriction (EUGR) increases the incidence of lung disease and altered lung development. Lung development depends on nutrient activation of the transcriptional regulator PPAR γ in part by the long chain fatty acid docosahexaenoic acid (DHA). We previously showed that intrauterine growth restriction impairs lung development and decreases circulating DHA, as well as PPAR γ expression in rat pups. However whether EUGR affects circulating DHA, and lung PPAR γ protein abundance in the rat is unknown.

We hypothesize that EUGR decreases circulating DHA and lung PPAR γ protein abundance in the rat lung.

Methods Used EUGR was induced in our rat model using variation in litter size by cross fostering newborn rat pups into rat dams with litter sizes of 16 (EUGR) or 8 (control). Rat pup weights were measured every other day from birth to day of life 21 (d21). GC-MS was used to measure serum fatty acid profiles at d21. Western blotting was used to measure PPAR γ protein abundance in the lung at d21.

Summary of Results Results are EUGR values as % of control $\pm$ SD. EUGR rats weighed significantly less than control by d5 and through d21. EUGR decreased circulating DHA in male ($47\pm 16\%$ *) but not in female ($88\pm 27\%$) rat pups. EUGR decreased PPAR γ protein abundance in the lung of male ($32\pm 23\%$ *) and female ($14\pm 14\%$ *) rat pups. * $p\leq 0.05$

Conclusions We conclude that EUGR deregulates circulating DHA in male but not female rat pups as well as decreases lung PPAR γ protein abundance in male and female rat pups. We speculate that decreased circulating DHA with decreased lung PPAR γ protein abundance in male rats causes decreased transcription of lung PPAR γ targets in EUGR rat lung, thus contributing to alterations in lung development.

55 ACUTE VEGF AND CONNEXIN43 UPREGULATION IN RAT LUNG AND BRAIN FOLLOWING CHORIOAMNIONITIS

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10.1136/jim-2016-000365.55

Purpose of Study Chorioamnionitis (CHORIO), inflammation at the fetomaternal interface, is a leading cause of preterm birth. Numerous perinatal complications are associated with CHORIO, including bronchopulmonary dysplasia (BPD) and encephalopathy of prematurity. Previously, we have shown that CHORIO in a preclinical rat model leads to neurological sequelae including gait deficits, cognitive impairment and ventriculomegaly. However, the role of inflammation in the maternal-placental-fetal axis and subsequent interaction with the developing brain and lungs is unknown. Thus, we undertook a spatio-temporal investigation of vascular endothelial growth factor (VEGF) and Connexin43 (Cx43) in our preclinical model of CHORIO. Cx43 is a gap junction protein central to propagation of inflammation, and VEGF is a key regulator of vasculogenesis and angiogenesis. Together, these are essential molecular mediators of lung and brain development.

Methods Used On embryonic day 18 (E18) a laparotomy was performed with a transient (60 minutes) uterine artery occlusion (transient systemic hypoxia ischemia, TSHI) followed by injection of lipopolysaccharide (LPS, 4 μ g/amniotic sac) to mimic CHORIO. The laparotomy was then closed and dams recovered. Brain and lung tissue was collected from pups at E19 and postnatal day 0–7 (P0–7). Multiplex electrochemiluminescent immunoassays and western blots were performed in sham (laparotomy with no further intervention) and TSHI+LPS brain and lung tissue homogenates. Statistical analysis was performed with

a student's t-test ($n=3-5$ /group).

Summary of Results Acutely following TSHI+LPS at E19, VEGF was upregulated in both the brain and lung compared to the sham ($P=0.02$ and $P=0.001$, respectively). TSHI+LPS also increased Cx43 in E19 lung ($P=0.004$). Notably, TSHI+LPS led to a sustained increase in brain VEGF levels through the first postnatal week ($P=0.03$), concomitant with increased cerebral Cx43 ($P=0.08$).

Conclusions Taken together, these data show dysregulation in crucial molecular regulators of both lung and brain development in a clinically relevant animal model of CHORIO. Further study of mediators of inflammatory signal transduction and growth factors in the maternal-placental-fetal axis will aid in therapeutic targets and biomarker identification for preterm infants with CHORIO and associated lung and brain injury.

56 HMGB1: POTENTIAL MEDIATOR OF PERINATAL SENSITIVITY TO INFLAMMATORY STRESS

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10.1136/jim-2016-000365.56

Purpose of Study Compared to adults, neonates demonstrate increased susceptibility to infection. The mechanisms underlying this observation are not well understood. Cytosolic translocation of the nuclear protein HMGB1 is a late mediator of sepsis-related mortality in adults. Whether HMGB1 contributes to increased neonatal sensitivity to inflammatory stress is unknown. The objective of this study was to determine the developmental expression profile of HMGB1 and its receptors, and to determine if HMGB1 contributes to the increased susceptibility of neonates to endotoxemia.

Methods Used Protein and mRNA was isolated from fetal (E15, E19), neonatal (P0), and adult murine hepatic and pulmonary tissue. The expression of HMGB1 and its receptors (TLR4 and RAGE) was assessed by RT-qPCR and Western blot. To determine the effect of endotoxemia on HMGB1 nuclear export, Western blot was performed on hepatic and pulmonary nuclear extracts prepared from neonatal (P0) and adult wild-type mice exposed to LPS (5 mg/kg IP, 0–24 hours; 6 per time point).

Summary of Results Hepatic HMGB1 mRNA and protein expression were static from the perinatal period through adulthood. In contrast, pulmonary HMGB1 levels doubled over this time ($p<.05$). Pulmonary and hepatic TLR4 expression, as well as pulmonary RAGE expression were static throughout development. In contrast, hepatic RAGE expression was highest during the perinatal period, and decreased significantly throughout development ($p<.05$). In adult mice exposed to sublethal endotoxemia, pulmonary and hepatic nuclear HMGB1 levels were equal to control at 24 hours of exposure. In contrast, neonatal pulmonary and hepatic nuclear HMGB1 levels remained significantly lower compared to control at this time point.

Conclusions HMGB1, RAGE and TLR4 are expressed in the perinatal lung and liver, and pulmonary HMGB1 and hepatic RAGE expression are dynamic over development.

Endotoxemic neonates demonstrate sustained nuclear export of both pulmonary and hepatic HMGB1. These findings may help explain organ-specific responses to infection and increased sensitivity to inflammatory stress in the neonatal period.

Neonatology General I Concurrent Session 12:45 PM Thursday, January 26, 2017

57 IDENTIFICATION OF RISK FOR NEONATAL HEMOLYSIS: A MULTI-CENTER STUDY

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10.1136/jim-2016-000365.57

Purpose of Study Levels of end-tidal breath carbon monoxide (CO), corrected for ambient CO, or ETCOc are accurate biomarkers of bilirubin production and risk of hemolysis. In this multi-center study, we determined postnatal ETCOc ranges from healthy term newborns, correlated these values to risk of developing hyperbilirubinemia (as defined by the hour-specific bilirubin nomogram) and assessed if their combined use can identify infants at high risk.

Methods Used Otherwise healthy infants (n=333) recruited from 5 well-baby nurseries were enrolled at ages 6–120 h. Serial ETCOc measurements (≤ 4) were done on each infant until discharge. Total bilirubin (TB) levels were measured by the diazo method (n=4 sites) or transcutaneously (TcB, n=1 site). TB levels were then plotted on the hour-specific Bhutani nomogram to assign percentile risk and correlated with ETCOc ranges and subsequent phototherapy prescription.

Summary of Results Mean postnatal ETCOc levels (ppm, n=681 from 333 infants) from all centers were 1.83 ± 0.5 , 1.65 ± 0.5 , 1.65 ± 0.5 , and 1.66 ± 0.5 for ages $6 < 20$ h, $20 \leq 47$ h, $48 \leq 72$ h, and ≥ 72 h, respectively. ETCOc levels were not significantly different at postnatal ages > 20 h. In a subcohort with paired TB and ETCOc measurements (n=247), infants with TB > 75 th percentile were more likely to have ETCOc > 1.6 (73 vs 27%, $\chi^2 = 10.1$, $p < 0.001$). ETCOc > 2.5 was observed in only 6.1% (15/247). More importantly, phototherapy was not prescribed in newborns who had TB < 75 th percentile and ETCOc < 1.6 (n=83) as compared to 17.2% (5/29) of infants with TB > 75 th percentile and ETCOc > 2.0 ($p < 0.001$).

Conclusions In summary, postnatal ETCOc levels remain stable through 72 h of age in healthy term infants. When paired with TB > 75 th percentile and ETCOc > 2.0 , infants at highest risk for developing extreme hemolytic hyperbilirubinemia and most likely to need phototherapy can be identified. We conclude that the combined use of both TB and ETCOc levels can be integrated into an interpretive algorithm to manage neonatal hyperbilirubinemia.

58 PARENTAL ASSESSMENT OF EXECUTIVE FUNCTION IN FORMER PRETERM INFANTS

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10.1136/jim-2016-000365.58

Purpose of Study We previously reported improved cognition and executive function (EF) at 3.5–4 years among infants randomized to receive erythropoiesis stimulating agents (ESAs). The Behavior Rating Inventory of Executive Function (BRIEF) is a parent questionnaire that measures perception of child executive function (i.e., cognitive flexibility, inhibition & working memory). We determined if the BRIEF questionnaire correlated with tests of cognition and EF.

Methods Used Preterm infants originally randomized to ESAs or placebo were enrolled in the BRITE (Brain Imaging and Developmental Follow up of Infants Treated with Erythropoietin) study. Children born at term served as controls. Children's IQ, EF, and visual-motor skills were evaluated at 3.5–4 years of age. Parents completed the BRIEF questionnaire.

Summary of Results Of the 80 children born preterm and evaluated at 2 years, 50 were enrolled in the BRITE study (36 ESA, 14 placebo); they were comparable for test age, birth weight, and gestational age. 23 term controls were enrolled. ANOVA with post hoc analysis of BRIEF revealed no significant difference between ESA and placebo groups in all areas. Term controls had significantly higher scores compared to the placebo group in all areas ($p < 0.05$). There were no differences between ESA and term controls in BRIEF subsets of inhibit, emotional control (EC) and inhibitory self-control index (ISCI=inhibit+EC). In a partial correlation of the preterm groups (controlling for income, test age, and gender), there was an inverse relationship between FSIQ with EC & Flexibility Index (FI). In the same correlation, there was an inverse relationship between VIQ & Gift Delay with Shift (ability to move from one activity to another).

Conclusions Infants randomized to ESAs showed no significant difference in parentally assessed EF compared to placebo. There were no significant differences between ESA and term group in ISCI, inhibit, & EC suggesting the ESA group is approaching term controls in EF ability. Partial correlation suggested the BRIEF may be related to IQ in a former preterm population.

59 CREATING REFERENCE INTERVALS FOR THE IMMATURE PLATELET FRACTION IN NEONATES AND USING THIS PARAMETER TO CATEGORIZE NEONATAL THROMBOCYTOPENIAS

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10.1136/jim-2016-000365.59

Purpose of Study Thrombocytopenia is a common problem in neonatal intensive care units. The immature platelet fraction (IPF) is a measurement of immature

platelets in the circulation and is a reflection of the state of thrombopoiesis. IPF values can be expressed either as the percent of immature platelets (IPF%) or the absolute number of immature platelets (IPF/ μ L). The highly-fluorescent IPF (H-IPF%) identifies the most immature platelets. We sought to establish reference ranges for the three IPF parameters in neonates, based on gestational and post-natal age, and to evaluate whether the IPF can be used to categorize neonatal thrombocytopenias regarding the underlying kinetic mechanism as hypoproliferative or consumptive.

Methods Used We performed a retrospective analysis of deidentified data from neonatal complete blood counts (CBCs), producing reference intervals for the three IPF parameters according to gestational age at birth and post-natal age. The data set was from non-thrombocytopenic neonates. Then we reviewed charts of neonates with ≥ 2 platelet counts $<100,000/\mu$ L to determine the cause of their thrombocytopenia and evaluate whether their IPF was related to the kinetic cause of the thrombocytopenia.

Summary of Results The database contained 20,614 CBCs from 8,967 neonates without thrombocytopenia. The upper reference intervals for IPF%, IPF/ μ L, and H-IPF% at birth decreased with increasing gestational age. The average upper reference interval for IPF% was 8% on the day of birth and 10% over the first 90 days of life in term infants. Infants with consumptive thrombocytopenia had higher IPF% and IPF/ μ L compared to infants with hypoproliferative thrombocytopenia ($p=0.04$ and 0.0002 respectively).

Conclusions Neonatal reference intervals for the IPF can be used to recognize abnormal values. In thrombocytopenic neonates, high IPF values suggest consumptive varieties of thrombocytopenia and normal values suggest hypoproliferative thrombocytopenias.

60 DEFINING THE IRON STATUS AT BIRTH OF INFANTS AT RISK FOR IRON DEFICIENCY

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10.1136/jim-2016-000365.60

Purpose of Study Iron deficiency at critical times during brain development can result in neurocognitive deficiencies. Small for gestational age (SGA) neonates, infants of diabetic mothers (IDM), and very-low-birth-weight premature neonates (VLBW) are reported to be at risk for developing both iron deficiency and neurocognitive delays. We sought to define the iron status at birth of these infants.

Methods Used We conducted a pilot study at two perinatal centers. At birth, umbilical cord blood was obtained from SGA ($n=10$), IDM ($n=10$), VLBW ($n=10$) and healthy control neonates ($n=20$). Serum iron, transferrin, iron binding capacity, percent iron binding capacity saturation, ferritin, soluble transferrin receptor, zinc protophyrin to heme ratio, reticulocyte hemoglobin content, and other relevant CBC parameters were measured in all neonates.

Summary of Results Six of the 50 neonates had evidence of iron-deficiency at birth, with the consistent pattern of low serum iron, low % iron saturation, low ferritin, elevated soluble transferrin receptor, and elevated zinc protophyrin to heme ratio. This pattern of iron deficiency was found in 1 of 10 SGA, 1 of 10 IDM, 3 of 10 VLBW, and 1 of 20 controls. None of the six had evidence of iron-deficient erythropoiesis or iron deficiency anemia.

Conclusions Biochemical iron deficiency was found in 12% of screened neonates and 17% of screened high risk neonates. Additional study is needed to assess potential contributions from the maternal iron status and derangements in placental iron-transport. Studies are also needed to determine whether these infants are at risk for subsequent development of iron-limited erythropoiesis, iron deficiency anemia, or iron-limited neurocognitive delay. We speculate that some neonates could benefit from initiating iron supplementation earlier than current recommendations suggest.

61 REVERSAL OF INTRACEREBRAL TEMPERATURE GRADIENT IN NEONATAL HYPOXIC-ISCHEMIC ENCEPHALOPATHY DURING AND AFTER WHOLE-BODY THERAPEUTIC HYPOTHERMIA

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10.1136/jim-2016-000365.61

Purpose of Study In physiological conditions, core brain temperature is about 0.5 to 1°C warmer than peripheral brain. We aim to determine the brain temperatures within regions of interests most commonly injured in infants with hypoxic-ischemic encephalopathy (HIE).

Methods Used Infants with HIE admitted to Children's Hospital Los Angeles for therapeutic hypothermia (TH) from April 2012 to July 2016 were enrolled into the study. MR scans were obtained during and after TH. By way of MR spectroscopy (MRS) and measuring the absolute chemical shift difference between the water signal and metabolites at the thalamus (Thal), basal ganglia (BG), and gray matter (GM) the respective temperatures were extrapolated. Rectal temperatures were recorded during MRS acquisition.

Summary of Results Forty-seven patients (mean birth-weight 3277 ± 606 g and gestational age 39 ± 2 weeks) were enrolled and 88 MRS analyzed. There was a significant difference in mean brain temperature during and after TH (33.2 ± 0.9 vs. $36.2 \pm 0.8^\circ\text{C}$, $p < 0.01$). Mean distance (SD) from skull bone to Thal, BG, and GM were 37.0 ± 1.9 , 27.9 ± 1.2 , and 19.1 ± 2.4 mm, respectively. RM-ANOVA showed significant difference in regional brain temperature during and after TH. Post-hoc Tukey's multiple comparisons test revealed Thal temperature to be significantly lower than GM during and after TH (32.9 ± 0.9 vs $33.6 \pm 0.8^\circ\text{C}$ and 36.2 ± 0.8 vs $36.7 \pm 0.8^\circ\text{C}$, both $p < 0.01$). There was no significant correlation between brain temperature and body weight, gestational age.

Conclusions During and after TH, deep brain structures (Thal and BG) were significantly lower in temperature than

superficial brain (GM). The reversal of intracerebral temperature gradient persists after TH, suggesting a disruption in temperature regulation in the injured brain.

62 RESOURCE UTILIZATION PATTERNS OF NEONATES WITH HYPOXIC-ISCHEMIC ENCEPHALOPATHY IN CHILDREN'S HOSPITALS AND NON-CHILDREN'S HOSPITALS IN THE UNITED STATES FROM 1997–2012

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10.1136/jim-2016-000365.62

Purpose of Study Therapeutic hypothermia (TH) has become standard of care for neonatal hypoxic-ischemic encephalopathy (HIE) in recent years. However, resource utilization patterns between children's and non-children's hospitals have not been thoroughly investigated. We aimed to determine if resource utilization, such as length of stay (LOS), hospital cost and diagnostic procedures for the management of neonatal HIE differed between children's and non-children's hospitals.

Methods Used Data was retrospectively extracted from the national Healthcare Cost and Utilization Project (HCUP) Kids' Inpatient Database (KID) from 1997 to 2012. Neonates with HIE (ICD-9-CM codes 768.0–3, 768.5) were identified. Hospital costs were adjusted for inflation relative to year 2012. Bivariate tests were used to compare resource utilization of HIE neonates treated in children's and non-children's hospitals.

Summary of Results A total of 86,454 cases (4,612 in children's and 81,842 in non-children's hospital) with the diagnosis of neonatal HIE were identified. LOS, hospital cost and TH utilization were significantly higher in children's hospitals ($p < 0.01$). Median LOS (IQR) in children's hospitals was 10(18) days, whereas it was 3(3) days for non-children's hospitals. Median cost (IQR) was \$23,395 (53,130) for children's hospital, compared to \$1,675 (5,988) for non-children's hospitals. More neonates received TH in children's hospital (49.5%) than in non-children's hospital (9.6%). Cases at a children's hospital were also more likely to receive diagnostic procedures such as EEG (3.8%) and MRI (3.3%) compared to a non-children's hospital (0.4% and 0.7%, respectively) ($p < 0.01$).

Conclusions Significant differences in resource utilization for treating neonatal HIE were found in children's hospitals vs. non-children's care units. The higher cost for neonates with HIE cared for in children's hospitals may be due to higher utilization of TH, MRI and EEG.

63 NEONATAL SEPSIS DUE TO RESPIRATORY SHIGELLA INFECTION

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10.1136/jim-2016-000365.63

While neonatal sepsis due to Shigella and E.coli infections is relatively common, our literature review revealed no published cases of sepsis caused by respiratory Shigella infection. We present the case of a 3-day old infant of estimated 33 wk gestation with no prenatal care born outside the hospital to a homeless mother, who had diarrhea at time of delivery and reported using unsterilized scissors to cut the umbilical cord and utilizing a used shoelace to tie it. Given this history and patient's presentation of lethargy, poor feeding, diffuse hypertonia and trismus, there was initial concern for tetanus and the infant was treated with IVIG. However, the time course was inconsistent with this diagnosis as average incubation period is about 8 days. Endotracheal aspirate cultures obtained on admission, grew E.coli and Shigella on day 4 of hospitalization. The infant was initially treated with empiric antibiotics, which were narrowed to Cefotaxime and Gentamicin based on endotracheal cultures. Patient recovered on this therapy and was discharged to foster care at 1 month of age.

This case illustrated the potential for severe neonatal infection by aspiration of maternal fecal material during delivery.

64 QUALITY INITIATIVE TO ACHIEVE OPTIMAL THERAPEUTIC HYPOTHERMIA DURING TRANSPORT FOR INFANTS WITH NEONATAL ENCEPHALOPATHY

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10.1136/jim-2016-000365.64

Purpose of Study Neuroprotection with therapeutic hypothermia (TH) is the standard of care for Neonatal Encephalopathy (NE) resulting in decreased death and disability at 18–24 months. TH initiated shortly after the insult results in a greater neuroprotection compared to delayed initiation. The objective of this study was to evaluate how changes in protocol affected the admission temperatures of infants transported to a regional level IV NICU for TH.

Methods Used We identified infants with NE who were transported to our institution (Children's Hospital Colorado) for TH through the Children's Hospital Neonatal Database from 2010–2016. This data was combined with transport team data to further evaluate infant temperature throughout transport and the mode of cooling during transport. Two interventions were undertaken. Review of the transport Body Cooling Protocol revealed a suboptimal temperature goal of 34–35 C, this protocol was revised to 33–34 C and is reflected in infants admitted in 2015–2016. The second intervention was the increased use of an active cooling protocol with gel packs during transport.

Summary of Results 133 eligible infants were analyzed between 1/2010 and 7/2016. Infants were transported a median of 18 miles (IQR 0.3–560 miles) for continuation of TH. Admission temperatures were stratified by distance transported; prior to 2015, infants transported <10 mi arrived within goal temperature range 13.3% (mean 35.6 C) which improved to 36.4% (mean 34.6 C) post-intervention. Those transported 11–30 mi arrived within goal temperature range 23.8% (mean 34.3 C) pre-intervention and

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improved to 60% (mean 33.6 C) post-intervention. Infants transported >31 mi arrived within goal temperature range 21.4% (mean 34.5 C) pre-intervention with post-intervention improvement to 61.5% (mean 33.8 C). The use of active cooling increased from 9% before 2015 to 44% during 2015–2016.

Conclusions Increased utilization of active cooling during transport has the ability to improve the percentage of infants admitted within the target range but the use of servo-controlled mattresses is indicated to further improve target admission temperatures.

65 VULNERABILITIES AND OUTCOMES OF LATE PRETERM INFANTS MANAGED BY PROTOCOL

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10.1136/jim-2016-000365.65

Purpose of Study To determine the medical and nutritional profiles of late preterm infants (LPI) managed by protocol and correlate with readmission in the first month of life.

Methods Used In 2001, a LPI protocol was instituted at UC San Diego Medical Center, standardizing admission to NICU, feeding guidelines, criteria for transfer to couplet care and discharge. A retrospective chart review was performed for 210 infants born at 34 0/7–36 6/7 weeks in 2015. Data collected included infant medical history and maternal metrics. Readmission data was obtained from the one regional children's hospital and our institution.

Summary of Results LPI are a vulnerable group, the majority delivered by Cesarean section and many are twins. Their feeding skills are immature, with one in three requiring nasogastric feeds. They have additional medical vulnerabilities; 25% needed phototherapy. None of the 34 weekers, 35% of 35 weekers and 66% of 36 weekers met criteria to join their mothers in couplet care, resulting in 59% being discharged from the NICU. The most immature LPI may require longer length of stay to demonstrate discharge readiness. The readmission rate was 2%.

Conclusions LPI are often deemed mature at birth and remain with their mothers in couplet care. National data show that these immature infants may be sent home before 48 hours, and recent reports are demonstrating high levels of readmission, most often for hyperbilirubinemia and feeding issues.

In 2001, increasing LPI readmissions led to our implementation of a protocol. Instituting a period of observation in the

NICU and criteria for joining mother in couplet care while providing high levels of lactation support has allowed us to optimize breastfeeding and identify fragile feeders. Discharge criteria including weight gain, bilirubin screening, and feeding assessment have led to low rates of readmission. Length of stay data driven by infant discharge readiness and not maternal or provider factors may better reflect optimal targets to reduce readmission rates of this vulnerable group of infants.

Surgery I Concurrent Session 12:45 PM Thursday, January 26, 2017

66 PLATELET-RICH PLASMA AND STROMAL VASCULAR FRACTION FROM AUTOLOGOUS FAT: A NEW COMBINATION THERAPY FOR OSTEOARTHRITIS

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10.1136/jim-2016-000365.66

Purpose of Study Osteoarthritis (OA) is a degenerative joint disease that can cause severe pain in those affected. Currently, there are no therapeutic drugs available to treat osteoarthritis. While total joint arthroplasties (TJA) allow for improved function, there are no less invasive, yet effective procedures that can be done for patients unable to undergo major surgery.

Platelet-rich plasma (PRP) has been shown to reduce the symptoms of OA when injected into the affected joint. Patients treated by this method have improved self-reported pain and improved lower extremity function. While PRP treatment of OA has been positive, treatment with SVF offers additional benefits that PRP alone cannot. SVF contains a significant amount of mesenchymal stem cells which hold regenerative potential. The potential to generate new cartilage in osteoarthritic joints goes beyond treatment of the symptoms, offering a reversal of the harmful pathology. Considering the positive results seen from both SVF and PRP treatment, the reduced risk of surgical complication when compared to TJA, and the possibility for equal or greater pain improvement and joint functionality compared to TJA, we believed it would be advantageous to investigate a combined PRP and SVF therapy for relief of OA.

Methods Used Patients with moderate osteoarthritis presenting with severe hip pain were selected for treatment. After an informed consent process, patients were taken to

Abstract 65 Table 1 LPI Features and Outcomes

Gestational Age	Twins	%C-Section	Birth Weight	NG Tube	Photo-therapy	Home on Human Milk	Length of Stay Median	Discharge from NICU	Readmission
34 week (#47)	32%	70%	2032 g	64%	23%	85%	13.5 d	100%	0%
35 week (#66)	30%	55%	2528 g	39%	32%	88%	8 d	65%	3%
36 week #97	19%	35%	2705 g	13%	20%	87%	4 d	34%	2%
All LPI (#210)	25%	53%	2590 g	33%	24%	88%	7 d	59%	2%

the operating room for the combination treatment. SVF was isolated using liposuction equipment, and PRP and SVF were centrifuged independently. With ultrasound guidance, a mixture of PRP (10 mL) and SVF (10 mL) was injected into the osteoarthritic hip joints of patients under general anesthesia. The Western Ontario and McMaster Universities Arthritis Index (WOMAC) scale was used to assess patients for pain improvement preoperatively and postoperatively.

Summary of Results WOMAC scores were 67/96 preoperatively, and 17/96 at five weeks post-op. This indicated a decrease in pain and increased mobility. The procedure was both efficient—taking approximately one hour of operative time—and cost effective. No intraoperative or postoperative morbidities were found.

Conclusions This new combination therapy offers a minimally invasive, low-risk and high-satisfaction treatment for osteoarthritic joints.

67 LIVING AT HIGHER ALTITUDES INCREASES THE RISK OF SURGICAL COMPLICATIONS AFTER BREAST RECONSTRUCTION SURGERY

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10.1136/jim-2016-000365.67

Purpose of Study It has been anecdotally noted that patients who live at higher altitudes are at an increased risk for developing complications after breast reconstruction surgery.

Methods Used Data was collected for patients that received breast reconstruction surgery through the Loma Linda University Plastic Surgery Department during 2013–2015. Zip codes were obtained for each of the patients through chart review and a list of patients with complications was gathered from the plastic surgery morbidity and mortality database. All post-surgical complications including infectious, wound-related, implant-based, and systemic were included. The patients were grouped by elevation data.

Summary of Results During the three-year span, 1418 patients were identified to have had breast reconstruction surgery. Out of these, 70 had a surgical complication. Of the patients with complications, 10 lived at a high altitude (above 3000 feet). 41 of the patients with no complications lived at a high altitude. The risk for developing complications at higher altitudes was 19.6% (10/51) while the risk at lower altitudes was 4.4% (60/1367). The risk increase at altitudes above 3000 feet is 15.2% with χ^2 analysis giving $p < .000001$. In the second analysis, 4 of the patients living at a high altitude (above 5000 feet) had complications and 10 of the patients with no complications lived at a high altitude. The risk for developing complications at higher altitudes was 28.6% (4/14) while the risk at lower altitudes was 4.7% (66/1404). The risk increase at altitudes above 5000 feet is 23.9% with χ^2 analysis giving $p < .000041$.

Conclusions We sought to investigate whether patients that lived at high altitudes would be at an increased risk of

developing surgical complications after having breast reconstruction surgery. It is clear that living at altitudes above 3000 feet increases the relative risk of complications by a factor of 3. Furthermore, patients living above 5000 feet are at an increased relative risk of 4 fold. Physicians should be aware of the significantly increased risk of complications for living at high altitudes when they counsel their patients for breast reconstruction surgery.

68 A COMPARATIVE ANALYSIS OF SURGICAL WOUND INFECTION METHODS: INADEQUACIES OF CDC CLASSIFICATIONS IN BREAST RECONSTRUCTION

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10.1136/jim-2016-000365.68

Purpose of Study Currently there is no universal system that allows surgeons to assess surgical site infections; however, it is not uncommon for surgeons to use different scoring systems to grade wounds. Some common scoring systems include the Center for Disease Control (CDC) definition, the Southampton scale, and the ASEPSIS system. The CDC classifies wounds as superficial incisional surgical site infections (SSI), deep incisional SSIs, and organ/space SSIs. Southampton categorizes wounds based on the presence of erythema, discharge, pus, and hematomas. ASEPSIS assigns points based on the proportion of wounds affected by serous exudate, erythema, purulent exudate, and separation or deep tissues. Further points are given for additional treatments. The purpose of this study was to compare these different scoring methods within a population of breast reconstructive patients.

Methods Used A retrospective analysis was done of surgical wound infections from breast reconstruction using a morbidity and mortality database from January 2013–June 2016. Demographic information, medical history, and wound features were obtained and used to calculate various wound scores.

Summary of Results All of our 22 evaluated wounds were classified as Superficial Incisional SSIs using the CDC definition, while their ASEPSIS and Southampton scores varied. For example, a patient with an ASEPSIS score of 12—exhibiting only erythema—and another patient, with a score of 45—displayed a wound with serous and purulent exudate, erythema, debridement, and removal of pus—both displayed the same CDC classification. A patient displaying signs of normal healing fell under Southampton category IC, whereas an additional patient that had a hematoma, pus, discharge, and erythema was categorized as V. Both these patients received the same CDC score. The subjective diagnosis of a SSI by a medical professional creates the discrepancies inherent to the CDC criteria.

Conclusions As seen, the CDC definition is inadequate for identifying wounds secondary to breast reconstruction. The ASEPSIS and Southampton methods show promise. Further analysis should be done to find the predictive value of available scoring systems within plastic surgery.

69 LIGHTS, CAMERA, SIMULATION: USING SIMULATION AND MULTIMEDIA TO IMPROVE THE LEARNING EXPERIENCE OF MEDICAL CLERKS DURING SURGERY ROTATIONS

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10.1136/jim-2016-000365.69

Purpose of Study When medical students begin their general surgery clerkship in their third year, they are expected to see and perform several surgical procedures in order to meet core clerkship objectives. Currently, there is not yet an avenue for students to safely practice these skills. As a result, students are often ill-prepared when it comes time to perform a procedure on a patient. This project focuses on developing accessible, self-sustaining resources to improve the educational experience of third year medical students on their surgery rotation.

Methods Used Surgical simulation videos were created for 3 procedures and 4 techniques (Inserting a nasogastric tube, applying surgical skin staples, and inserting a urinary catheter for males and females; gowning and gloving, applying direct pressure to stop an intraoperative bleed, sterile dressing change, and sterile techniques in the operating room). The simulations were designed using materials that allow the simulation to be sustainable over repeated use. Each simulation is presented in an instructional step-by-step video, and is supplemented by documents providing background information (indications, contraindications, risks, complications) for each procedure.

Summary of Results These materials will be incorporated into the medical curriculum by making them available online to clerkship students and establishing stations in our simulation centre.

Conclusions Student feedback will be taken to measure the effectiveness of multimedia and simulations in medical education, and whether to apply these methods more broadly throughout the medical curriculum.

70 PERIOPERATIVE SAFETY OF UNINTERRUPTED THERAPEUTIC WARFARIN ANTICOAGULATION FOR PRIMARY TOTAL HIP AND KNEE ARTHROPLASTY

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10.1136/jim-2016-000365.70

Purpose of Study Management of surgical candidates who are chronically anticoagulated with warfarin is an area of controversy for orthopedic surgeons. While the continuation of chronic warfarin therapy as primary perioperative thromboprophylaxis is gaining acceptance in cutaneous procedures, maintaining patients at therapeutic INR values during arthroplasty continues to cause concern for excessive blood loss. While bridging therapy with low molecular weight heparin is currently recommended for patients on chronic warfarin therapy, few studies have evaluated the safety of continuing patients on warfarin during total joint

Abstract 69 Figure 1 How to Insert a Nasogastric Tube

arthroplasty—making concerns about increased perioperative bleeding risk largely theoretical. Our study evaluates the safety and efficacy of continuous therapeutic warfarin anticoagulation in conjunction with primary hip and knee replacement.

Methods Used We conducted a retrospective, matched-pair analysis of patients who underwent primary THA or TKA performed by a single surgeon. 49 patients who underwent arthroplasty while therapeutically anticoagulated with warfarin (INR 2.0–3.0) were matched with 49 non-anticoagulated controls based on age, sex, BMI, intraoperative tranexamic acid use, date of surgery, type of surgery, and pre-operative hemoglobin value.

Summary of Results The warfarin and control groups were similar for age ($p=0.88$), sex ($p=1.0$), BMI ($p=0.14$), and pre-operative hemoglobin value ($p=.88$). 33% of matched pairs underwent THA (32 patients), while 67% underwent TKA (66 patients). The percentage change in hemoglobin value post-surgery was not greater in the warfarin group than in controls ($p=0.89$). Additionally, units RBCs transfused ($p=0.49$), surgical site infection rates ($p=1.0$), bleeding complication rates ($p=1.0$), thrombotic complication rates ($p=1.0$), and overall complication rates ($p=0.23$) were similar between groups.

Conclusions Many considerations must be made when choosing perioperative thromboembolic prophylaxis for arthroplasty candidates with medical comorbidities requiring chronic anticoagulation. While current guidelines suggest that patients on chronic warfarin anticoagulation should discontinue warfarin and undergo bridging therapy, our data suggests that it is safe to continue therapeutic warfarin administration prior to and during hip and knee arthroplasty surgery.

71 DO ADOLESCENTS WITH GYNECOMASTIA NEED TO BE EVALUATED BY ENDOCRINOLOGY PREOPERATIVELY?

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Purpose of Study Gynecomastia is the benign proliferation of glandular breast tissue; it affects up to 65% of

adolescent males. These children are routinely referred to endocrinology for assessment to exclude medical causes. The objective of this study was to examine the yield of endocrinological investigations in the evaluation of pediatric gynecomastia.

Methods Used A 25-year retrospective review was conducted. Data collection included all patients with gynecomastia presenting to the pediatric endocrinology clinic at a quaternary hospital with a catchment of four million patients. Clinical metrics, endocrinological test results, costs and treatment details were reviewed.

Summary of Results 197 patients were evaluated by endocrinology. 98 (50%) were classified as overweight or obese and 29 (15%) had a positive family history. The mean age of onset was 11.4, of which 26 cases (13%) were prepubertal. A total of 15 patients (7.6%) were diagnosed with secondary gynecomastia (10 related to medication or marijuana usage). Endocrine investigations were performed in 173 patients (87%) with positive findings in 3 cases (1.7%). The mean ages of spontaneous resolution and surgery were 14.5 and 15.9 respectively. Outcomes were surgery (n=91) and observation (n=110). The cost per patient for an endocrine evaluation was \$461.

Conclusions The endocrinological workup is a low yield component of the diagnostic algorithm; it identified secondary gynecomastia in 7.6% of patients—of which only 1.7% were evident on bloodwork; it is associated with an avoidable case cost burden (\$461) to the healthcare system and unnecessary invasive testing for the child. Since the majority of cases (67%) were shown to be drug-induced, we recommend a comprehensive medical history conducted by a primary care provider and endocrinology work-up only when clinically indicated. Referral for surgery is warranted if gynecomastia persists beyond 14.5 years of age.

72 INTERMEDIATE-TERM OUTCOMES OF PULMONARY VALVE REPLACEMENT IN THE MODERN ERA: COMPARISON OF TWO THERAPIES, SURGICAL PULMONARY VALVE REPLACEMENT VERSUS TRANSCATHETER PULMONARY VALVE REPLACEMENT

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10.1136/jim-2016-000365.72

Purpose of Study To compare outcomes of surgical pulmonary valve replacement (SPVR) versus transcatheter pulmonary valve replacements with melody valves (TPVR) at our institution.

Methods Used Retrospective review of all patients who underwent SPVR and TPVR from June 2005 to June 2016.

Summary of Results A total of 131 patients underwent SPVR and 39 patients had TPVR for severe pulmonary valve dysfunction. All SPVR patients had at least 1 previous cardiac procedure (range: 1–6) and 66% had a concomitant procedure at the time of SPVR. Median age for SPVR group was 15 yr (range 10–20) while TPVR group median age was 17.5 yr (range 10–22.6). Operative mortality was zero for both groups. Median length of stay was 48.5 hours (range 48–72) for SPVR group and 28 hours (range

Abstract 72 Table 1

	Median length of stay (hours)	Median total direct cost
SPVR	48	\$202,282
TPVR	29	\$151,395

21–32) for TPVR group ($p<.001$). There was no significant difference in complications (bleeding, infection, arrhythmias) between the two groups ($p<0.69$). Hospital charges were lower for the TPVR group; however, 8% of attempted TPVRs were aborted due to coronary artery compression. Freedom from re-intervention for the SPVR group was 100% at 5 years and 94% at 10 years.

Conclusions The outcome of SPVR and TPVR is excellent, with minimal morbidity. The medium term durability of SPVR is very good, while that of TPVR is still unknown. TPVR may not be applicable to all patients, but when performed, it appears to be less costly than SPVR. Both therapies are not mutually exclusive from each other.

73 THE IMPACT OF THE AFFORDABLE CARE ACT AFTER SIX YEARS: DECREASING REVENUE IN PLASTIC SURGERY DESPITE INCREASED RATES OF INSURED PATIENTS

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10.1136/jim-2016-000365.73

Purpose of Study Our eight-plastic-surgeon-practice has previously found that while the Affordable Care Act (ACA) has decreased the percentage of uninsured plastic surgery patients by an average of 64.22%, collection rates of the local managed Medicaid ACA provider have been significantly lower than that of all other insurance payments. As we have started to contract with individual ACA benefit plans, this study seeks to quantitatively reevaluate the impact of the ACA on plastic surgery practice revenue.

Methods Used Detailed plastic surgery billing information for January 2013 to December 2015 was collected. Collection rates of ACA insurers and other payors were compared side-by-side in 6-month intervals using 1-tailed paired t-tests. Collection rates of individual ACA benefit plans were plotted over time.

Summary of Results Managed MediCal collection rates

Abstract 73 Table 1

Months	Managed MCAL Charge Capture	All Other Charge Capture	P-Values
Jan 2013-Jun 2013	14.18%	27.11%	3.46E-05
Jul 2013-Dec 2013	11.35%	27.80%	5.86E-05
Jan 2014-Jun 2014	13.74%	29.08%	8.28E-05
Jul 2014-Dec 2014	14.33%	30.94%	9.55E-06
Jan 2015-Jun 2015	14.00%	28.90%	3.57E-06
Jul 2015-Dec 2015	15.44%	29.41%	3.28E-06

Abstract 73 Figure 1

are consistently significantly lower than that of all other insurance payors over this three-year period [Table 1]. An individual contracted ACA healthcare plan shows an increase in payment following the initiation of contracted rates in October 2015 [Figure 1].

Conclusions Although overall ACA payor collection rates have remained significantly lower than other insurances, the positive trend in income from an individual benefit plan reflects the impact of a specific contract.

74 DISTINCT RISK FACTORS FOR SUPERFICIAL VERSUS ORGAN-SPACE SURGICAL SITE INFECTIONS AFTER PANCREAS SURGERY

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10.1136/jim-2016-000365.74

Purpose of Study SSI rates are increasingly used as a quality metric, and a trial investigating piperacillin-tazobactam versus cephalosporin perioperative prophylaxis has been proposed. However, RFs for SSI in pancreas surgery remain undefined. NSQIP codes three SSI types: superficial, deep-incisional, organ-space, but only reports one overall SSI rate. Thus, the aim is to stratify superficial and organ-space surgical site infections (SSIs) after pancreatectomy and investigate their modifiable risk factors (RFs).

Methods Used NSQIP-HPB data were obtained for 201 patients undergoing pancreatectomy from July 2013-June 2015 at our institution. Patients routinely received piperacillin-tazobactam perioperatively. Univariate and multivariate analyses were performed to assess RFs and outcomes.

Summary of Results The overall SSI rate was 28.9%; superficial, deep-incisional, and organ-space SSI rates were 13.9, 4.0, and 11.9%. Only four patients (2%) had concurrent superficial and organ-space SSIs. Independent RFs for superficial SSI were preoperative biliary stenting and immunosuppressive corticosteroids [odds-ratio (OR)=4.1, $p=0.042$; OR=24.8, $p=0.007$], while soft gland texture was the only RF for organ-space SSI [OR=5.11, $p=0.008$]. Relatedly, postoperative pancreatic fistula was highly associated with organ-space [OR=35.2, $p<0.001$], but not

superficial SSI. Smoking, diabetes, albumin, preoperative chemotherapy, histology, or Whipple versus distal resection were not predictive of SSI. Organ-space, but not superficial SSI, was associated with increased odds of sepsis and prolonged length-of-stay [OR=10.0, $p<0.001$; OR=2.9, $p=0.015$].

Conclusions Preoperative biliary stenting and steroids increase superficial SSI, even in patients receiving piperacillin-tazobactam. Extended perioperative antibiotics should be considered in these patients. Organ-space SSIs appear related to pancreatic fistulae, which are not modifiable. Reporting these as a single, "overall" SSI rate may be misleading.

Cardiovascular II Concurrent Session

3:15 PM

Thursday, January 26, 2017

75 ETIOLOGY OF SUDDEN CARDIAC ARREST AND DEATH IN COMPETITIVE ATHLETES IN THE UNITED STATES: A 2-YEAR PROSPECTIVE STUDY

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Purpose of Study Cardiovascular disorders are the leading cause of sudden death in young athletes. The purpose of this study was to determine the etiology of sudden cardiac arrest and death (SCA/D) in competitive athletes through a comprehensive prospective surveillance.

Methods Used Cases of SCA/D were identified from July 1, 2014 through June 30, 2016, through traditional and social media searches, direct reporting to the National Center for Catastrophic Sports Injury Research, and review of student-athlete deaths on the NCAA Resolutions List. Autopsy reports and medical records were reviewed by a multidisciplinary panel to determine the underlying cause.

Summary of Results 170 cases were identified (71 arrests with survival, 99 deaths): average age 16.6 years (range 11–29), 142 (84%) male, 78 (46%) Caucasian and 51 (30%) African-American. 32 (19%) cases occurred in middle school, 97 (57%) in high school, 21 (12%) in college, and 20 (12%) in other athletes. 126 (74%) cases occurred during exercise and 35 (21%) during rest/sleep. 16 sports were involved, with 50 (29%) cases in basketball and 45 (27%) in football.

83 (49%) cases had a reported or adjudicated diagnosis, including 59 (60%) deaths. Etiologies included: 14 (17%) hypertrophic cardiomyopathy, 12 (15%) coronary artery anomalies, 10 (12%) idiopathic left ventricular hypertrophy, 7 (8%) Wolff-Parkinson-White, 5 (6%) long QT syndrome, 5 (6%) autopsy-negative sudden unexplained death, 4 (5%) valve disorder, 3 (4%) aortic dissection, 3 (4%) coronary atherosclerosis, 3 (4%) commotio cordis, 2 (2%) arrhythmogenic cardiomyopathy, 2 (2%) myocarditis, and 1 (1%) dilated cardiomyopathy. 37 of 42 (88%) available autopsy reports included microscopic examination and 1 (2%) genetic analysis.

Conclusions Most cases of SCA/D in athletes occur during exercise and in basketball and football. The etiology of SCA/D involves a wide range of clinical disorders, and the quality of autopsy reports varies widely. Standardized autopsy protocols combined with more robust reporting mechanisms for SCA/D will better inform strategies to prevent catastrophic events in athletes.

76 ACCURACY OF ELECTRONIC HEALTH RECORDS TO IDENTIFY CARDIOVASCULAR DISEASE IN WOMEN VETERANS: A QUALITY IMPROVEMENT AUDIT OF COMPUTERIZED PATIENT RECORD SYSTEM, VETERANS AFFAIRS LOMA LINDA HEALTHCARE SYSTEM

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10.1136/jim-2016-000365.76

Purpose of Study Electronic Health Records (EHR) are ideal tools for population health estimates to manage at-risk patients. The largest EHR system, Computerized Patient Record System (CPRS), is used in 144 Veterans Health Affairs (VHA) facilities. Women veterans (WV) are at higher risk for Cardiovascular Disease (CVD), the #1 killer of women, compared to the non-veteran female population, and our Bless Her Heart (BHH) program is designed to improve cardiovascular health in WV. As part of BHH, we used the VHA data warehouse to identify all WV in the Veterans Affairs Loma Linda Healthcare System (VALLHCS) with diagnoses of ischemic heart disease (IHD), stroke (CVA/TIA), or peripheral ischemic disease (PID) to assess prevalence. Our study evaluated the accuracy of CPRS identification of CVD diagnoses in WV prior to population risk factor interventions.

Methods Used Based on a 3,987 WV population, any WV with CPRS indicators of CVD was identified and a clinician team searched each patient's EHR to confirm CVD diagnosis. At least one clinically verified diagnosis of IHD, CVA/TIA, or PID equaled a correctly classified CVD diagnosis by CPRS. Transgender WV were excluded. Death from a CVD event was sufficient evidence of CVD.

Summary of Results Of 264 WV identified by CPRS with CVD (6.6% prevalence), we verified 70% (n=185) with CVD, 28% without CVD (n=75), and excluded the 2% transgender WV (n=4). We assessed 71% of IHD, 71% of CVA/TIA, and 78% of PID diagnoses as accurate, giving a verified 4.6% (185/3987) CVD prevalence in WV. CPRS-misclassified cases (n=75) were due to "rule-out" diagnoses, other non-ischemic cardiac disorders, or coding errors for testing/imaging.

Conclusions We detected a 28% inaccuracy of ischemic CVD diagnoses based on CPRS screening indicators alone with inflated CVD prevalence. Most incorrect CVD diagnoses were made by provider documentation errors. Although EHR can provide efficient population

management data, especially in 144 VHA facilities, a margin of error must be anticipated before making policy decisions. In Phase 2, we will track chronic disease outcomes of all WV with verified CVD who could not have been accurately identified solely by using CPRS indicators.

77 BMI AS A PREDICTOR OF 90 DAY READMISSION IN HEART FAILURE PATIENTS WITH REDUCED EJECTION FRACTION

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Purpose of Study Heart Failure (HF) is a serious, chronic, and progressive condition that may require hospitalization. There are 1 million hospitalizations from decompensated HF in the United States annually. The objective of this study was to investigate the effect of BMI on the frequency of rehospitalization in patients with HF.

Methods Used In this retrospective study, 300 HF patients with low left ventricular ejection fraction (LVEF) and increased BMI (July, 2015 to July, 2016). Eligible patients were ≥ 65 years old, had an established diagnosis of HF, with LVEF $< 40\%$. The patients were divided into 3 groups. 100 patients were identified to have BMI < 30 (normal). 100 patients had BMI 30–40 (mild-moderate obesity). 100 patients had BMI > 40 (severe obesity). Data was collected through uniform data query of a community hospital databases. Data were collected on patient demographics, medical history, laboratory findings, antihypertensive therapies, hospital associated events, readmission within 90 days of hospital discharge, and admission to ICU within 90 days, following the index hospitalization.

Summary of Results The 90-day readmission rate of all patients was 26% (78/300). Of those patients 10% (8/78) were readmitted more than once. Conversely, only 23% (23/100) of HF patients with BMI between 30–40 required readmission. Of those patients 4% (1/23) were readmitted more than once. Patients with a BMI between 30–40 had a significantly lesser overall readmission rate with p value < 0.05 . Patients with BMI < 30 had a readmission rate of 30% (30/100). Of those 10% (3/30) were readmitted more than once. Patients with a BMI > 40 had a readmission rate of 25% (25/100). Of those 8% (2/25) were readmitted more than once. Patients with a BMI > 40 had a significantly lesser readmission rate with a p value < 0.05 .

Conclusions More than one third of patients discharged home after hospitalization for HF were rehospitalized at least once within 90 days for heart failure exacerbation. The presence of mild to moderate obesity was significantly associated with a decrease readmission rate. The presence of severe obesity was associated with significant decreased readmissions when compared to normal BMI. Further studies are warranted to determine the impact of other variables on readmission rates and clinical outcomes in this population.

78

IMPACT OF DEMOGRAPHICS AND SOCIOECONOMIC STATUS ON MODE OF TRANSPORTATION AND TIME TO PRESENTATION IN PATIENTS WITH ST ELEVATION MYOCARDIAL INFARCTION

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10.1136/jim-2016-000365.78

Purpose of Study National guidelines recommend the utilization of a robust network for pre-hospital care of patients who experience chest pain and other relatable symptoms subsequently classified as ST elevation myocardial infarction (STEMI). Despite the widespread use of this network, little is known about the influence of economic, demographic, and sociological factors on the use of this system by the STEMI patient population.

Methods Used In this retrospective study, we examined 766 patients who presented to a tertiary-care university medical center with STEMI between 2009 and 2015. Of this cohort, 529 presented directly to the medical center and were included in this study. A group of clinical variables including gender, race, ethnicity, religion, and language were collected from a comprehensive review of patient records. Two sample t-test, χ^2 , ANOVA, and Fischer's exact test were utilized to assess the impact of these variables on time to presentation and mode of transportation.

Summary of Results Patients who utilized emergency medical services (EMS) as their mode of transportation had a 64 minute shorter time to presentation from the onset of their symptoms compared to those who utilized self or family/friend for transportation (151 minutes, 95% CI 136–168 vs 216 minutes, 95% CI 158–294; $p=0.021$). There was no significant difference in time to presentation between Whites and African Americans (155 minutes vs 157 minutes). However, there was a trend towards shorter time to presentation in Asians compared to Whites and African Americans ($p=0.059$). No significant associations were found between sex, religion, ethnicity, or language on time to presentation or mode of transportation.

Conclusions In our study, a significant difference in time to presentation was observed for STEMI patients who presented via EMS compared to those who used private transportation. Although race was not found to have a significant impact on time to presentation, there was a trend towards lower presentation time in the Asian population. Understanding the impact of patient demographics and socioeconomic status aides in detecting disparities in the utilization of EMS.

79

ISCHEMIC TIME AND RISK FACTORS ASSOCIATED WITH THE INCIDENCE OF CARDIOGENIC SHOCK IN PATIENTS PRESENTING WITH ST ELEVATION MYOCARDIAL INFARCTION

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10.1136/jim-2016-000365.79

Purpose of Study Cardiogenic shock (CS) is the number one predictor of mortality in patients with ST-elevation myocardial infarction (STEMI) 1. Emergent evaluation and treatment including revascularization when indicated is recommended upon arrival to hospital. There is variation in time to presentation and total ischemic time in this patient population. We sought to evaluate the impact of ischemic time on the incidence of CS and variables which may influence its presentation.

Methods Used In this retrospective study, we evaluated data from 766 patients who presented to a tertiary-care university medical center with STEMI from 2008–2015. During this time period, 56 of the 766 patients who presented with STEMI had diagnosis of CS. Two sample t-test was used to compare ischemic time in patients with and without CS on presentation. χ^2 test was used to compare in-hospital mortality between the two groups and assess the impact of initial symptoms on presenting with CS. Multivariate analysis was used to identify risk factors for CS in this patient population.

Summary of Results Ischemic time did not influence the incidence of CS ($p=0.75$). In-hospital mortality was significantly higher in patients who had diagnosis of CS during index hospitalization vs those without (34% vs 4%, $p<0.001$). Elevated BMI was found to be associated with an increased risk of CS with a 6.7% increased risk for every unit of BMI >25 (95% CI 1.012–1.126). Female gender was associated with a 45% decrease in the likelihood of presenting with CS (95% CI 0.304–1.002). An analysis of initial presenting symptoms demonstrated that patients presenting with syncope were at increased risk for CS (OR=4.9, 95% CI 1.50–15.81); and patients presenting with chest pain were at decreased risk for CS (OR=0.27, 95% CI 0.15–0.49).

Conclusions In our study of patients presenting with STEMI, ischemic time did not influence the incidence of CS. BMI and syncope were independent risk factors for patients presenting with CS, whereas female gender and chest pain presentation were associated with lower risk of presenting with CS. Additional studies are needed to further evaluate the mechanism between ischemic time and risk factors associated with CS.

80

MODERATE-SEVERE TRICUSPID REGURGITATION AFTER HEART TRANSPLANTATION DOES NOT REQUIRE SURGICAL REPAIR

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10.1136/jim-2016-000365.80

Purpose of Study Tricuspid regurgitation (TR) after heart transplantation (HTx) is common. Causes for TR may be due to volume overload, flail tricuspid leaflet from endomyocardial biopsy (EMB), or due to inherent defect from the donor heart. It is not known as to the natural history of moderate-severe TR following heart transplantation. We sought to assess our HTx patients who developed moderate-severe TR for outcomes and the necessity for surgical intervention.

Methods Used Between 2010 and 2014 we evaluated 131 HTx patients who had developed moderate-severe TR in

Abstract 80 Table 1

Endpoints	Moderate-Severe TR (n=131)
1-Year Survival	84.0%
2-Year Freedom from CAV	89.3%
2-Year Freedom from NF-MACE	86.3%
1-Year Freedom from Any-Treated Rejection	79.6%
1-Year Freedom from Acute Cellular Rejection	90.0%
1-Year Freedom from Atrial Arrhythmia	75.7%

the first month following HTx surgery. Outcomes included the development of right ventricular (RV) dysfunction (low RV ejection fraction) at 3 and 6 months from TR diagnosis. Other endpoints included 2-year survival, 2-year freedom from cardiac allograft vasculopathy (CAV) $\geq 30\%$ by angiography, Non-Fatal Major Adverse Cardiac Events (NF-MACE: myocardial infarction, new congestive heart failure, percutaneous coronary intervention, implantable cardioverter defibrillator/pacemaker implant, stroke) and any-treated rejection (ATR). The need for valvular repair was also recorded.

Summary of Results Moderate-severe TR patients had improvement in their TR in the ensuing 3–6 months [JK1]. There was also a numerical trend towards a decrease in mean right ventricular internal diameter (RVID) by 3-months post-HTx (36.8 ± 7.9 vs 34.6 ± 7.7 , $p=0.066$) and a significant decrease by 6-months post-HTx (36.8 ± 7.9 vs 33.7 ± 6.4 , $p=0.009$). 1-year survival, freedom from CAV, NF-MACE and ATR were not unexpected.

Conclusions HTx patients who develop moderate-severe TR following HTx surgery appear to show improvement in a majority of these valves over time. While patients who develop moderate to severe TR should be closely monitored, surgical intervention is rarely necessary.

81 JEHOVAH WITNESS PATIENTS: CHALLENGES IN HEART TRANSPLANTATION

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10.1136/jim-2016-000365.81

Purpose of Study Patients (pts) with end-stage heart disease who are Jehovah Witness (JW) present a complex challenge to the surgical Team. These pts do not accept blood products and therefore are at risk for intraoperative death due to extensive blood loss, which is possible in open heart surgery. Many JW pts, however, will accept cell-saver units, but not all are liberal in this regard. Blood substitutes have not been easily accepted by these pts. Heart transplantation (HTx) is a complex surgical procedure where blood loss can be extensive. Nonetheless, we have performed heart transplant surgeries in a number of these JW pts. We now present our experience at a single center with standardized intraoperative and post-operative care.

Methods Used Between 2012 and 2015 we assessed 437 pts undergoing HTx. We noted 5 JW pts who underwent

Abstract 81 Table 1

Endpoints	Jehovah Witness (n=5)	Control: No Sternotomy (n=198)	Log-Rank P-Value
6-Month Survival	100.0%	100.0%	
6-Month Freedom from NF-MACE	100.0%	90.0%	0.467
6-Month Freedom from Any-Treated Rejection	80.0%	89.6%	0.531

HTx. These pts were determined to be acceptable candidates as they were viewed as low risk for excess intraoperative and perioperative bleeding. These included pts with no previous sternotomy and no bleeding tendencies. 4/5 pts were open to utilize a cell-saver unit. Endpoints included 6-month survival, 6-month freedom from any-treated rejection (ATR) and freedom from Non-Fatal Major Adverse Cardiac Events (NF-MACE: myocardial infarction, new congestive heart failure, percutaneous coronary intervention, implantable cardioverter defibrillator/pacemaker implant, stroke). A control group of 198 heart transplant pts were comparators for outcome.

Summary of Results All 5 pts were Status 1 at transplant. The JW pts had an average waitlist time of 18 days ± 9.0 for HTx. Blood counts were stable throughout the surgery. There was 100.0% survival at 6-months post-transplant for all JW pts with a mean length of stay 8.8 days ± 1.9 . Post-transplant outcome was compared to non-JW pts who had no previous sternotomy. There was no significant difference in 6-month survival, 6-month freedom from ATR and 6-month freedom from NF-MACE between the two groups. **Conclusions** Selected JW pts appear to do well after HTx. Post-transplant outcomes are comparable to non-JW pts. Therefore, JW pts should be acceptable candidates for HTx.

82 PREDICTORS OF STENT ECCENTRICITY AFTER IMPLANTATION OF A NOVOLIMUS ELUTING BIORESORBABLE STENT IN CORONARY BIFURCATIONS

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10.1136/jim-2016-000365.82

Purpose of Study We aimed to evaluate the influence of the underlying plaque morphology and the pre-dilatation result on stent eccentricity after implantation of a novolimus eluting bioresorbable stent (BRS) in coronary bifurcation lesions.

Methods Used Patients with stable angina pectoris and a de-novo coronary bifurcation lesion were included in the present study and treated with the Desolve BRS (Elixir, US). Implantation was evaluated at baseline and at one-month follow-up using optical coherence tomography (OCT). In-stent plaque morphology was determined by OCT and categorized as calcified, lipid, fibrotic or mixed. Stent eccentricity index (SEI) was evaluated as maximum

divided by minimum diameter in all analysed OCT frames. Baseline and follow-up recordings were matched and analysed according to a seven segment model. Multiple linear regression was performed at frame-level using SEI as independent variable and stent expansion, number of dissections, balloon type, segment and plaque composition as dependent variables.

Summary of Results Ten patients were enrolled. Nine OCT-recordings at baseline and eight at follow-up were eligible for analysis. Seven plaque compositions were observed in 727 frames at baseline. In the proximal main vessel the SEI at frame-level was decreased from 0.87 [0.83;0.90] at baseline to 0.85[0.82;0.89] at follow-up ($p<0.001$). This was consistent for all in-stent segments. Multiple linear regression showed that calcified plaques decreased the SEI by 0.20 ± 0.02 at baseline and 0.22 ± 0.02 at follow-up compared to a healthy reference segment. Dissection after pre-dilatation decreased SEI by 0.04 ± 0.01 at baseline and 0.07 ± 0.01 at follow-up. Scoring balloon used for pre-dilatation was an independent predictor of increased SEI (0.02 ± 0.01 at baseline and 0.04 ± 0.01 at follow-up).

Conclusions Calcified plaque and plaque dissection were independent predictors of decreased SEI after treatment with the Desolve BRS. Calcium morphology should be taken in account before BRS implantation. Choice of pre-dilatation balloon may be an important factor for acute and late SEI when implanting BRS, though limitations precludes firm conclusions regarding pre-dilatation strategies.

Community Health I Concurrent Session

3:15 PM

Thursday, January 26, 2017

83 THE IMPACT OF INITIATING BUPRENORPHINE/ NALOXONE TREATMENT FOR OPIOID ADDICTION IN THE EMERGENCY DEPARTMENT

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10.1136/jim-2016-000365.83

Purpose of Study Buprenorphine/naloxone (Suboxone) is effective medication-assisted therapy (MAT) for opioid use disorders (OUDs). A previous study showed that giving Suboxone to patients with OUDs in acute withdrawal in the emergency department (ED) increases adherence to treatment. Prescription of Suboxone requires a provider to be waived, but non-waivered providers can administer one dose if patients can enter a MAT program within 3 days. We proposed a novel treatment protocol in which non-waivered providers could administer Suboxone and a community healthcare worker (CHW) could assist patients in finding treatment. We aimed to prove the concept of this protocol by implementing it in one ED and one treatment program and measuring adherence to treatment at 30 and 60 days.

Methods Used The treatment protocol was approved by Providence Sacred Heart's ED and the Spokane Regional Health District's treatment program. When a patient meeting the criteria for treatment arrived in the ED, a CHW would meet them there. Patients were given one dose of Suboxone by non-waivered providers and, with the assistance of the CHW, were enrolled in the treatment program within 24 hours. There, they received daily doses of Suboxone and counseling. Enrollment occurred 5 days per week and 24 hours per day.

Summary of Results Enrollment took place from July 4th-August 30th 2016, during which 35 patients seen in the ED for acute withdrawal were able to be referred to treatment according to our protocol. Non-waivered physicians effectively administered Suboxone to the appropriate patient population. After 30 days, 25 out of 35 patients were still enrolled in MAT and 10 were no longer in treatment.

Conclusions This study established the feasibility of this treatment protocol and illustrated its usefulness by increasing access to opioid treatment programs and increasing options for providers treating patients in acute withdrawal. Furthermore, this study used non-waivered providers to administer the first dose of Suboxone, which was a novel method of treatment and well-received by providers and patients.

84 IMPACT OF MULTIDISCIPLINARY APPROACH IN THE OUTPATIENT HIV CLINIC IN IMPROVEMENT OF PATIENT CARE

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10.1136/jim-2016-000365.84

Purpose of Study The Delivery System Reforms Incentive Payment (DSRIP) was developed as part of Medicaid waiver program. California was the first states to pilot this program. Under DSRIP, Kern Medical launched the HIV retention program and care team in April 2012. Team was consistent of case manager, HIV certified Clinical Pharmacist, Behavioral Health Analyst and HIV physician. The objective was directed towards improving the quality of life, providing opportunities to implement preventive health interventions and to promote healthy behavior

Methods Used Patients of HIV clinic at Kern Medical (2011–2014) were included. Based on DSRIP, 10 performance measures were selected. Data was collected retrospectively by chart review and analyzed and compared with top 25% nation benchmark by DSRIP

Summary of Results Out of 10 performance measures 8 showed consistent improvements. Highest impact of multidisciplinary approach over 3 years of program implementation respectively were, adherence to visits (11% to 95%), antiretroviral therapy (18% to 100%) and Mental health screening (3% to 83%). Program achieved to match or near matching to top 25% national benchmark in 6 out of 8 categories. (Table 1 attached).

Conclusions Multidisciplinary team approach is a successful method in improving outcome and enhancing quality of care in patients with HIV. Overall increase in adherence to clinic

Abstract 84 Table 1 Represents the 10 performance measures used to monitor clinical performance. It contains data for three consecutive years since the implementation of the program.

	2011 Baseline	2012	2013	2014 N=69	Top 25% Nation Benchmark
CD4 Count Monitoring	17%	52%	77%	86%	78%
Antiretroviral Therapy	18%	56%	100%	100%	100%
Medical Visit Adherence	11%	34%	74%	95%	N/A
Pneumocystis Prophylaxis	43%	54%	68%	95%	100%
Viral Load Monitoring	62%	60%	86%	82%	94%
Viral Load Suppression (<20)	100%	61%	100%	82%	89%
Hepatitis C Screening	28%	54%	74%	39%	100%
Syphilis Screening	30%	49%	61%	65%	95%
Mental Health Screening	3%	18%	67%	83%	84%
Case Management	16%	78%	68%	95%	N/A

visits and treatment measures not only benefits health of individuals but also prevents transmission at the public level.

85 INACCURACY OF POINT-OF-CARE MEASUREMENTS OF GLYCATED HEMOGLOBIN IN WELLNESS PROGRAM PARTICIPANTS

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10.1136/jim-2016-000365.85

Purpose of Study Point-of-Care (POC) analyzers enable immediate feedback by health coaches to Wellness Program participants (WPP) about analytes like lipoproteins and glycated hemoglobin (HbA1c). Such results are increasingly used by employers as the basis for incentives to optimize WPP lifestyle choices. However, seven recent WPP doubted the accuracy of their POC HbA1c measurements in finger-stick blood, prompting them to recheck HbA1c via primary physicians using venipuncture blood analyzed in a hospital lab (HL). POC values were higher than HL in all 7 (6.7+0.6 SD vs. 5.7+0.4, $p=0.0003$). Five of seven were misclassified as diabetic. We therefore compared current POC values of HbA1c with previous HL values in two groups of WPP.

Methods Used: **Group 1** (county employees, age 43, 47% male) comprised 290 WPP whose HbA1c HL results in 2014 and 2015 agreed within 0.3 %. **Group 2** (healthcare workers, age 45, 12% male) comprised 241 WPP who had one HL value of HbA1c from 2014. POC values from 2016 in each group were compared with HL values from 2015 (Group 1), and from 2014 (Group 2), vis-a-vis American Diabetes Association categories of HbA1c (normal, prediabetes and diabetes), and by Bland-Altman plots, t-tests and Fisher Sign Tests. **Summary of Results** HbA1c by POC up-classified WPP from normal to prediabetes in 16.2% and from prediabetes to diabetes in 2.1% of Group 1, and from normal to prediabetes in 17.4% and to diabetes in 3.3% of Group 2. POC down-classified 7.6% of Group 1 and 1.7% of Group 2 to prediabetes to normal. Mean values of HbA1c by POC exceeded HL values by 0.2+0.4 in Group 1, and by 0.3+0.5 in Group 2 ($p<0.0001$).

Conclusions POC results up-classified one of six WPP, leading us to explore switching to a different analyzer with daily controls to check on HbA1c accuracy.

86 COMMUNITY CRISIS CENTER: THE LIVING ROOM

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10.1136/jim-2016-000365.86

Purpose of Study The Park County Suicide Prevention Needs Assessment identified a need for district-wide procedures addressing suicide and crisis intervention. Park County is a rural Wyoming community that faces challenges when addressing mental health crisis and suicide prevention because it is 100 miles from the nearest inpatient psychiatric care and 214 miles from the nearest in-state, inpatient psychiatric care. A Community Crisis Center (CCC) would create a comfortable, non-clinical space where individuals experiencing mental health crises could go to resolve their crises or be linked to more intensive intervention services.

Methods Used Community-based, mental health crisis intervention programs were explored in a literature review. Community conversations with the County Health Officer, County Nurse Manager, Prevention Management Organization (PMO), Crisis Intervention Services (CIS), Crisis Intervention Team (CIT), Suicide Prevention Alliance (SPA), Yellowstone Behavioral Health (YBH) and families recently effected by suicides were conducted to identify current barriers to mental health crisis intervention. Discussions with each of these entities also assessed current strengths in mental health crisis intervention and identified potential roles in program implementation.

Summary of Results Literature review and community conversations identified a CCC, modeled after "The Living Room" to be the most appropriate and effective approach for mental health crisis intervention. Literature review and project proposal was presented to PMO, CIS, CIT, SPA and YBH. All organizations felt that a CCC could be incorporated into the current crisis intervention services, would address current barriers to mental health care, and serve to address the need for suicide intervention and mental health crisis intervention. A committee was assembled to address the logistics of project implementation and is currently researching the feasibility of a pilot program.

Conclusions A CCC would address the need for suicide and mental health crisis intervention in Park County. Challenges to implementation include: funding,

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sustainability and identification of agencies' role in project maintenance. Continued meetings of the CCC Committee, further identification of resources, and detailed logistical planning of the pilot program is required for complete project implementation.

87 THE RELATIONSHIP BETWEEN HEALTH KNOWLEDGE AND BMI IN YOUTH

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10.1136/jim-2016-000365.87

Purpose of Study In San Bernardino county, 39% of children are overweight or obese. Many have wondered if this is in part due to a lack of health and nutrition education. The purpose of this study was to evaluate the effectiveness of current health education and its relationship to childhood obesity.

Methods Used Children ages 8–15 were invited to participate in a 5-day camp called “Operation Fit” with an emphasis on exercise and health education. On the first day, participants were measured for BMI and were asked to fill out several survey. We selected 8 questions to evaluate the children’s level of knowledge on health and nutrition. All 8 of these questions are based on the *MyPlate* curriculum and the *7+3 Guidelines to Health* curriculum. Results from this question set are reported below.

Summary of Results According to our data, the most missed questions were questions 6, 7, 9, and 10. A logistic regression was conducted to assess the effect of health knowledge on BMI. However, there was no statistical significance between the variables and BMI.

Conclusions The data suggests that health knowledge alone does not correlate to BMI in children. This indicates that the childhood obesity crisis cannot be mitigated by health education alone, but that there must be further efforts made to encourage healthy lifestyles beyond basic nutrition education.

88 THE EFFECT OF COMMUNAL EATING ON BODY MASS INDICES

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10.1136/jim-2016-000365.88

Q#	Question:	% Correct	Correlation to BMI		
			P-value	OR	95% CI
Q2	At least how long should you exercise each day?	57.9%	0.65	1.26	(0.45 – 3.49)
Q3	How much water should you drink per day?	42.1%	0.49	0.73	(0.25 – 1.94)
Q5	At least how many servings of vegetables should you have per day?	73.1%	0.13	0.43	(0.14 – 1.30)
Q6	How many servings of fruits should you have per day?	22.7%	0.91	0.93	(0.26 – 3.29)
Q7	What kind of grains should you have?	24.5%	0.24	1.96	(0.62 – 6.17)
Q8	How many hours of sleep should you get every night?	40.3%	0.72	0.82	(0.27 – 2.42)
Q9	What is the maximum duration of screen time you should get each day?	26.4%	0.97	1.02	(0.26 – 3.97)
Q10	Name at least one healthy fat.	17.6%	0.63	0.67	(0.13 – 3.44)

*P<0.05, N=129, (Male=67, Female=62) (Hispanic=104, Non-Hispanic=25) (Age Mean=11.36, Age Range=7.2–15.5)

Abstract 87 Figure 1

Abstract 88 Table 1 Communal Eating and BMI

Variable	P-Value	OR	95% CI
Rarely with parents	0.05*	0.41	0.17–1.02
Occasionally with parents	0.68	1.27	0.39–4.14
Most of the time with parents	Ref	1.00	Ref

*Significant at <0.05

Purpose of Study Over the years, the average length and frequency of dinnertime in homes across the United States has decreased. Many factors play into this, including the prevalence of food deserts in low-income areas. These areas have poor access to affordable fresh food, often due to lack of transportation. This can have deleterious effects on the health of these communities. This study aims to investigate how the frequency of family dinners correlates to body mass indices (BMI).

Methods Used 241 children (116 males, 125 females), ages 9 to 15, from San Bernardino County schools and clinics who were at risk for being overweight were recruited to join a 5-day educational camp focusing on nutrition and fitness. BMI was compared with answers to a pre-camp survey question “How often do you and your family eat together?” The answer choices were: rarely, occasionally, and most of the time. A logistic regression was conducted to assess the effect of family communal eating on BMI.

Summary of Results When all variables are held constant, the odds of being overweight/obese is expected to increase by 0.41 units for those who “rarely eat” with their parents. There was no relationship found between those who answered either “occasionally” or “most of the time” and BMI. The odds of being overweight/obese is also expected to increase by 0.10 for those who are Hispanic.

Conclusions Children who rarely ate with their parents were at an increased risk for being at unhealthy weight. This may indicate the importance of family communal meals in maintaining a healthy weight, whether due to food choices, portion sizes, or other factors. In communities with little access to healthy foods, it may be more feasible to obtain nearby fast-food, especially if there is a lack of transportation. A possible solution is the implementation of healthier food options within walking distance of these locations. Investigation of this concept, among other factors, could provide information for interventions and prevention of childhood obesity in poverty communities.

89 TAKE-HOME NALOXONE OPIOID OVERDOSE PREVENTION (THNOOP): PRESCRIBE TO SURVIVE

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10.1136/jim-2016-000365.89

Purpose of Study Opioid abuse and overdose issues are brought to attention on a daily basis—one only has to turn on the nightly news to be made aware. Lander, WY and Fremont County (FC), are not exceptions regarding the opioids. FC has an opioid overdose related mortality rate that approximates 9 times the national average, and 2.7 times the state average. These data indicate that opioid

overdose prevention programs are needed in Lander, Wyoming and FC.

Methods Used After visiting with physicians, a public health nurse and patients the rise of opioid related issues in FC over the last several years becomes apparent. FC data, obtained from the Fremont County Coroner, emphasizes the high rate of opioid overdose related mortality. A literature review showed that communities with high rates of opioid related mortality had successfully reduced these numbers with take-home naloxone programs. Conversations with physicians at the Lander Medical Clinic were conducted about incorporating THNOOP amongst patients receiving opioids and creating awareness with other healthcare providers. The Prevention Management Organization of Wyoming (PMO) was contacted about becoming the organizing unit for such a program and also to help create awareness through their *prescription drop-box* and *prescription take-back* programs.

Summary of Results A comprehensive PowerPoint presentation was created detailing the opioid overdose related mortality problem in FC. The PowerPoint also included a literature summary about naloxone programs and reputable resources for creating a naloxone program. The PowerPoint presentation was shown to physicians at the Lander Medical Clinic and the PMO of Wyoming at their prevention coalition meeting and Dr. Clint McMahill, an internist at the Lander Medical Clinic, has begun to implement a naloxone program. Wyoming is 1 of 3 states lacking naloxone legislation.

Conclusions A take-home naloxone program is designed and suited to reduce opioid overdose related mortality in communities. It provides a way for laypersons in a private setting—the location of the majority of overdoses—to protect the at-risk members of their family and friends. Furthermore, in rural communities, take-home naloxone could be the first response. Naloxone programs provide protection for all opioid users—licitly and illicitly. Naloxone programs are evidence based and start-up costs are negligible.

90 REACH OUT AND READ: PROMOTING EARLY LITERACY

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10.1136/jim-2016-000365.90

Purpose of Study The mission of Reach Out and Read (ROR) is to promote success in school by providing pre-school children with a strong foundation in reading. This is accomplished at well-child appointments through primary care physicians providing age-appropriate books and encouraging families to read together. Lincoln County, Idaho has a population of 5,207 people and is 30% Hispanic, which is a very oral culture. In addition, Lincoln County only has 76.9% and 11.3% of people graduating high school and college, respectively. These numbers are well below the state average and demonstrate a crucial need for children to develop strong foundations in learning to be able to succeed in school.

Methods Used Upon speaking with clinic and community members, it was evident there was a strong need to

promote early literacy in order to provide a foundation for success in school. After discussion with the county librarian and clinic director, it was decided that the ROR program would have the biggest impact on Lincoln County's pre-school education and their large Hispanic population. A literature review was completed to study the effectiveness of the ROR program and the best ways to implement it successfully.

Summary of Results In order for long-term success, the ROR program needed yearly funding. The Idaho Commission for Libraries agreed to fund all start-up costs and materials for the first year of implementation if sustainability of the program could be demonstrated. To secure funding for sustainability, a proposal was presented to the Lincoln County Commissioners asking for 5 years of funding, which was granted. In addition, a clinic flow was created based on research demonstrating the most effective way to implement the program. Online training was set up for providers in the Shoshone Family Medical Clinic (SFMC). Finally, a donation box was set up in the clinic in order to obtain books that could be used in the new waiting room library.

Conclusions The ROR program planning at SFMC was successful in that there was a strong community partner with the program, positive feedback and interest by the community, and sustainable funding for at least six years. Potential challenges of the program are obtaining enough books for a successful waiting room library, ensuring providers continue to counsel all families at well-child checks, and sustaining the program after the initial six years.

91 SELF-ESTEEM: EFFECT OF CHILD'S PERCEPTION OF HOW THEIR PARENTS VIEW THEIR WEIGHT

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10.1136/jim-2016-000365.91

Purpose of Study Childhood obesity in San Bernardino County (SBC) is close to double the national rate. Some authors have found a high BMI may contribute to low self-esteem and facilitate the problem of obesity. This question

Abstract 91 Table 1 Effects of a Parent's Perception on How a Student Views Themselves

Variable	P-value	OR	95% CI
Parent Perception on Student			
not the right weight	0.04*	2.05	(1.00–4.23)
the right weight	Ref	1.00	Ref
Weight As An Issue			
weight is an issue	0.54	0.75	(0.29–1.90)
weight is not an issue	0.74	1.18	(0.42–3.33)
never thought of my weight	Ref	1.00	Ref
My Parents Like My Looks			
yes	<0.0001*	11.2	(4.58–27.8)
no	Ref	1.00	Ref

*p<0.05

addresses a child's perception of how their parents view their weight and how this affects self-esteem.

Methods Used At risk children (372 children, 51% male, 76% Hispanic) from SBC aged 9–15 attended the 5-day health camp “Operation Fit”. On a body esteem survey, students answered the question “My parents like my looks.” On a post-intervention survey, parents answered the question “Do you think your child is too skinny, too fat, or about right?”

Summary of Results Logistic regression assessed students' self-esteem and how it relates to their parents' view and the students' perception of how their parents view them. When variables are constant, the odds of a student being happy about the way they look increases by 11.2 units for those who perceive that their parents like their looks. However, the parents state that their child is not the right weight, with significance of 2.05 units in relation to students' positive view of themselves. There is no significance with positive self-esteem with respect to age, gender, language, race/ethnicity, or BMI.

Conclusions Children who think that their parents like the way that they look have better self-esteem. Even when children perceived that their parent approved of the way they looked, the parents thought the child was at an unhealthy weight. This may have implications for the home environment and the impact of how parents address their child's self-esteem.

Global Health I Concurrent Session

3:15 PM

Thursday, January 26, 2017

92 IMPROVING WATER, SANITATION, AND HYGIENE IN PERU'S SACRED VALLEY

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10.1136/jim-2016-000365.92

Purpose of Study In indigenous mountain communities of Peru's Sacred Valley, diarrheal disease is a leading cause of death among children. In addition, 18% of children under 5 are malnourished, 60% are stunted, and 54% are anemic. A lack of adequate water, sanitation, and hygiene (WaSH), geographic isolation, and limited access to medical care are key underlying factors. This project aimed to improve WaSH by enhancing health worker training curriculum and exploring the applicability of Solar Water Disinfection (SODIS).

Methods Used This project partnered with a local non-profit, Sacred Valley Health (SVH), that trains local health workers, or *promotoras*. A literature review of WaSH interventions was conducted using PubMed and other relevant sources, and by communicating with experienced professionals. Surveys that included questionnaires, visual inspections, and water quality testing for *E. coli* and chlorine residual were conducted. Aquagenx Compartment Bag and Hach Color Wheel test kits were used for measuring *E. coli* and chlorine residual, respectively. Community

coordinators, *promotoras*, and Quechua interpreters helped facilitate travel and surveys. SODIS efficacy was assessed in two communities by treating water and testing for *E. coli*.

Summary of Results Surveys were conducted in 7 communities. Boiling was reported as the water treatment method in all communities. 3 communities with chlorination systems tested negative for free residual. 4 of the 7 water sources had direct contact with animals. Boiled water samples were tested in 4 communities, none showed presence of *E. coli*; however, it was reported that boiling is not universal due to time, fuel, and cost constraints. Interest in SODIS was expressed in all communities and piloted in two, once by a trained *promotora*. Both attempts were effective. A SODIS training curriculum was created and piloted with 7 senior *promotoras*. The training was well received and each *promotora* committed to trying SODIS. SVH adopted and integrated the training as part of their *promotora* curriculum.

Conclusions This was the first project to formally assess WaSH among communities served by SVH and SODIS applicability. A training curriculum was created that will be delivered to over 50 *promotoras* in the coming year. Results will also be used to engage the municipality responsible for chlorinating water systems.

93 THE FINANCIAL BURDEN OF CLINICAL CARE ON FAMILIES IN EASTERN UGANDA

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10.1136/jim-2016-000365.93

Purpose of Study Accessing healthcare services presents a significant challenge for patients in low-resource settings, where families have limited income for perceived non-essential costs. Although Uganda has a public healthcare system, 69.1% of health care costs are paid out-of-pocket. This study assessed how families procured the funds to pay for pediatric patient care at Soroti Regional Referral Hospital (SRRH) in Eastern Uganda, and to identify the economic impact of seeking healthcare on the family.

Methods Used A concurrent triangulation mixed methods study was conducted at SRRH in May 2016 using structured questionnaires. Parents of pediatric patients at SRRH completed questionnaires with assistance from trained local interpreters. The questionnaire collected demographic information about the patient's family, contextual data about the child, and data surrounding the finances of accessing health care, including the cost of care, the source of funds, and the impact on the family.

Summary of Results Of the 125 participants recruited, the majority (80.8%) reported farming as their primary occupation. Median reported annual income was 119.45USD (IQR 58.99–235.96USD), with median total expenditures on healthcare costing 4.2% of annual income (IQR 1.3–10.7%). Significantly more families took out loans (36.8%) or sold family assets (35.2%), compared to those who accepted donations (8%), paid with personal savings (11.2%), or used other sources of funds to pay for healthcare costs (8.8%) ($p < 0.01$). No families used private

health insurance. Analysis of open-ended survey questions revealed 158 codes, 9 sub-themes and 4 overarching themes. From most to least frequent, themes included impact on family finances, stress and emotional trauma, parenting challenges, and healthcare concerns.

Conclusions Despite Uganda's publicly funded health care system, seeking healthcare presents a significant burden for families of pediatric patients. This may lead to delays in diagnosis and inadequate treatment for pediatric patients.

94 REDUCING THE BURDEN OF PEDIATRIC DIARRHEAL ILLNESS THROUGH EDUCATION OF INFORMAL BABY-CARE PROVIDERS IN KARAGITA, KENYA

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10.1136/jim-2016-000365.94

Purpose of Study Diarrheal illness and dehydration disproportionately affect the pediatric population in the rural slum of Karagita, Kenya compared to neighboring communities. Conditions of the informal babycares in Karagita contribute to this burden of disease, with poor hygiene and sanitation practices, overcrowding and inadequate health education amongst caregivers. The aim of this project was to reduce the burden of pediatric diarrheal illness and improve health outcomes by providing focused health education to informal babycare providers in the community.

Methods Used Local pediatricians and community health volunteers (CHVs) assisted in developing a curriculum focused on prevention and home management of diarrhea. A poster was developed based on WHO Integrated Management of Childhood Illness recommendations to provide a protocol for diarrhea management. The curriculum was taught to individual babycare providers in 30–45 minute in-person presentations. At a second visit 1–2 weeks later, an oral and practical assessment was given in which providers were asked several questions about preventing diarrhea, demonstrated preparation of oral rehydration salts and zinc, and acted out signs of dehydration. A CHV was present at all sessions to co-facilitate and translate.

Summary of Results A total of 28 informal babycares were visited for the initial educational session. Twenty-seven of these babycares were revisited 1–2 weeks later for assessment, as one provider was unavailable. A passing score was given if 7 out of 10 questions were answered correctly. All 27 babycares passed the test and received a certificate of completion. Five CHVs were trained in facilitating the curriculum and plan to continue these educational sessions as new babycares are identified.

Conclusions The project increased awareness and education in the community regarding prevention and management of diarrhea and dehydration. CHVs will conduct ongoing surveillance and continue training new caregivers, with input from local physicians who can identify if children hospitalized for dehydration attend an informal baby-care and require further training. Additional focused educational interventions on topics such as malnutrition and pneumonia are needed to further train babycare providers on caring for a sick child.

95 A FOUR YEAR FOLLOW UP TO THE ASSESSMENT OF ANEMIA PREVALENCE IN SCHOOL-AGED CHILDREN LIVING IN THE INDIAN HIMALAYAS

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10.1136/jim-2016-000365.95

Purpose of Study In 2007, the University of British Columbia initiated a health program at the Munsell Boarding School located in a remote community in the Spiti Valley of the Indian Himalayas. Due to the initial health teams finding a high prevalence of anemia, interventions, such as iron supplementation, health education, greenhouses, deworming and water sanitation, have been implemented.

Methods Used The aim of this study is to reassess anemia prevalence by measuring hemoglobin levels. Using the HemoCue Hemoglobin Hb 201+ Analyzer, 419 consenting students from ages 7–19 were tested. Anemia testing was conducted during annual health screens, which included screening for anemia, scabies, worms and lice, as well as for vision, dental, respiratory and gastrointestinal problems.

Summary of Results After adjusting hemoglobin levels for age, gender, and altitude, it was found that 84.2% of students were anemic as per the World Health Organization criteria. Anemia in this population was defined as less than 145 g/L for ages 7–11 years, less than 150 g/L for ages 12–14 and for females over 15, and less than 160 g/L for males over 15. 3.8% of students were categorized as severely anemic with a hemoglobin level less than 100 g/L, 78.5% were between 100–145 g/L, and 17.7% were greater than 145 g/L. The mean hemoglobin level was 133.2 g/L (CI 131.8–134.7), which is not a significant increase from 2012 when the mean hemoglobin level was 130.7 g/L (CI 129.1–132.2). Further analysis is ongoing to assess trends between age and gender cohorts.

Conclusions Our data suggests that there is an ongoing, significant burden of anemia in this population and further strategies to enhance the nutritional intake with iron-rich foods or supplements need to be developed and implemented.

96 THE EFFECT OF SANITARY PADS AND MENSTRUAL SYMPTOM MANAGEMENT ON SCHOOL PERFORMANCE OF ADOLESCENT GIRLS IN RURAL KENYA: A CLUSTER RANDOMIZED TRIAL

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10.1136/jim-2016-000365.96

Purpose of Study Access to education is an important social determinant for adolescent and maternal health. Despite the recognized importance of menstruation-related problems as a barrier to adolescent girls' education, studies addressing this have failed to show improved school

attendance. Additionally, school performance has not been studied in this context. Thus, the purpose of this study was to determine whether the availability of menstrual products and ibuprofen would improve examination scores of seventh and eight grade girls.

Methods Used A cluster randomized controlled trial was performed in which both intervention and control groups received puberty education, and the intervention group received sanitary pads and ibuprofen. Fourteen schools in rural Kenya were randomized (seven to each group) and included menstruating seventh and eight grade girls. Additionally, baseline demographic data on participant characteristics were collected. The outcome was the mean difference in school test scores from the baseline term (T1) to the second (T2) and third (T3) terms in the intervention, compared to the control group.

Summary of Results Exam results and baseline data were available for 99 participants (54 control and 45 intervention). From T1 to T2 the change in test scores were 3.5 (SD 6.9) in the control group and 5.5 (SD 4.0) in the intervention group, and from T1 to T3, the change in scores were 0.1 and -0.6 respectively. The differences between the intervention and control groups were not significant when adjusted for grade level, wealth index variables, and baseline menstrual symptoms ($p=0.35$ for T1-T2 and $p=0.82$ for T1-T3).

Conclusions There are many hidden cultural and socioeconomic factors at play in rural Kenya that may have influenced the results of this study, such as reported 'feelings of isolation.' Although unidentifiable confounding variables may have played a role, sanitary pads and ibuprofen were not shown to be effective in improving school performance when added to an education program for adolescent girls in rural Kenya.

97 ASSESSMENT OF PERI-NATAL GUIDELINE VARIABILITY IN RURAL NEPAL

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10.1136/jim-2016-000365.97

Purpose of Study Nepal has introduced programs to improve pre, peri and post-natal care, however implementation of these guidelines is variable. This study compares maternal-child health practices in two rural communities of Nepal which have distinctly different access to health facilities.

Methods Used This population-based observational study took place in two locations of Gorkha District, Nepal. In Gankhu, a hospital was accessible by two hour bus ride; in Keranju, the nearest health facility was a six hour walk. Households were randomly surveyed using local interpretation to assess community health resources and pre, peri and post-natal care practices.

Summary of Results 34 households in Gankhu and 35 households in Keranju were surveyed. In Gankhu, 65% of mothers had a pre-natal anemia screen, 94% had a blood pressure screen, and 85% had a urine screen. In Keranju, 40% had an anemia screen, 80% had a blood pressure check, and 40% had a urine screen. In Gankhu 26% of women had a homebirth vs 83% in Keranju. Skilled birth

attendants were present at 68% of Gankhu births compared to 9% of Keranju births, with dedicated rooms for the delivery in 71% vs 11% of births, respectively. In Gankhu and Keranju, prolonged labor was similar at 35% and 37%, but mother-reported problems with delivery were lower in Gankhu at 6% versus 34%. Immediately following birth, 88% of infants in Gankhu were dried vs 86% in Keranju. After drying, 68% vs 60% were placed skin to skin and delayed cord clamping was 6% vs 3%, respectively. Nearly all women breastfed within one hour after birth. In Gankhu, 82% of babies were weighed vs 46% in Keranju. After birth, 65% were seen for a one week check in Gankhu and 57% seen in Keranju; danger signs were noted in 6% and 9%, respectively. At time of survey all 69 infants were alive with an average age of 13.2 months in Gankhu and 16.4 months in Keranju.

Conclusions The proximity of resources impacts access to care in rural Nepal. Women in remote areas were more likely to give birth in their homes and less likely to have one week infant checks. Consideration should be given to the construction of dedicated health posts equipped with resources for optimal pre, peri and post-natal care. A specific focus should be placed on increasing access to care for families in remote areas. This may improve access to and outcomes at one week checks in these communities.

98 INCREASING THE AWARENESS OF MALARIA LIFE CYCLE, SYMPTOMS, PREVENTION, TREATMENT, AND EXISTING GOVERNMENTAL ANTI-MALARIAL EFFORTS IN THE DISTRICT OF NEMA IN ZIGUINCHOR, SENEGAL

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10.1136/jim-2016-000365.98

Purpose of Study Malaria is the third largest cause of death in Senegal and disproportionately affects Ziguinchor due to the abundance of rainfall and numerous breeding grounds for the *Anopheles* mosquito. This project aimed to teach members of the community about malaria, increase awareness of existing government programs surrounding malaria, and ascertain how to increase community awareness in the future.

Methods Used A community assessment was conducted by informally interviewing members of the community both at the market and by visiting households. The assessment identified gaps in knowledge surrounding malaria life cycle, symptoms, prevention, treatment, and the existing government efforts. A brochure was created to rectify these gaps in knowledge and was distributed to people in clinic and in the community. Each person contacted received a copy of the malaria brochure and received a short class on malaria life cycle, prevention, treatment, and existing governmental anti-malarial efforts.

Summary of Results A total of 100 members of the community received education about malaria. These included both people that were reached during house-to-house visits and people that were reached during visits to Nema Health Post. The Chief Nurse at Nema Health Post was presented with the results of the education project and was taught about the gaps in knowledge in his community. To work on

increasing community knowledge, he plans on asking every patient about their insecticide-treated bed net usage and will give small malaria classes to any patients presenting with symptoms similar to malaria. He was also provided with a copy of the malaria brochure.

Conclusions The project increased knowledge about malaria in the small community of Nema by the distribution of brochures and informal teach-back during conversations. More importantly, it helped illuminate the current community knowledge to the Nema Health Post, and subsequently armed them with a simple malaria teaching tool to help rectify gaps in community knowledge. In order for this to be sustainable, it is incumbent on the health workers to continue to teach and make efforts to bridge the gap between government policies and poor members of the community.

99 ENRICHING DIABETES EDUCATION: DHULIKHEL, NEPAL

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10.1136/jim-2016-000365.99

Purpose of Study The burden of diabetes is rapidly growing in Nepal due to child malnutrition, sedentary lifestyles, carbohydrate-heavy diets and central adiposity. This project aimed to work with Dhulikhel Hospital staff to improve existing diabetic patient classes and to implement community diabetes prevention education with interactive, evidence-based curricula.

Methods Used PowerPoint presentations, activities, and pre/posttests were created for hour-long inpatient, outpatient, and community women's group classes. Material followed ADA guidelines and *Partnership to Improve Diabetes Education (PRIDE) Toolkit* format, which targets low health literacy populations. Presentations were adapted to Nepali culture with familiar images and language addressing relevant concerns and available resources. Activities included a hypoglycemia role play, meal building challenge, foot care show-back and exercise demonstration. Presentations were modified based on participant and instructor feedback.

Summary of Results Forty patients and 78 community women attended classes. Outpatient posttest scores improved by an average of 200%. Teach-back evaluations of inpatient and community classes showed significant improvement in knowledge of risk factors, complications, foot care, diet and exercise. Attendance and participation was significantly greater than with previous classes. The women's groups requested more topics in the new interactive format. PowerPoint materials were easily transported and adapted. Instructors reported that the activities improved understanding and class discussions allowed for clarification of misconceptions as they arose.

Conclusions Feedback from participants and collaborators suggests the interactive model is more effective at engaging and teaching patients than the former lecture method. Staff will continue to use the presentations and analyze test scores. Hospital departments will collaborate to improve outpatient clinic follow up so that a series of classes covering separate topics can be implemented. This design will allow more time for discussion and goal setting, which improves lifestyle modifications and health outcomes.

100 EVALUATION OF A WHO-INSPIRED, WORKSHOP-BASED APPROACH TO EDUCATING COMMUNITY HEALTH WORKERS ABOUT MENTAL HEALTH ISSUES AND CARE IN KISUMU, KENYA

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10.1136/jim-2016-000365.100

Purpose of Study To determine the effectiveness of a series of mental health education workshops delivered to Community Health Workers (CHWs) near Kisumu, Kenya, in terms of knowledge gained by the CHWs about recognizing and responding to mental health issues in the community.

Methods Used This study involved delivering 4 mental health education workshops to 22 CHWs that were affiliated with Pamoja, a local community empowerment organization located near Kisumu, Kenya. The workshops were each 1.5 hours in length and were derived from modules designed by the World Health Organization. The workshops covered the following topics: defining mental illness and its causes, recognizing common types of mental illness, how to provide mental health first aid, and mental health resources available in the community (including medications). A survey that tested the CHWs' mental health knowledge was administered both before the first workshop and after the last workshop. Survey design was based on I-TECH Guidelines, consisting of 16 questions, testing content from each workshop in 4 questions. Three focus group discussions were held following completion of the workshops to gain a qualitative understanding of the impact of the workshops.

Summary of Results A significant improvement in individual survey scores was found for 17/22 participants ($p < 0.01$, paired t-test). The participants achieved significantly higher scores for each individual question on the second knowledge survey compared to the first survey, on average ($p < 0.0001$, paired t-test). Analysis of the quantitative data indicated an increase in mental health knowledge for this cohort. Analysis from the focus group discussions identified themes including change in belief that mental illness is caused by witchcraft, confidence with regard to identifying and responding to community members with mental health issues, eagerness to share the material with community members, and interest in learning more about the treatment of mental illness.

Conclusions We believe that the new mental health knowledge acquired by CHWs via the series of implemented workshops will improve the health outcomes of people in the community who suffer from mental illness, and has a strong potential for dissemination throughout the community in the future.

101 CRITICAL ASSESSMENT OF MATERNAL-NEWBORN CARE DELIVERY IN SOLUKHUMBU, NEPAL

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10.1136/jim-2016-000365.101

Purpose of Study The majority of Nepal's births take place in remote, rural and difficult to reach areas. Adverse

outcomes for mothers and newborns are common. Little information exists about available health resources and care practices for maternal-child health (MCH) in these areas.

The intent of this study was to evaluate care practices and identify areas of intervention for ante-, intra-, and post-partum care in one Nepali district.

Methods Used From December 2015 to March 2016, in the Solukhumbu District, we surveyed a random sample of 122 women who had delivered in the preceding 24 months. They live in 3 randomly selected, geographically separated village clusters (pop ~5,000), each consisting of 9 settlements. Women were identified from government birth records. This was done using a previously validated, standardized MCH household survey, based on WHO practice guidelines with a primary focus on ante-, intra-, and post-partum processes and outcomes after delivery. Reporting is descriptive.

Summary of Results Of 122 women surveyed, 60/122 (49%) had a birth preparedness plan, including at least one antenatal care visit. 32/122 (26%) of deliveries took place in a healthcare facility, with a trained midwife who has the ability to manage birth asphyxia. 86/122 (70%) of deliveries were at home without a skilled provider, and 3 deliveries occurred en route to a hospital. 19/122 (16%) deliveries had complications including post-partum hemorrhage, mal presentation, or prolonged labor; including one maternal and one newborn death. Of 121 live births, 7/121 (6%) had all four essential elements of newborn care (immediate drying, skin-to-skin placement, cord clamping after 1–3 minutes and breast-feeding within 1 hour). 11/121 (9%) of live newborns had a danger sign in the first week, and 47/121 (39%) received a health-worker check-up within the first week.

Conclusions Access to skilled care around childbirth remains problematic in Solukhumbu. Improvements in the access to quality MCH services are critically needed. This data, in combination with prior related studies, has laid the foundation for our cohort to undertake a multi-faceted intervention to make such improvements possible.

Hematology and Oncology I

Concurrent Session

3:15 PM

Thursday, January 26, 2017

102 WHERE DOES MERKEL CELL CARCINOMA METASTASIZE AND HOW DOES THE SITE AND TIMING OF INITIAL DISTANT METASTASIS IMPACT SURVIVAL?

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10.1136/jim-2016-000365.102

Purpose of Study Merkel cell carcinoma (MCC) is an aggressive, neuroendocrine skin cancer and 30% of patients develop metastatic disease. Specific sites and timing of initial distant metastases are largely undescribed and, if characterized, could inform radiologic surveillance

protocols and prognosis estimates.

Methods Used This retrospective, natural history study included 292 patients with metastatic MCC, grouped by the site(s) and timing of their initial distant metastases. Patients were followed from their first distant metastasis to last contact or their death. Survival was compared using a multivariate competing-risks regression. The primary endpoint was death from MCC, with other causes of death considered competing-risks.

Summary of Results 292 patients had 420 initial distant metastatic sites (90 patients had multiple sites: median 2, range 2–5) during the 824 total years of follow-up (median 1.9 years). The most common sites of initial distant metastasis were non-regional lymph nodes (40% of 292 patients), skin / body wall (26%), liver (22%), bone (20%), lung (9%), pancreas (8%), and brain (4%). Patients with only liver metastases (n=31; HR 2.1; p=0.02; 5-year mortality 87%) or patients with metastases in multiple sites (n=90; HR 2.7; p<0.01; 5-year mortality 92%) were over twice as likely to die of MCC than patients with only skin / body wall metastases (n=42; 5-year mortality 67%). Additionally, patients with initial distant disease found >3 years after primary diagnosis (n=21; 5-year mortality 67%) were twice as likely to survive MCC than patients with metastases found within two years of diagnosis (n=238; HR 0.5; p=0.02; 5-year mortality 86%).

Conclusions Survival varies for patients with metastatic MCC and stratification by site(s) of initial distant metastasis may facilitate more accurate risk assessment and counseling. Most patients who developed a distant metastasis did so within 2 years of their original diagnosis, so newly diagnosed patients may benefit from intensive surveillance during this period with lengthened imaging intervals after 3 years.

103 USING RADIATION THERAPY TO PRIME THE IMMUNE SYSTEM IN HEAD AND NECK SQUAMOUS CELL CARCINOMA

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10.1136/jim-2016-000365.103

Purpose of Study The exciting combination of immunotherapy and radiation therapy (RT) in cancer treatment shows promise to improve RT treatment strategies. RT has immune adjuvant-like effects enabling the body to fight off malignancies. The mechanism is unknown, but it is thought that to be via antigen driven activation of T cells. We hypothesize that RT increases antigen presenting capacity and immunogenicity of tumor cells, and thus can activate CD8+ T cells.

Methods Used HNSCC datasets from the TCGA were sorted into cytotoxic and exhausted CD8+ T cell phenotype patient groups. Patients in the highest and lowest quartiles of these groups were compared for relative expression of MHC I.

HNSCC B4B8 and LY2 cell lines were plated and irradiated with 0, 4, 8, or 25 Gy X-rays at 24 hours. Tumor cells were harvested 24 hours after RT to assess

surface expression of MHC I, CD80, and PD-L1 by flow cytometry.

For co-culture, mouse spleens were harvested and CD8+ T cells were purified using magnetic bead negative selection. In the proliferation assays, CD8+ T cells were labeled with CFSE prior to co-culture. CD8+ T cells were incubated with 24-hour post- 25 Gy RT tumor cells for 4 days. T cell CFSE and CD69 were assessed using flow cytometry.

Summary of Results TCGA data showed higher HLA gene expression in the cytotoxic T cell group compared to the exhausted group. RT resulted in a dose dependent increase in expression of MHC I in both B4B8 and LY2 cell lines ($p < 0.0001$, $p = 0.0029$, respectively). CD80, a T cell co-stimulatory marker, showed a similar increase ($p = 0.0229$, $p = 0.0004$), however PD-L1, a T cell inhibitory marker, also increased following RT ($p = 0.0029$, $p = 0.0299$). Co-culture of CD8+ T cells with irradiated cell lines showed an increase in CD69+ CD8+ T cells compared to non-irradiated controls ($p = 0.0019$, $p = 0.0363$). T cell proliferation levels were also higher in the RT group (replicate in progress).

Conclusions TCGA data show that cytotoxic T cell phenotypes are correlated with increased MHC I expression in HNSCC. Further, RT increases expression of MHC I, CD80, and PD-L1 in two murine HNSCC cell lines. CD8+ T cells co-cultured with these 25 Gy irradiated tumor cells showed increased levels of CD69 and proliferation relative to a non-irradiated control.

104 ANATOMIC PATTERNS OF RELAPSE AND PROGRESSION FOLLOWING TREATMENT WITH ^{131}I -MIBG IN METASTATIC NEUROBLASTOMA

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10.1136/jim-2016-000365.104

Purpose of Study Neuroblastoma is the most common pediatric extracranial solid tumor. Patients with MIBG-avid relapsed or refractory neuroblastoma may exhibit significant, but transient, responses to salvage treatment with ^{131}I -MIBG. It is not known whether disease progression following ^{131}I -MIBG treatment occurs in previously involved or new anatomic sites. Understanding this may inform consolidative external beam radiation therapy following ^{131}I -MIBG administration.

Methods Used Patients with relapsed or refractory metastatic MIBG-avid blastomas who received single-agent ^{131}I -MIBG on phase II and compassionate access protocols at a single institution were included if they had 1) stable or responding disease 6–8 weeks following ^{131}I -MIBG infusion, but subsequently experienced disease progression and 2) had serial diagnostic MIBG scans available from protocol enrollment through first progression. Progression was defined as development of MIBG-avid disease in a previously uninvolved anatomic location, or as recurrence of MIBG avidity in a previously involved site that had fully cleared following MIBG treatment.

Summary of Results A total of 142 MIBG-avid metastatic sites were identified prior to MIBG therapy in a cohort of 15 patients. Following first ^{131}I -MIBG infusion, and prior to

disease progression, five patients received additional ^{131}I -MIBG treatments; none received external beam radiation therapy. At first progression, a total of 140 MIBG-avid sites were identified, of which 103 (74%) overlapped with pre-treatment disease sites, while 37 (26%) represented anatomically new disease areas. Nine of 15 patients had one or more new MIBG avid site at first progression. Of the 103 involved sites at progression that overlapped with pre-treatment disease, 19 represented relapsed sites that had cleared following MIBG therapy, 19 were persistent but increasingly MIBG-avid, and 65 were stably persistent.

Conclusions Previously involved anatomic disease sites predominate at disease progression following ^{131}I -MIBG treatment. Nevertheless, the majority of patients progressed in at least one new anatomic disease site. Thus consolidative focal therapies targeting residual disease sites may be of limited benefit in preventing systemic disease progression following ^{131}I -MIBG treatment of relapsed or refractory neuroblastoma.

105 DIGEX: CONNECTING GENE EXPRESSION SIGNATURES FOR DRUG REPURPOSING AND REPOSITIONING

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Purpose of Study To develop DIGEX (Drug-Induced Gene Expression Changes), a novel computational method to predict drugs and drug combinations based on a query set of genes that connect to a reference database of drug-induced gene expression signatures. To deploy DIGEX as a web tool that allows users to utilize the resulting connectivity map in their research.

Methods Used Publicly available gene expression data were obtained from the NCBI Gene Expression Omnibus (GEO). We collected human microarray data from different studies assessing drug treatment on various cell lines. We included data from three different microarray platforms: Affymetrix, Illumina, and Agilent. Gene chip series were selected based on availability of supplementary raw data. Within each series, we filtered samples that met the criteria of available drug treatment data, including cell line treated, drug name, dosage (micromolar), and time treated (hours). Cell lines with insufficient or absent data regarding treatment time and dosage were excluded. Samples that shared these criteria were aggregated into groups; aggregated treatment groups were thus compared to aggregated control groups. This data was then normalized on a Log2 scale to compare treatment versus control gene expression data. After manually curating and normalizing the data, we developed Python scripts for inserting the data into the MySQL tables.

Summary of Results From the three gene chip microarray platforms, we collected 599 series, of which there were 772 cell lines and 1978 unique compounds. Within these cell lines and compounds, 4480 comparisons of treatment versus control groups were made. Based on the Connectivity Map concept, we developed and implemented a matching algorithm in DIGEX. We developed a web

portal that queries and displays the MySQL database, using D3 technology.

Conclusions In conclusion, we developed DIGEX, a novel computational method that connects a list of query genes to a reference database for drug repurposing and repositioning. The reference database of drug-induced gene signatures was derived from publicly available gene expression data sets. The gene sets based on drug-induced gene expression could be used as a resource for gene set enrichment analyses. The web tool allows users to search and retrieve drug-induced gene expression data in a meaningful visual representation.

106 LYMPHOMA CANCER INTERNET PATIENT INFORMATION: A SYSTEMATIC EVALUATION OF THE QUALITY OF ONLINE RESOURCES FOR LYMPHOMA PATIENTS

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10.1136/jim-2016-000365.106

Purpose of Study Lymphoma patients are a growing population whose educational needs are insufficiently studied. Past studies have investigated the quality of online information in other cancer sites, but none have focused on lymphoma. This study systematically evaluates the quality of online lymphoma resources using a validated structured rating tool.

Methods Used >500 web pages were retrieved using Google.ca, Dogpile.com and Webcrawler.com. The top 100 unique websites were compiled using inclusion and exclusion criteria. Their quality was evaluated using a validated structured rating tool.

Summary of Results Of the 100 sites evaluated, 62% were not commercially affiliated, 94% used 4 or more structural tools, 91% had a search engine, 94% allowed queries for webmaster, and 84% had a discussion forum available. However, only 54% of sites identified their authors, and even fewer identified author affiliation (32%) or credentials (40%). 54% did not disclose their currency or were out of date. The average readability grade levels were high at 11.6 (Flesch Kincaid grade level score) and 10.7 (SMOG), and >90% of websites required more than an 8th grade education level. With respect to content, 97% Hodgkin (HL)/97% non-Hodgkin (NHL) sites described definition, 89% HL/87% NHL symptoms, and 89% HL/87% NHL treatment. However, few sites contained information about prevention. Symptom and treatment accuracy were high but definitions were less complete for non-Hodgkin. 66% HL/69% NHL of sites had inaccurate or incomplete information regarding prognosis and 61% HL/46% NHL regarding etiology.

Conclusions This study reveals strengths and weaknesses in the quality of online lymphoma resources. Strengths include lack of commercial affiliation, structure, and interactivity. Weaknesses include attribution of authorship, disclosure of currency and readability grade level, which was

far above recommendations made by AMA, NIH, and CDC. Content-wise, symptom, and treatment were well described, but prognosis, etiology and prognosis can be improved. These results can inform physicians of gaps and overlaps in patient knowledge to optimize doctor-patient communication and patient resources.

107 MAGNETICALLY FOCUSED PROTON IRRADIATION OF SMALL VOLUME RADIOSURGERY TARGETS USING A TRIPLET OF QUADRUPOLE MAGNETS

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10.1136/jim-2016-000365.107

Purpose of Study Proton therapy is an advantageous choice for the irradiation of tumors in proximity of critical structures due to rapid dose fall off and high dose deposition at the target compared to dose at tissue entrance (ie, peak-to-entrance dose ratio (P/E)). However, with target fields below 1.0 cm, multiple Coulomb scattering broadens proton beams leading to diminished peak-to-entrance dose ratios and dose delivery efficiencies (DDE). The purpose of this research is to investigate the advantages of magnetically focusing proton beams using a triplet of quadrupole rare earth permanent magnets in an effort to minimize the effects of multiple Coulomb scattering.

Methods Used Monte Carlo simulations of 127 MeV protons were performed using a model of the Gantry 1 clinical beam line at James M Slater MD Proton Treatment and Research Center at the Loma Linda University Medical Center (JMSPTRC). Dose deposition of proton beams focused through a triplet of quadrupole magnets (MF3) was compared to unfocused collimated beams (UNF) (the current standard for treatment in radiosurgery). Four sets of triplet magnets were used, each with different magnetic field gradients (a measure of focusing strength). Initial beam diameters were 5–20 mm for both MF3 and UNF beams. Optimized simulation parameters were then used as a starting point for comparative proton experiments in Gantry 1 at JMSPTRC.

Summary of Results Experimentally, target beam spot size from 5, 6, and 8 mm MF3 beams using 200 T/m gradient magnets were size-matched to a 5 mm UNF beam. The MF3 beams showed P/E dose improvements of 45–77% and up to a 1.7x gain in DDE compared to the UNF beam. The 12, 15, 18, and 20 mm MF3 beams using 150 T/m gradient magnets were size-matched to an 8 mm UNF beam and showed P/E dose improvements of 41–67% and up to a 3.4x gain in DDE. Additional data collected using the two additional magnet sets is currently under analysis and the latest results will be presented.

Conclusions Proton beams focused using a triplet of rare earth permanent quadrupole magnets showed improvements of P/E dose ratios and DDEs compared to UNF beams. Clinically, such improvements could reduce radiation damage to normal tissue and deliver enhanced dose to the target in less time compared to UNF collimated beams.

108 NOVEL MICROENDOSCOPE PLACED INTO DONOR SPECIMEN IN ANATOMY LAB TO REVEAL DUCTAL ANATOMY

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10.1136/jim-2016-000365.108

Purpose of Study Quarter century has passed since Asian researchers successfully used a single microfiberscope without ductal distension to assess initial 3 cm's of breast ducts. Very low quality image acquisition and fragile equipment failure prevented any widespread traction. Recent developments using multifiber microendoscopes have evolved to solve this problem. Unfortunately, in best situations, mammography leaves 2/3 of patients at risk for cancer death. The objective of this study was to investigate if a microendoscope could be placed into breast ducts of donor cadavers without creating incisions and acquire images.

Methods Used Literature search investigating microendoscope use as a ductoscope versus mammograms. C-Link Micro Endoscope system (CLME) was used with irrigation to dilate the duct. Female cadaver donors (N=10 breasts, average 71) had microendoscope attempted.

Summary of Results Literature search revealed many negatives about mammograms and several positives when ductoscope was used, albeit minimally. 92% of subjects undergoing ductal lavage had at least one duct successfully cannulated. All 10 donors were successfully cannulated and scoped. CLME is capable of detecting abnormal or pre-cancerous cells and lesions in the milk ducts 10 to 15 years before they can be detected by mammograms. CMLE is used to investigate nipple discharge and allows for a more targeted and accurate approach in locating abnormal ductal lesions for excision and biopsy. CMLE can be used in conjunction with a lumpectomy to achieve clearer margins to minimize excess tissue removal. 92% of subjects undergoing

ductal lavage had at least one duct successfully cannulated. Performing ductoscopy using the CMLE can detect pre-cancerous cells in the milk ducts which allows for significantly earlier Breast Cancer detection than mammography. **Conclusions** This study demonstrated CMLE can be conducted on cadavers to teach ductal anatomy, develop endoscopy skills and nurture disruptive or future innovations.

109 CHARACTERIZING THE OBESITY AND BREAST CANCER RELATIONSHIP IN MEN

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10.1136/jim-2016-000365.109

Purpose of Study Obesity is a risk factor for male breast cancer. However, the characteristics of obesity-associated male breast cancer have not been well described due to its rarity. This study examines the relationship between obesity and features of male breast cancer.

Methods Used In a retrospective single-institution study, men who underwent mastectomy at Memorial Sloan Kettering Cancer Center were included. Demographic and clinicopathologic data were abstracted from electronic medical records. Age and body mass index (BMI) were assessed at date of surgery. Through a descriptive approach, clinicopathologic variables were examined by BMI category.

Summary of Results From 2001–2011, 156 men were identified; 13 with benign gynecomastia were excluded and 143 with breast cancer were included. Baseline characteristics by BMI category are provided in the Table. Median age at presentation was 44 (40–64) years in morbidly obese men versus 69 (47–85) in normal BMI men. Most morbidly obese men had grade III tumors (82%) and tumors >2 cm (70%) while only 40% and 27% of normal BMI men had grade III tumors or tumors >2 cm, respectively.

Abstract 109 Table 1

	Variable	Normal (N=24)	Overweight (n=67)	Obese (n=39)	Morbidly Obese (n=13)
Median Age	Age in years (range)	69 (47–85)	66 (23–96)	63 (35–84)	44 (40–64)
Tumor Type	ER +/HER2 -	19 (86%)	55 (92%)	32 (97%)	11 (100%)
	HER2 +	3 (14%)	4 (7%)	1 (3%)	0 (0%)
	Triple Negative	0 (0%)	1 (1%)	0 (0%)	0 (0%)
	N/A	2 (8%)	7 (10%)	6 (15%)	2 (15%)
Grade	I	1 (5%)	1 (1%)	1 (3%)	0 (0%)
	II	12 (55%)	27 (46%)	14 (41%)	2 (18%)
	III	9 (40%)	31 (53%)	19 (56%)	9 (82%)
	N/A	2 (8%)	8 (13%)	5 (13%)	2 (15%)
Invasion	In situ	2 (8%)	7 (10%)	3 (8%)	2 (15%)
	Invasive	22 (92%)	60 (90%)	36 (92%)	11 (85%)
Tumor Size	<2 cm	16 (73%)	34 (58%)	20 (56%)	3 (30%)
	2–5 cm	6 (27%)	24 (41%)	16 (44%)	7 (70%)
	>5 cm	0 (0%)	1 (1%)	0 (0%)	0 (0%)
	N/A	2 (8%)	8 (10%)	3 (8%)	3 (23%)
Lymph Node Involvement	Y	11 (50%)	37 (62%)	17 (47%)	5 (45%)
	N	11 (50%)	23 (38%)	19 (53%)	6 (55%)
	N/A	2 (8%)	7 (10%)	3 (8%)	2 (15%)

Conclusions Obese and morbidly obese males appear to present with breast cancer at a younger age, with larger and higher grade tumors than normal BMI men.

110 RETICULONS INFLUENCE ENDOPLASMIC RETICULUM MORPHOLOGY AND NUCLEAR SIZE IN XENOPUS AND HELA CELLS

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10.1136/jim-2016-000365.110

Purpose of Study The endoplasmic reticulum (ER) is perhaps one of the most elaborate and complicated organelles of the eukaryotic cell due to its morphological features and multifunctional purpose. The ER is a complex network of membrane sheets and tubules; however, only recently have mechanisms that determine ER morphology been identified. The purpose of this study was to further characterize the influence of tubule-shaping reticulon proteins on ER morphology and to observe downstream effects on the functional capacity of the ER. This study was also designed to develop precise ER visualization techniques that will facilitate further research on the relationship between cytoplasmic volume and ER assembly using microfluidic encapsulation technology.

Methods Used Extract from *Xenopus laevis* eggs was prepared through standard protocols, arrested in interphase, and combined with demembranated *X. laevis* sperm chromatin to initiate in vitro nuclear and ER assembly. Some reactions were supplemented with exogenous recombinant reticulon 4b (Rtn4b). Nuclei were visualized using immunofluorescent labeling of the nuclear pore complex, and nuclear cross-sectional area was quantified using MetaMorph Image Analysis software. Exogenous Rtn4b was observed using anti-6x-His immunofluorescent labeling. HeLa cells were transfected with GFP-Rtn4a, and the ER was visualized by immunofluorescence with an anti-Calnexin antibody and confocal microscopy.

Summary of Results The addition of exogenous Rtn4b at varying nanomolar concentrations to nuclei assembled in *X. laevis* egg extract resulted in an overall decrease in nuclear cross-sectional area compared to control nuclei. Added Rtn4b was incorporated into ER tubules and was clearly visualized using anti-6x-His antibodies. Furthermore, HeLa cells transfected with GFP-Rtn4a demonstrated obvious alterations in ER morphology.

Conclusions The decrease in nuclear cross-sectional area with overexpression of Rtn4b suggests that there is a direct influence of ER morphology on nuclear size. Moreover, the morphological changes observed in transfected HeLa cells with overexpressed Rtn4a warrant further investigation into how altered ER morphology impacts ER function.

Neonatal Pulmonary II Concurrent Session 3:15 PM Thursday, January 26, 2017

111 IMPACT OF THE SOD3 R213G POLYMORPHISM ON ALVEOLAR AND PULMONARY VASCULAR DEVELOPMENT

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10.1136/jim-2016-000365.111

Purpose of Study Imbalance in oxidative stress contributes to BPD and PH. Loss of the vascular antioxidant enzyme, extracellular superoxide dismutase (SOD3), worsens injury in a neonatal mouse model of bleomycin-induced BPD and PH. A human SOD3 polymorphism with a single amino acid substitution (R213G) decreases matrix binding affinity of SOD3. Paradoxically, expression of this single nucleotide polymorphism (SNP) is associated with decreased COPD but increased cardiovascular disease. The impact of this SNP on the developing lung is unknown. We hypothesized that the R213G SNP will worsen vascular development and injury in a neonatal murine model of BPD.

Methods Used Wild type (WT) and homozygous R213G mice were injected with bleomycin (3 u/kg) or PBS for 9 IP doses, beginning on PN 2 and sacrificed on PN 22 (n=5–8 per group). Pulmonary tissue and serum were assessed for SOD1, SOD2, SOD3 and catalase protein by western blot. Alveolar development was evaluated by radial alveolar count and vascular development by vessel density. RVH was tested by Fulton's index and RVSP by direct RV puncture.

Summary of Results Compared to WT, R213G mice had decreased pulmonary SOD3 protein levels and increased serum SOD3 protein levels (p<0.001). Bleomycin had no effect on SOD3 levels in either WT or R213G mice. Pulmonary SOD1, SOD2, and catalase levels were similar between strains and were unchanged by bleomycin. RAC was similar in control WT and R213G mice. Bleomycin exposed WT mice demonstrated a significant decrease in RAC (p<0.01), and this decrease was attenuated in R213G mice. Compared to WT, R213G controls demonstrated decreased vessel density at baseline (p<0.05). Bleomycin decreased vessel density in WT (p<0.01), and this decrease was significantly mitigated in R213G mice. R213G control mice had elevated RVH and RVSP at baseline (p<0.01). Bleomycin induced RVH and elevated RVSP in WT mice (p<0.001), a finding not observed in R213G mice.

Conclusions Redistribution of EC-SOD due to the R213G SNP leads to PH at baseline but protects mice against bleomycin-induced PH and hypoalveolarization. Thus, EC-SOD localization is important in disease progression.

Support: NIH/NICHD T32007186–32, NIH/NHLBI HL086680

112 NOTCH SIGNALING IN LUNG INNATE IMMUNITY CELLS OF EXTREMELY PREMATURE INFANTS: IMPLICATIONS FOR BPD PATHOGENESIS

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10.1136/jim-2016-000365.112

Purpose of Study Bronchopulmonary dysplasia (BPD) remains a common morbidity in preterm infants. Its etiology includes lung inflammation & injury that results in arrested alveolar development. NOTCH is a major signaling pathway in lung development and alveogenesis. Also NOTCH induces a pro-inflammatory M1 phenotype in macrophages. Here we investigate the expression of NOTCH receptors & ligands in lung-derived macrophages from preterm neonates in order to delineate the potential relationship between NOTCH & risk for BPD pathogenesis.

Methods Used Tracheal aspirate fluid (TAF) was obtained from intubated infants in the NICUs at LAC+USC Medical Center & Good Samaritan Hospital in Los Angeles per IRB protocol. The cellular component of TAFs was isolated & used in flow cytometry to isolate macrophages or directly homogenized in Trizol reagent. RNA was extracted & used for microarray analysis or conventional & quantitative PCR (qPCR) for NOTCH pathway components.

Summary of Results Transcriptomic analysis of mRNA from isolated lung macrophages followed by bioinformatics identified NOTCH as a significantly upregulated pathway in macrophages from 24 week compared to more mature infants. Using conventional PCR, we show the receptors NOTCH1 & NOTCH2, as well as the ligands DLL1 & JAG1 are expressed in macrophages from most neonates between 22 & 40 weeks gestation. NOTCH3, DLL2 & JAG2 were variably expressed. Using qPCR, we show NOTCH1 & NOTCH2 mRNAs are increased in infants born <28 weeks gestation compared to term. There was a trend towards increased JAG1 expression in extremely premature infants.

Conclusions There is increased mRNA expression of NOTCH1 & NOTCH2 in the innate immune cells of premature infants born <28 weeks. We speculate that increased NOTCH signaling in lung macrophages may impact the function of the neonatal immune system and more interestingly participate in lung development & differentiation of alveolar epithelial cells. These interactions may represent a molecular pathway of BPD pathogenesis. Supported by NIH, NHLBI and The Hastings Foundation.

113 INHIBITION OF LPS-INDUCED IκBβ/NFκB SIGNALING ATTENUATES IL-1β EXPRESSION WITHOUT INCREASING CELL DEATH IN THE DEVELOPING LUNG

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10.1136/jim-2016-000365.113

Purpose of Study The pro-inflammatory cytokine IL-1β is implicated in the pathogenesis bronchopulmonary dysplasia.

NFκB inhibition prevents LPS-induced IL-1β expression but also increases apoptosis in the developing lung. NFκB activation proceeds by cytosolic degradation of its inhibitory proteins, IκBα and IκBβ. After NFκB activation, IκBs enter the nucleus where IκBα terminates and IκBβ potentiates NFκB-mediated pro-inflammatory gene expression, including IL-1β. We sought to determine whether selectively targeting IκBβ/NFκB signaling would attenuate LPS-induced IL-1β expression without increasing apoptosis.

Methods Used RAW 264.7 macrophages pretreated with increasing doses of BAY 11-7085 (0.5–20 mM; IκBβ/NFκB signaling is selectively targeted at 0.5–1 mM) and wild type and IκBβ knockout BMDM were exposed to LPS. We assessed IL-1β and anti-apoptotic gene expression with RT-qPCR and immunoblot, apoptosis by caspase-3 cleavage, and cell viability by trypan blue exclusion. To assess absent IκBβ/NFκB signaling in vivo, WT and IκBβ KO neonatal (PO) mice were exposed to LPS and pulmonary IL-1β and anti-apoptotic gene expression assessed.

Summary of Results Low dose BAY inhibited LPS-induced IκBβ degradation and IL-1β expression (mRNA/protein; $p < 0.05$). In contrast, inhibition of IκBβ/NFκB signaling did not suppress induction of anti-apoptotic gene (BCL2A1, XIAP, and PAI-2) expression, increase caspase 3 activity, or decrease cell viability. In contrast, high dose BAY 11-7085 completely inhibited LPS-induced NFκB activation and IL-1β expression as well as anti-apoptotic gene expression ($p < 0.05$). This was associated with caspase-3 cleavage and cell death. Consistent with selective pharmacologic inhibition of IκBβ/NFκB signaling, LPS-induced IL-1β expression was significantly attenuated in IκBβ KO BMDM (mRNA/protein; $p < 0.05$), while expression of anti-apoptotic genes and caspase 3 cleavage was not affected. Supporting these in vitro findings, pulmonary expression of IL-1β was attenuated in endotoxemic IκBβ KO neonatal mice compared to controls ($p < 0.05$) without altering expression of anti-apoptotic genes.

Conclusions Given the association of IL-1β with BPD, targeting IκBβ/NFκB signaling may prevent inflammatory injury without inhibiting NFκB's protective role in the neonatal lung.

114 COMPARISON OF OXYGENATION INDEX (OI) AND THE SPO₂/FIO₂ RATIO (SF) IN NEONATES WITH CONGENITAL DIAPHRAGMATIC HERNIA

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10.1136/jim-2016-000365.114

Purpose of Study OI (mean airway pressure × FiO₂ × 100 / PaO₂) and PaO₂/FiO₂ (PF) are commonly used to assess severity of respiratory failure. An OI ≥ 15 and ≥ 25, and PaO₂/FiO₂ < 200 and < 100 are consistent with moderate and severe disease, respectively. Calculating OI and PF requires PaO₂ which is not always feasible if an arterial line is lacking. All babies with respiratory disease have SpO₂ monitored continuously via pulse oximetry. Studies in adults and children have demonstrated good correlation between OI and PF, and between PF and SF ratios. No studies in neonates with respiratory failure have assessed the association between OI and SF.

Abstract 114 Figure 1

Methods Used A database of 315 babies with congenital diaphragmatic hernia (CDH) managed in two NICUs from 1998 to 2016 was analyzed. OI was calculated using post ductal paO_2 . Paired calculations from the same time point for OI and SF were determined over the first 7 days of life ($n=1450$) and compared by regression analysis. We performed ROC AUC analysis for SF prediction of lung disease based on dichotomous classification using OI definitions (moderate: $\text{OI} \geq 15$; severe: $\text{OI} \geq 25$).

Summary of Results 315 neonates were included, with median birth weight 3022 (IQR 2618–3366) g and median gestational age 38 (IQR 37–39) weeks. The relationship between OI and SF ratio was shown by the equation $Y = -2.78x + 167.8$ ($p < 0.0001$). An OI of 15 and 25 corresponded to a SF ratio of 130 and 106. For severe lung disease ROC analysis AUC was 0.936 (Figure 1) and for moderate lung disease ROC analysis AUC was 0.916 (Figure 2).

Conclusions In the absence of PaO_2 values SF ratio can be used as a relative marker of severity of lung disease in neonates with CDH, thus allowing for the estimation of severity of lung disease in neonates without invasive arterial access. We speculate this may apply to neonatal respiratory disease from any cause.

115 DURATION OF MECHANICAL VENTILATION AFFECTS RESPIRATORY MECHANICS IN FORMER PRETERM LAMBS

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10.1136/jim-2016-000365.115

Purpose of Study Mechanical ventilation (MV) of preterm (PT) neonates impairs respiratory mechanics and increases airway hyper-reactivity. The duration of MV resulting in persistence of these outcomes is unknown. We hypothesized that 3d of MV will impair respiratory mechanics and increase airway hyper-reactivity. To test this hypothesis, we used chronically ventilated preterm lambs that were weaned from respiratory support after 3 d. We used the forced oscillation technique (FOT) to determine persistence of 3 d of MV on respiratory mechanics and airway hyper-reactivity in the first 3 months (M) of life of the former

Abstract 115 Figure 1

preterm lambs (FPT; ~3 y in humans).

Methods Used PT lambs delivered at 128–130 d (term ~150 d) were resuscitated with MV: Group 1 was weaned from MV at 2–3 h to non-invasive support for 3 d (FPT_{3h}; $n=3$, m:f 1:2). Group 2 remained on MV for 3 d (FPT_{3d}; $n=3$, 2:1). PT lambs were weaned from respiratory support and lived for ~4 M (~3 M corrected postnatal age, cPNA). Control lambs ($n=21$, 7:14), born at term (T) lived until 3 M. Respiratory mechanics were measured monthly, using FOT at 11 Hz. Airway hyper-reactivity was assessed by changes in FOT variables after stepped nebulization of methacholine (MCh) (0.06–2 mg).

Summary of Results Baseline respiratory resistance (R_{rs}) and reactance (X_{rs}) were higher ($p < 0.05$) and lower ($p < 0.05$), respectively, for FPT_{3d} lambs compared to FPT_{3h} and T lambs at 1 M cPNA (Figure). For the FPT_{3d} group, nebulized MCh (2 mg) increased R_{rs} from the respective month's baseline at 1 M (ΔR_{rs} 6.4(1.1) (median (IQR)) and at 2 M (6.6(6.0)) cPNA. Differences decreased with age.

Conclusions MV of PT lambs for 3 d impairs respiratory mechanics and increases airway hyper-reactivity later in life. These abnormalities diminish with advancing postnatal maturation. HL110002

116 UNPLANNED EXTUBATION IN NEWBORN INFANTS: RESULTS OF AN ONGOING QUALITY IMPROVEMENT PROJECT

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10.1136/jim-2016-000365.116

Purpose of Study Previous research has shown that neonates are especially prone to unplanned extubation (UE). Currently, UE requiring reintubation is the 4th most common adverse event in neonatal intensive care units (NICUs) in the United States, and it is a costly drawback to the benefits NICU patients receive from intubation as it may lead to multiple adverse events. Studies over the last 30 years have shown UE rates ranging from .14 UEs/100 ventilation days to 5.3 UEs/100 ventilation days with no change in incidence over the past 5 years. Currently, there is no clear strategy in the literature that has been documented on good care practices in the NICU in order to lower the rate of UE.

Methods Used Our goal through this study was that through a continuous quality improvement exercise, we would reduce our UE rates and maintain these gains over

Abstract 116 Figure 1

the long term. We prospectively collected data pertaining to every UE beginning in 2012 and started a regular Plan-Do-Study-Act cycle.

Summary of Results Over this 4-year period there were 110 UE's with UE rates varying between 0 to 1.1 UE/100 ventilator days (Figure 1). The initial reduction in UE was not sustained with the UE rates increasing in the last 1 year of observation. Causes of UE changed over time with high endotracheal tube (ETT) being more frequent between 2012–2014, while UE with ETT re-taping was more common in 2015–2016 (P value<0.05).

Conclusions Initial gains in reducing UE rates have been hampered by new challenges, emphasizing the role of quality improvement as a long term, continuous process.

117 EARLY EXTUBATION TO NONINVASIVE VENTILATION IN NEONATES RECEIVING HIGH FREQUENCY VENTILATION: A SINGLE CENTER EXPERIENCE

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10.1136/jim-2016-000365.117

Purpose of Study Sick infants on conventional ventilation often receive rescue high frequency ventilation (HFV) to improve gas exchange and/or to resolve air leaks. There is limited experience on extubation during the weaning phase of HFV to noninvasive ventilation (NIV). Common clinical practice is to wean from HFV to synchronized intermittent mandatory ventilation (SIMV) before extubation to NIV. We compared infants extubated directly to NIV with infants who were transitioned to SIMV and then extubated to NIV.

Methods Used Data on infants requiring HFV in a single NICU from 1/2009 to 12/2015 was retrospectively reviewed. Institutional review board approval was obtained for reviewing the data. All infants who received respiratory support with either high frequency oscillatory ventilator and/or high frequency jet ventilator while in the NICU were searched through our divisional database. Infants were excluded if they expired while on HFV or were transported to another facility while on HFV. Data obtained for infants extubated to NIV from HFV was compared with data from infants transitioned to SIMV prior to extubation to NIV. The primary outcome evaluated was successful extubation from HFV to NIV.

Summary of Results Out of 161 NICU infants who received HFV during the study period, 98 infants met

eligibility criteria. A total of 34 infants (35%) were directly extubated to NIV, and 64 infants (65%) were transitioned to SIMV prior to extubation. Mean birth weights (970 g vs 1187 g), mean gestational age (26.7 weeks vs 27.5 weeks), and mean time spent on HFV (21.5 days vs 19.9 days) were similar in both groups. Total invasive ventilation days were significantly lower (P<0.05) in the NIV group (mean 26.5 +/- 14.7 days) compared to the SIMV group (mean 33.8 +/- 18.1 days). Reintubation rates (11.8% in the NIV group compared to 7.8% in the SIMV group) were not significantly different (P=0.38).

Conclusions Direct extubation to NIV after rescue support with HFV is safe, feasible, and may decrease invasive ventilation days. There is no increased risk of extubation failures in infants extubated directly to NIV. Further studies are needed to establish guidelines for early extubation in infants receiving HFV to NIV.

118 RETROSPECTIVE ANALYSIS OF HIGH FREQUENCY NASAL VENTILATION USE IN NEONATES

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10.1136/jim-2016-000365.118

Purpose of Study High frequency nasal ventilation (HFNV) is a non-invasive (NIV) alternative to intubated ventilation of neonates. Though not widely used, this mode of ventilation has shown promising outcomes in small cohort and retrospective studies. The purpose of this study was to evaluate effectiveness and safety of HFNV in neonates.

Methods Used IRB approved retrospective study of 26 neonates managed by HFNV from a single center NICU.

Abstract 118 Table 1

	Improved (n=18)	Failed (n=8)
Age: Gestation (wk)	32 (23–41)	31 (24–39)
Start (d)	49 (3–121)	65 (11–174)
Weight: Birth (g)	2014 (405–3750)	1650 (678–3170)
Start (g)	2799 (660–4660)	2693 (740–6122)
Male n(%)	11 (61%)	5 (62%)
Diagnosis: BPD (n,9)	5 (56%)	4 (44%)
Pneumonia, other (n,6)	5 (83%)	1 (17%)
Anomaly, Lung/heart (n,11)	8 (73%)	3 (27%)
Pre-HFNV Mode	8 (67%)	4 (33%)
NIV (n,12)		
Ventilator (n,14)	10 (71%)	4 (29%)
Prior NIV failure	14 (78%)	6 (75%)
Initial settings	0.42 (0.24–1.00)	0.47 (0.21–.95)
FiO2	20 (8–32)	22 (12–30)
Convective rate	415 (340–530)	400 (136–440)
HF rate	10 (6–13)	9 (7–12)
Paw		
PIP	20 (13–30)	20 (15–22)
Oxygen Saturation Index	5.2 (2.1–16.8)	3.7 (2.1–4.8)
Pre-HFNV mode	4.2 (1.4–9.6)	6.1 (2.0–12.6)
24 h later		

Medical records were reviewed and standard data collected, including blood gases immediately prior to and following, as well as 24 hours after, HFNV initiation. Demographic data, support settings for pre-HFNV mode, initial HFNV use, and post-HFNV use, intubation dates, time on HFNV support, and other data were also assessed. HFNV was provided via Bronchotron or VDR-4 devices (Percussionaire).

Summary of Results Of 26 neonates, HFNV successfully supported 18 (69%), including 14/20 (70%) with prior NIV failure; 8 (31%) neonates failed and were intubated, 50% in less than 24 hours. Demographic or support data were not different, as shown in the Table (mean±range, except as noted). Infants successfully managed by HFNV showed time-related improvement in oxygen saturation index ($\text{MAP} \times \text{FiO}_2 \times 100 / \text{SpO}_2$) compared to those who failed HFNV (Table).

Conclusions HFNV was successful in 69% of study infants, including 70% of infants who previously failed NIV support. HFNV use in neonates has the potential to support ventilation and improve oxygenation where other NIV modes fail. Earlier HFNV could lead to reduced rates of ventilator-induced chronic lung disease in high-risk neonates.

119 COMPARISON OF NITRIC OXIDE METABOLISM IN ADULT AND FETAL TISSUES

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10.1136/jim-2016-000365.119

Purpose of Study Nitric oxide (NO) is a radical that can be converted to metabolites including nitrite (NO_2^-), nitrosothiols (SNO), and iron-nitrosyl compounds (FeNO) that preserve NO bioactivity. How these NOx species are produced, stored, and exert NO-like cardiovascular effects changes at birth. We find plasma NOx concentrations fall by >50% minutes after birth, which may alter cardiovascular function, including blood flow and oxygen delivery to the brain. The objective of this study was to compare rates of NO metabolism and profiles of metabolic products in fetal and adult cerebral cortex. We hypothesized that fetal tissues would metabolize NO more rapidly and with a lower yield of NOx than adult tissues.

Methods Used Nitric oxide (10 mM) was added to homogenates of fetal and adult cerebral cortex from sheep. Concentrations of NOx species were measured after 0.5, 1, 2, 3, 4, 5, 10, and 20 minutes. NO was detected by sparging samples with a stream of argon into a chemiluminescence analyzer. NOx was measured after adding tri-iodide to reduce the various NOx species to NO. Results for nitrite, SNOs, and FeNOs were separated by adding acid sulfanilamide to remove nitrite with or without HgCl_2 to remove SNOs.

Summary of Results Nitric oxide was metabolized more quickly in fetal tissues than in adult tissues, disappearing completely from fetal brain homogenates within 3 minutes ($n=5$), and from adult samples with a half-life of 2.8 minutes ($n=4$). Approximately 50% of the NO added to both fetal and adult tissue was converted to nitrite, which remained stable for 20 min. SNO concentrations reached a

maximum of 0.7 ± 0.1 mM at 0.5 min in fetal brain tissue and 0.98 ± 0.15 mM at 4 min in adult brain ($p < 0.05$). FeNO concentrations reached a maximum of 0.66 ± 0.13 mM at 4 min in fetal brain and 1.35 ± 0.21 mM in adult brain ($p < 0.01$).

Conclusions NO is metabolized more rapidly in cortical brain tissue samples from fetal sheep than those from the adult. Nitrite yields are similar between fetus and adult while SNO and FeNO yields are greater in the adult brain. Future studies will determine what portion of NO is converted to nitrate, investigate the mechanism underlying differences in NO metabolism between fetal and adult brain, and the role of NOx in regulating cerebral blood flow after birth.

Neonatology General II

Concurrent Session

3:15 PM

Thursday, January 26, 2017

120 CYCLED PHOTOTHERAPY IS A SAFE AND EFFECTIVE TREATMENT FOR SMALL PREMATURE INFANTS WITH HYPERBILIRUBINEMIA

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10.1136/jim-2016-000365.120

Purpose of Study Continuous phototherapy (60 min/hr, PT60) is the standard treatment for hyperbilirubinemia. It is believed to be necessary and safe; however, 2 large trials have shown that PT is likely to increase deaths among extremely low birthweight (ELBW) infants (≤ 1000 g). In 6 older trials of larger infants, cycled PT, given part of each hr, reduced total serum bilirubin (TB) levels comparable to PT60. We designed a multicenter randomized controlled trial in ELBW infants to assess whether cycled PT effectively reduces mean peak TB levels similar to PT60 while reducing PT exposure.

Methods Used After enrollment, ELBW infants were randomized to receive cycled PT for 15 (PT15) or 30 (PT30) min/hr and increased only if TB rose to pre-specified levels; or standard PT60 (controls). A cycling timer was used to control the delivery of PT. For all 3 groups, TB levels to start/stop PT were identical to those used in the aggressive PT arm in the 2008 NICHD Neonatal Research Network Trial (Morris et al, *N Engl J Med* 359:18, 2008). Secondary outcomes were: predischARGE deaths and latency of waves III/V of brainstem auditory evoked (BAER) responses at 35 wks PMA.

Summary of Results Interim analyses were done on 92 infants: 30 with PT15 (BW= 786 ± 165 g, 26.3 ± 1.6 wks GA), 32 with PT30 (779 ± 162 g, 26.0 ± 1.3 wks GA), and 30 with PT60 (757 ± 146 g, 26.2 ± 1.6 wks GA). 7 infants died [PT15 (1); PT30 (4); PT60 (2)]. Mean peak TB over 14 days of PT were 6.9 ± 1.8 , 6.5 ± 1.1 , and 6.2 ± 1.3 mg/dL in the PT15, PT30, and PT60 groups, respectively. Mean TB increase (peak minus baseline) were similar for all

groups (3.3, 3.4, and 3.2 mg/dL, respectively). Mean duration of PT was significantly shorter in the PT15 (33.6 hr) compared to PT30 (47.5 hr) and PT60 (64.7 hr). BAER results did not suggest any increase in wave V latencies between PT15 (7.35 ± 0.53 ms, $n=19$), PT30 (7.40 ± 0.37 ms, $n=17$), and PT60 (7.50 ± 0.41 ms, $n=19$) groups.

Conclusions These preliminary data suggest that cycled PT is as safe and effective as PT60 in controlling TB levels. Moreover, cycled PT use in preterm infants reduced light exposure and therefore might reduce phototoxicity and PT-associated increases in mortality in ELBW infants.

121 PHYTOSTEROLS, CYTOKINES, BILE ACIDS, AND FATTY ACIDS: PREDICTORS OF PARENTERAL NUTRITION ASSOCIATED LIVER DISEASE

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10.1136/jim-2016-000365.121

Purpose of Study Premature neonates and neonates with gastrointestinal (GI) disorders depend on intravenous (IV) lipids for nutrition. IV soybean oil contains phytosterols and pro-inflammatory polyunsaturated fatty acids (PUFAs), which are linked to parenteral nutrition associated liver disease (PNALD). This study's objective was to investigate changes in phytosterols, cytokines, bile acids and PUFAs in neonates at risk for PNALD and correlate changes with conjugated bilirubin (CB).

Methods Used Inclusion criteria: birth weight <2 kg/GI disorder, <7 days of age, and PN requirement >14 days. Weekly blood samples were collected. Plasma phytosterols and bile acids and erythrocyte PUFAs were analyzed using mass spectrometry. Plasma cytokines were analyzed using a Luminex assay.

Summary of Results Subjects ($n=14$) were premature (mean ($\pm$ SEM) gestational age, 32 ± 1 weeks). Twenty one percent developed PNALD at 5 ± 1 weeks (wk). PN duration was correlated with CB ($r=0.7$, $p<0.001$). When compared to baseline, 1) wk 2 phytosterols, taurocholic acid (TCA), and linoleic acid (LA) were higher ($p<0.05$ for

all), and 2) wk 2 arachidonic (ARA) and docosahexaenoic acid (DHA) were lower (Table). While not statistically significant, wk 2 stigmaterol, IL-8, and glycochenodeoxycholic acid (GCDCA) were correlated with wk 2 CB ($r=0.6-0.8$, $p=0.1-0.2$).

Conclusions Specific phytosterols, bile acids, and cytokines may predict liver injury in neonates at risk for PNALD.

122 A NEW MODEL FOR COMPOUNDED NEONATAL PARENTERAL NUTRITION OSMOLALITY

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10.1136/jim-2016-000365.122

Purpose of Study Intravenous infiltrates are one of the most frequent preventable harm events in the NICU and risk is related to the osmolality of parenteral nutrition (PN). Preliminary studies suggest that theoretical osmolality (mOsm/L) underestimates osmolality (mOsm/kg) in compounded PN. We sought to improve prediction of osmolality utilizing a broader range of basic nutrient solutions from a variety of manufacturers. This study tested the hypothesis that theoretical osmolality underestimates osmolality. We then derived a more accurate algorithm that predicts osmolality in PN.

Methods Used Theoretical osmolality was calculated by a commercial software tool. Osmolality of PN was determined in triplicate from a freezing point depression micro-osmometer (Advanced® Model 3320). The osmolal gap, the difference between theoretical osmolality and osmolality, was determined in PN ($n=363$) and from the individual basic nutrient solutions. The relationship between theoretical osmolality and osmolality was derived by linear or polynomial regression using least squares method (SAS) with various combinations of ten components of PN, in addition to theoretical osmolality calculated from a commercial PN software tool. The best fit regression model was tested to minimize the osmolal gap.

Summary of Results Theoretical osmolality underestimated osmolality in all PN samples ($n=363$). The deviation between theoretical osmolality and osmolality increased with higher concentrations, and underestimated PN osmolality as much as 20%. Dextrose and amino acids contribute the majority of total PN osmolality, with dextrose contributing the most to the osmolal gap error. We determined a best-fit polynomial regression that effectively corrects for systematic osmolality error ($R^2=0.986$).

Conclusions Theoretical osmolality systematically underestimated the osmolality in compounded PN. We developed a new algorithm to more accurately predict PN osmolality from basic nutrient solutions used in North America. These study results suggest that prior clinical studies likely incorporated a systematic underestimate of PN osmolality. Future research should reassess the contribution of osmolality to adverse PN administration events in neonates.

Abstract 121 Table 1

	Baseline	Week 2	Week 4
Stigmaterol (μ g/dL)	268 $\pm$ 31	803 $\pm$ 101*	1214 $\pm$ 136
Sitosterol (μ g/dL)	731 $\pm$ 121	3789 $\pm$ 477*	5686 $\pm$ 1049
IL-8 (pg/mL)	243 $\pm$ 196	341 $\pm$ 193	459 $\pm$ 307
TNF- α (pg/mL)	19 $\pm$ 4	41 $\pm$ 19	40 $\pm$ 7
TCA (μ mol/L)	3.2 $\pm$ 0.8	5.0 $\pm$ 1.7*	13 $\pm$ 6.4
GCDCA (μ mol/L)	2.6 $\pm$ 1.2	4.9 $\pm$ 0.1	13 $\pm$ 5.4*
LA %	7.5 $\pm$ 1.1	14 $\pm$ 0.7*	16 $\pm$ 1.0*
ARA %	20 $\pm$ 0.8	17 $\pm$ 0.4*	16 $\pm$ 0.8*
DHA %	5.6 $\pm$ 0.3	4.5 $\pm$ 0.3*	3.7 $\pm$ 0.2*

Table. * $p<0.05$

123 HYPOTENSION FOLLOWING GASTROSCHISIS REPAIR

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10.1136/jim-2016-000365.123

Purpose of Study Surgical repair of gastroschisis may place the abdominal contents under increased pressure and lead to adverse effects including cardiovascular insufficiency, respiratory compromise, and decreased organ perfusion. The purpose of this study is to describe the incidence of post-operative hypotension in neonates with gastroschisis and identify perioperative predictors of increased risk of hypotension.

Methods Used This is a retrospective chart review of neonates admitted to Children's Hospital Los Angeles with an admission diagnosis of gastroschisis between 2006–2016. Hypotension was defined as having had at least one occurrence of mean blood pressure below gestational age in numerical value within 12 hours following final surgical closure. Independent *t*-tests, Wilcoxon-Mann-Whitney test and Pearson chi square were used to analyze the data.

Summary of Results One hundred patients who underwent gastroschisis repair were included in this study (Table). The hypotensive group (n=13) had lower urine

output post-operatively than the non-hypotensive group (n=87) (2.6 ± 1.2 vs 3.9 ± 1.5 ml/kg/hr, $p < 0.006$). There was a trend of higher C-section rate in hypotensive group ($p = 0.08$).

Conclusions Hypotension occurs commonly after gastroschisis repair, and is associated with lower urine output following final closure. Further data collection and analysis are underway to identify risk factors and additional outcomes of neonates who experience post-operative hemodynamic instability.

124 REGIONAL VARIATIONS IN THE CARE OF NEONATES WITH GASTROSCHISIS IN THE UNITED STATES 1997–2012

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10.1136/jim-2016-000365.124

Purpose of Study To determine if resource utilization (length of stay (LOS), total hospital charges and costs) for neonates with gastroschisis differed by geographical regions.

Methods Used We conducted a retrospective data analysis of the Kids' Inpatient Database from 1997 to 2012 (Healthcare Cost and Utilization Project). The hospitals were categorized into four different regions—Northeast, Midwest, South and West. All cases of gastroschisis in the were identified using ICD-9-CM codes for gastroschisis repair (54.71). Intestinal atresia, necrosis and/or perforation were used to define “complexity”. Bivariate tests were conducted to compare characteristics of the patients among the regions.

Summary of Results 8029 cases of gastroschisis were identified. Several characteristics significantly varied among different hospital regions (Table).

Conclusions Length of stay and the total charges of the neonates with gastroschisis varied among different hospital regions. Cases managed in the west had the shortest LOS while cases in the Northeast had the longest. Specific patient characteristics could explain this variance.

Abstract 123 Table 1 Clinical Characteristics

Variable	Non Hypotensive (n=87)	Hypotensive (n=13)	p
Gestational age (wks)	36.4±1.9	36.6±1.9	0.91
Birth weight (kg)	2.45±0.46	2.65±0.46	0.15
Male (%)	45 (52)	8 (62)	0.51
C-Section (%)	43 (49)	10 (75)	0.08
Apgars at 1 min	8 (6,8)	9 (8,9)	0.13
Apgars at 5 min	7 (3,8)	9 (6,9)	0.15
Base Excess (mEq/L)*	-1.5±4	-3.1±3.3	0.17
Urine Output (ml/kg/min)*	3.9±1.5	2.6±1.2	0.006
Boluses (%)*	32 (37)	7 (54)	0.24
Number of Boluses*	0 (0,1)	1 (0,3)	0.16
Survived (%)	87 (100)	12 (92)	0.13
NEC (%)	2 (2.3)	0 (0)	0.76

*denotes after surgery

Abstract 124 Table 1 Result Table

	Northeast (n=874)	Midwest (n=2331)	South (n=2072)	West (n=2749)	P-values
Complexity(%)					0.07
Simple	781 (89.4)	2069 (88.7)	1885(91.0)	2446 (88.9)	
Complex	92 (10.6)	264 (11.3)	187 (9.0)	305 (11.1)	
LOS/days*	37 (37)	33 (30)	33 (30)	32 (29)	<0.05
Total Charges/ USD**	205066 (258488)	170344 (186213)	157571 (182232)	220776 (243017)	<0.05
Cost/USD***	69914 (76880)	65423 (76642)	57775 (63396)	74544 (78808)	0.17

*Median days stayed in hospital (IQR)

** Median charges (IQR)

*** Median Cost (IQR)

125 RISK FACTORS ASSOCIATED WITH SPONTANEOUS INTESTINAL PERFORATION VS NECROTIZING ENTEROCOLITIS IN PRETERM NEONATES

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10.1136/jim-2016-000365.125

Purpose of Study Necrotizing enterocolitis (NEC) and spontaneous intestinal perforation (SIP) are the two most common gastrointestinal emergencies in very low birth weight infants. Early differentiation between NEC and SIP is important due to significant differences in management and outcomes. The purpose of our study was to identify the risk factors associated with SIP vs NEC.

Methods Used Retrospective chart review of infants admitted to CHLA NICCU from 2005 to 2015 with diagnosis of intestinal perforation. Demographic and prenatal data, information on postnatal factors and outcomes were collected and analyzed.

Summary of Results A total of 114 infants were included in the study and divided into two groups based on their final diagnosis. Infants with SIP had significantly lower gestational age (GA) at birth and at presentation; they were exposed to antenatal steroids more often. No other prenatal or intrapartum factors differed between the two groups. Infants with SIP were more likely to be treated for patent ductus arteriosus (PDA) with indomethacin and subsequently required PDA ligation; they were not fed or received trophic feeds only. Alkaline phosphatase (ALP) level was significantly higher at presentation in infants with SIP. Infants with NEC were more likely to be on full feeds, formula-fed, and presented with systemic inflammatory response. Mortality in NEC group was significantly higher: 42% vs. 6% ($p<0.0001$).

Conclusions SIP is associated with lower GA and chronological age at presentation, minimal or no enteral feeds, and postnatal exposure to indomethacin in premature infants with bowel perforation. They are less likely to present with signs of systemic inflammation and have better prognosis compared to infants with NEC.

126 PERIPHERALLY INSERTED CENTRAL CATHETER USE AND ASSOCIATED COMPLICATIONS IN MEDICALLY COMPLEX NEONATES: A SINGLE CENTER STUDY

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10.1136/jim-2016-000365.126

Purpose of Study Peripherally inserted central catheters (PICCs) are commonly used in the neonatal intensive care unit (NICU) to provide hydration, nutrition, and medication to neonates. While clinically necessary, complications of central venous catheters (CVCs) may result in significant neonatal morbidity. Limited data on specific patient and catheter-related risk factors in critically ill neonates exists. Our local practice utilizes cut-down central venous catheters (cd-PICCs) as an alternative to PICC placement when central venous access is difficult or urgent. However, scant literature exists to compare the risk profile of these techniques.

Methods Used Data on all CVCs placed during Level IV NICU admission at our institution from 2010–2015 were abstracted from Children's Hospital Neonatal Database (CHND), with supplementary information obtained from the medical record. PICCs and cd-PICCs were studied; patient characteristics and catheter complications were stratified by catheter type. Statistical analysis included chi-squared tests for categorical variables and student's T test for continuous variables.

Summary of Results During the study period 1076 catheters were placed in 824 patients, with an average of 1.3 catheters per patient. Patients who received a PICC ($n=413$) as compared to cd-PICC ($n=663$) were found to have a lower gestational age (32 vs 35 wks; $p<0.0001$) and birth weight (1979 vs 2572g; $p<0.0001$), and longer dwell time (15.3 vs 13.9 days; $p=0.03$). cd-PICCs were more likely to have multiple lumens (75% vs 30% double lumen), larger lumen size (2.5 fr vs 1.9 fr), and be removed secondary to patient death (20% vs 4%). For both PICCs and cd-PICCs, 7% were removed due to malposition, breakage/leakage, or mechanical obstruction, and 2%

Abstract 125 Table 1 Baseline Demographics and Risk Factors

	NEC n=66	SIP n=48	p-value
GA at birth, weeks (median [IQR])	28.2 [25.6–31.1]	25.6 [24.9–27.0]	0.0002
Antenatal steroids, n (%)	33 (52.4)	38 (82.6)	0.0012
Indomethacin, n (%)	17 (26.2)	30 (62.5)	0.0002
PDA ligation, n (%)	8 (12.1)	18 (37.5)	0.003
DOL on admission (median [IQR])	13.5 [8–23]	7.5 [6–10]	0.0001
PMA on admission (mean±SD)	31.3±3.3	27.3±1.7	<0.0001
NPO since birth, n (%)	2 (3.0)	21 (43.8)	0.0001
	7 (10.6)	24 (50.0)	0.0001
Trophic feeds, n (%)			
Full feeds, n (%)	49 (74.2)	0	0.0001
Formula, n (%)	22 (47.8)	3 (7.3)	0.0001
Severe neutropenia, n (%)	15 (22.7)	1 (2.1)	<0.0001
CRP, mg/dL (median [IQR])	9.0 [3.2–18.8]	2.8 [0.9–5.2]	0.002
ALP, Units/L (median [IQR])	236 [169–399]	782 [575–1283]	<0.0001

removed due to BSI or CLABSI. Complication rates were highest among infants with cardiac, infectious, and surgical diagnoses (25%, 16%, and 15% respectively) compared to other diagnoses (11%).

Conclusions While patient characteristics differed, PICC and cd-PICC have equivalent safety profiles for common catheter-associated complications. Neonates with cardiac, infectious, and surgical diagnoses were found to be at highest risk of line associated complications, however, further data is needed to elucidate specific risk factors in these populations.

127 PREVALENCE AND PREDICTORS OF BACK-TRANSPORT AFTER ACUTE CARE IN A REGIONAL NICU

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10.1136/jim-2016-000365.127

Purpose of Study 1) Determine the prevalence of back-transport (BT) of infants ≤ 32 weeks GA admitted to a level IV NICU from a wide catchment area; 2) Identify predictors of BT; 3) For infants not back-transported, determine the length of stay beyond a point of clinical stability.

Methods Used The data source was single center data (2010–2014) from the Children's Hospital Neonatal Database (CHND). Infants were included if ≤ 32 weeks GA and if maternal residence was outside the metro area. In addition to CHND data, demographic and clinical data were obtained by chart review. Bivariate associations of maternal and infant characteristics with BT were estimated with chi-squared tests for categorical variables and with student's T test for continuous variables at a significance level of $p < 0.05$. Multivariable logistic regression was used to assess the independent association of maternal and infant characteristics with BT, controlling for GA and insurance. Clinical stability was defined as reaching full nasogastric feedings and low flow nasal cannula.

Summary of Results Of 662 infants admitted from 2010–2014, 222 were eligible for analysis. Infants were transported a mean of 299 miles (IQR: 31–1061 miles) from maternal residence. After acute care, 25.3% were back-transported to a NICU closer to their maternal residence. Compared to infants of mothers who lived < 100 miles, those who lived > 500 miles were more likely to be back-transported (AOR 3.38; 95% CI 1.29–8.91). In the bivariate analysis, maternal race, insurance status, state, distance from hospital and IVH were associated with BT. In the adjusted analysis, compared to publicly insured infants, privately insured infants were more likely to be back-transported (AOR 3.40; 95% CI 1.59–7.26). Compared to infants born at 23–25 weeks GA, those born at 30–32 weeks GA were less likely to be back-transported (AOR 0.29, 95% CI: 0.11–0.77). For the 74% of infants not back transported, median length of stay beyond clinical stability was 28.5 days (IQR: 5–64 days).

Conclusions Predictors of infant BT include private insurance and younger GA. The majority of preterm infants admitted to a regional NICU for acute care remained hospitalized in a level IV NICU until discharge home, despite meeting criteria indicating clinical stability for which care

in a level II or III NICU closer to maternal residence may be appropriate.

128 REDUCING RETINOPATHY OF PREMATURITY IN AN AT RISK POPULATION

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10.1136/jim-2016-000365.128

Purpose of Study Improve ophthalmological outcomes in preterm infants undergoing surgery. With the aim of correctly identifying these patients preoperatively 95% of the time, as well as reducing the intraoperative oxygen exposure in these infants.

Methods Used We conducted a multi-intervention quality improvement project and included infant born at ≤ 32 weeks age who had a general surgical exposure from September 2015 to June 2016. Infants were excluded if they underwent laser intervention prior to admission/transfer to our unit.

First, we simplified our definition for “ROP risk” to any infant < 33 weeks. Previously, we had defined “ROP risk” as any preterm infant ≤ 29 weeks, or ≤ 32 weeks with specified additional risk factors. Second, we educated our staff to identify infants preoperatively for surgically related increased risk of laser intervention for ROP. This intervention involved modifying an existing pre-operative surgery checklist, with anesthesia and staff input, to provide meaningful clinical data as well as simplify the form. Finally, we reassessed our identification rates of surgical infants at risk for ROP, their intraoperative arterial oxygen saturations (SpO_2) and FiO_2 , as well as results of pre- and post-operative ROP exams

Summary of Results Thirty-five patients were included in the study, 28 completed ROP surveillance. Our baseline mean identification of “ROP risk” was 60%, after we simplified our definition of ROP our mean identification rate increased to 100%. We then initiated the modified pre-operative checklist and have maintained our mean 100% identification. Our baseline mean SpO_2 was 98% and mean FiO_2 was 52%. After completing our two interventions our mean intraoperative saturations were 96% (NS) with mean intraoperative FiO_2 of 46% (NS). Prior to intervention our laser intervention rate in surgical infants was 22%, at this time 28 infants have completed ROP screening with 4 infants requiring laser intervention, a laser intervention rate of 14%.

Conclusions Our intervention has resulted in a better identification of at risk infants. Our sample size is small and currently shows a decrease in laser intervention. Our next intervention will include a verbal reminder to OR staff at the time of patient transfer of the infants risk in regards to ROP with aim of reducing intraoperative oxygen exposure.

129 EFFECT OF VENTILATOR ROUNDS ON RESPIRATORY OUTCOMES IN VLBW INFANTS IN A LEVEL IV NICU

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10.1136/jim-2016-000365.129

Purpose of Study Risk of chronic lung disease (CLD) is directly proportional to the number of days on invasive mechanical ventilation (IMV). Non-invasive modes of respiratory support in very low birth weight (VLBW) infants have decreased the incidence of CLD in many centers. California Perinatal Quality Care Collaborative (CPQCC) data shows that CLD rates in the 84-bed level IV NICU of Loma Linda University Children's Hospital were higher than those at comparable NICUs. To address the issue and decrease the use of IMV, weekly ventilator rounds were instituted for one year in 2013 to discuss and evaluate all babies on IMV. The purpose of this study was to evaluate the effect of weekly ventilator rounds on the use of IMV, post-delivery-room bubble CPAP (bCPAP), postnatal steroids and incidence of CLD.

Methods Used Inborn babies <30 weeks' gestation and weighing 401–1500 g were placed on bCPAP immediately after birth to increase post-delivery-room bCPAP usage. Babies who failed bCPAP and required intubation had chest x-rays, blood gases, ductus arteriosus status, caffeine usage, mode of ventilation, baseline oxygen requirement, and diuretic usage reviewed and discussed with the primary care team weekly. The objectives were to allow permissive hypercapnea, encourage active ventilator weaning, and ensure extubation occurred within 24h after babies were deemed extubatable. Babies who remained intubated >2 weeks and had failed prior extubation and/or still required >40% FiO₂ were eligible for postnatal steroids. CPQCC outcomes for 2013 were compared to the two years prior to initiation of ventilator rounds (2011 and 2012) and to the year after it was stopped (2014).

Summary of Results Ventilator rounds in 2013 was associated with a 14.5% increase in the use of postnatal steroids, 11% increase in post-delivery-room bCPAP, and 9.5% decrease in the rate of CLD when compared to 2011–2012. Termination of ventilator rounds in 2014 was associated with a 22% decrease in the use of postnatal steroids, 6% decrease in post-delivery-room bCPAP, and 9% increase in the rate of CLD.

Conclusions Weekly ventilator rounds in 2013 decreased the overall CLD rate in babies who weigh <1,500 grams when compared to 2011 & 2012. When ventilator rounds were discontinued, BPD rates increased back to percentages comparable to 2011 & 2012.

Neuroscience I

Concurrent Session

3:15 PM

Thursday, January 26, 2017

130 DIFFUSION TENSOR IMAGING FINDINGS IN PEDIATRIC PATIENTS WITH MILD TRAUMATIC BRAIN INJURY

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10.1136/jim-2016-000365.130

Purpose of Study Approximately 14% of school age children with sports-related concussions (SRC) remain

symptomatic 3 months after injury. Previous studies have used diffusion tensor imaging (DTI) to detect white matter tract changes in regions of interest in symptomatic patients; however data in the pediatric population remains limited. This study was undertaken to determine whether DTI metrics can provide valuable information in pediatric mTBI patients with persistent symptoms.

Methods Used 29 adolescents (19 male, 10 female) who sustained a SRC and 24 controls (11 male, 13 female) were enrolled in the study. 3D T1 weighted images and DTI were acquired and maps of fractional anisotropy (FA), mean diffusivity (MD), axial and radial diffusivity (AD, RD) were calculated. Subject maps were warped to a template with labelled ROIs using ANTs. Regions analyzed were the genu, splenium, body of the corpus callosum (CC), inferior longitudinal fasciculus (ILF), posterior limb of the internal capsule, superior longitudinal fasciculus, cingulum, corona radiata (CR), unicate fasciculus and cerebral peduncle. Mean FA, AD, RD, and MD values were extracted for each ROI. To improve our sensitivity we manually defined ROIs in the CR, genu, ILF, splenium, and CC. Statistical differences between patient and control were determined using an unpaired t-test where $p < 0.05$ was considered significant.

Summary of Results Results of the automated ROI analysis showed elevated AD values in the CR. Manually drawing the ROIs reduced the inclusion of non-white matter and subsequently, we saw larger differences in the mean DTI metrics between controls and SRC subjects. Results of the manual ROI analysis showed decreased FA values in the genu, ILF, and splenium; elevated AD values in the CR and splenium; elevated RD values in the genu, splenium and ILF; and elevated MD values at the genu and splenium, suggesting axonal injury.

Conclusions Patients with persistent SRC symptoms are in danger of developing progressive neurodegeneration that may lead to behavioral changes, cognitive deficits and memory loss. The findings of this study are encouraging as the methods can potentially be used in a way to track changes in brain injury that may not be detectable with conventional imaging methods.

131 REDUCED CEREBRAL BLOOD FLOW AND BLOOD VOLUME IN PATIENTS WITH PERSISTENT POST CONCUSSIVE SYMPTOMS

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10.1136/jim-2016-000365.131

Purpose of Study Approximately 15–30% of people diagnosed with a mild traumatic brain injury have cognitive and physical symptoms that do not resolve following the first three months post-injury that can potentially lead to long term disability. Studies have shown regions of cortical and subcortical hypoperfusion in patients with persistent post concussive symptoms (PCS). The purpose of this study was to use whole-brain spatial mapping and a voxel wise statistical approach, not only to investigate the extent and anatomical distribution of cerebral hypoperfusion, but also cerebral blood volume, mean transit time, and time to

peak.

Methods Used Twenty-nine pediatric subjects ages 9–17 who reported persistent post concussive symptoms (PCS) following a single concussion were evaluated. The subjects were compared to a control group that included 14 healthy participants without history of brain injury. Automated and manual segmentation was performed to identify the basal ganglia, frontal gray matter, occipital gray matter, temporal gray matter, and the thalamus. Relative cerebral blood flow, cerebral blood volume, mean transit time, and time to peak maps were generated using a Bayesian probabilistic estimation algorithm with automatic arterial input function selection. Univariate groupwise comparisons were done using a two-tailed t-test. A two-tailed value of $p < 0.05$ was considered significant.

Summary of Results In comparison to the control group, patients with PCS had a decrease in CBF in the occipital gray, temporal gray, and frontal gray matter that worsened over time. A decrease in CBV is found in only the temporal lobe while differences in MTT and TPP were found to be insignificant across all regions. We also found that differences are more robust when manual ROIs were used.

Conclusions Patients with PCS are in danger of developing long-term disability. Recent advances in neuroimaging techniques make it possible to characterize brain abnormalities following mild traumatic brain injury. The findings of this study are encouraging as the methods can potentially be used as a way to track changes in brain injury over time. These methods can be used in future research to evaluate treatment efficacy to prevent or alleviate symptoms in individuals with PCS.

132 EXPLORING PHENOTYPIC HETEROGENEITY WITHIN ALS

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10.1136/jim-2016-000365.132

Purpose of Study ALS is a neurodegenerative disease that presents with symptoms of both upper and lower motor neuron damage, deficits in bulbar function, frequently with cognitive and behavioral changes. The initial presentation and speed of progression on these four axes can vary drastically between patients leading some researchers to believe that ALS is not a single disease but a collection of symptoms with varying etiologies. If true, these subgroups must be identified and studied individually, as a first step in improving the efficacy of ALS clinical research trials. The purpose of our research was to identify select

homogeneous subgroups by examining their symptoms at onset and their subsequent progression over time.

Methods Used A chart review of 67 patients with an initial diagnosis of ALS was performed. For each visit patients were graded on the extent of their UMN, LMN, and bulbar symptoms based on history, physical exam, and physician comments. Notes from other specialties such as PT, OT, and speech therapy were also assessed. Cognitive changes were assessed using the ALS-CBS (Cognitive Behavioral Screen) evaluation. The scale used to grade patients is in the table provided. Multiple visits were documented for each patient. Patient presentation, as well as progression in each axis, were used to find clusters of patients.

Summary of Results The study is ongoing but clusters identified included lower motor neuron predominant, upper motor neuron predominant, bulbar predominant, and those with “Charcot ALS” or typical rapidly progressing ALS. Patients are currently being enrolled to participate in the pathophysiologic analysis based on these subgroups.

Conclusions Different phenotypic subgroups appear in ALS and it is possible that multiple diseases are being classified as ALS. After identifying these subgroups, the next step of the project is to look for pathophysiologic differences by looking at biomarkers, genetic differences, and by performing stem cell studies. Studying these differences might lead to larger studies identifying major underlying differences between motor neuron diseases currently classified as ALS.

133 DETERMINATION OF COPPER TRANSPORT PROTEIN P62 AS A SIGNIFICANT CONTRIBUTOR TO ALZHEIMER’S DISEASE PATHOLOGY

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10.1136/jim-2016-000365.133

Purpose of Study AD is the sixth leading cause of death in the United States with a 50% increase in incidence expected within the next 10 years. This prevalence and an increasing financial burden on patients and the healthcare system has motivated the medical field in further understanding this disease. There is substantial and growing evidence supporting the idea that AD pathology is largely due to an increase in oxidative stress within neural cells. Amyloid plaques characteristically found in AD have been found to have an excessive accumulation of copper within these amyloid complexes in post-mortem AD brain tissue. These Cu-amyloid complexes can further induce oxidative damage within the cell due to

Abstract 132 Table 1 Phenotypic Grading Scheme

	A	B	C	D
UMN	Minimal or no involvement	Brisk and/or abnormal deep tendon reflexes	Increased tone and/or spasticity	Loss of function
LMN	Minimal or no involvement	EMG changes	Weakness and/or atrophy in two areas	Loss of function
Bulbar	Minimal or no involvement	Jaw jerk, palmomental reflex, tongue atrophy, tongue fasciculations	Mild dysarthria and mild dysphagia, or moderate dysarthria or dysphagia	Moderate or severe dysarthria and dysphagia
Cognitive	Minimal or no involvement	Either ALSci (score of 10–16) or ALSbi (score of 33–36)	Both ALSci and ALSbi	FTD (cognitive score <10 and/or behavioral score ≤ 32)

Cu's high reduction potential, leading to AD pathology. Thus, this accumulation of Cu within the brain has led us to believe that the Cu transport system, particularly dynactin and its subunit p62, is defective in AD patients. Therefore, we hypothesize that p62 degrades in AD patients, leading to a breakdown in Cu transport and the emergence of AD pathology, thereby enabling its possible use as a biomarker.

Methods Used All procedures for this experiment were conducted on human neuroblastoma cells. The cells were cultured, grown, and induced to differentiate into neuron-like cells. Once the cells had become successfully differentiated, an siRNA transfection was conducted in order to knock out the p62 gene. Following the transfection, a western blot will be done in order to confirm the p62 subunit is not being produced. An oxidase assay kit will also be used in order to monitor oxidative properties of the cells. A colorimetric kit and fluorescent probe will then be used to visualize Cu distribution. These results will then be compared with a control, cells with a functional p62 protein. Lastly, human brain samples will be tested for p62 expression and checked for correlations regarding copper deposition using histological stains and immunoprecipitation.

Summary of Results No conclusive results have been obtained, as this project is still currently in progress. We hypothesize that the transfected cells will show an increase in Cu concentration and oxidative damage, similar to that seen in AD patients.

Conclusions N/A

134 BELL'S PALSY: PRESENTING WITH HEMIPARESIS

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10.1136/jim-2016-000365.134

Case Report Bell's palsy is also known as acute peripheral facial nerve palsy of unknown cause. The classic presentation is sudden onset of unilateral facial paralysis. There is an increased risk during pregnancy and in diabetics. We report here a case of a 31 year old Hispanic female with metabolic syndrome presenting with unilateral acute facial paralysis with loss of taste and unilateral upper and lower extremity weakness and decreased sensation on the side of the facial paralysis. The unilateral upper and lower extremity weakness and decreased sensation was transient but unilateral facial paralysis was not. This case report takes a look into the unique presentation of Bell's palsy. We also review the treatment and management of Bell's palsy.

135 HEARING LOSS AS PRESENTATION FOR ENDOLYMPHATIC SAC TUMOR IN PREVIOUSLY UNKNOWN VON HIPPEL-LINDAU SYNDROME

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10.1136/jim-2016-000365.135

Case Report Von Hippel-Lindau syndrome is a rare autosomal dominant condition of the VHL gene on chromosome 3. It is associated with renal carcinoma, hemangioblastoma, retinal angiomas, and endolymphatic sac tumors. We describe a 14 year old male with no past medical history who presented with unilateral hearing loss,

who was found to have left endolymphatic sac tumor, right vestibular aqueduct enlargement and enhancement concerning for endolymphatic sac tumor, and cerebellar lesions concerning for early hemangioblastomas. There was no family history of hearing loss, nor von Hippel-Lindau syndrome. Although we do not have final pathologic or genetic diagnosis because the family chose to pursue surgery at an outside institution, the combination of unusual findings is most consistent with von Hippel-Lindau syndrome.

We describe a rare case of endolymphatic sac tumor with unilateral hearing loss in an adolescent, a rare presentation for von Hippel-Lindau syndrome. We will present a review of the literature, with particular emphasis with an overview of von Hippel-Lindau syndrome, diagnosis, and management of the disease.

136 FUNCTIONAL ELECTRORETINOGRAPHY CHARACTERIZATION OF VISION LOSS IN MOUSE MODELS OF ACHROMATOPSIA

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Purpose of Study Achromatopsia is a human blinding disease characterized by cone photoreceptor dysfunction, photophobia, and severe visual impairment. The Lin Lab recently found that autosomal recessive mutations in *ATF6* cause achromatopsia in patients (Kohl et al., *Nature Genetics* 2015). We also identified abnormal photoreceptors in *Atf6* knockout mice. In this study, we hypothesize that *Atf6* knockout mice will show many of the functional problems seen in achromatopsia patients with *ATF6* mutations, such as severely impaired cone electroretinography responses.

Methods Used Electroretinography (ERG) is a classic test to evaluate photoreceptor function. This test can reveal if photoreceptors are functional or diseased. ERG data are collected from mice of six different genotypes: *Atf6*^{+/+}, *Atf6*^{+/-}, *Atf6*^{-/-}, *Atf6*^{+/+Nr1}^{-/-}, *Atf6*^{+/-Nr1}^{-/-}, and *Atf6*^{-/-Nr1}^{-/-}. Cone photoreceptors are increased in *Nr1*^{-/-} mice, and this strain is widely used to study cone photoreceptor diseases. By quantifying electrical impulses produced by photoreceptors upon stimulation, ERG helps to determine if genetic modifications improve or worsen photoreceptor function.

Summary of Results Compared to *Atf6*^{+/+Nr1}^{-/-} mice, *Atf6*^{+/-Nr1}^{-/-} and *Atf6*^{-/-Nr1}^{-/-} mice show delayed photopic responses. This may indicate degeneration in the phototransduction pathway. The *Atf6*^{+/+Nr1}^{-/-}, *Atf6*^{+/-Nr1}^{-/-} and *Atf6*^{-/-Nr1}^{-/-} mice also demonstrate more pronounced differences between mutant and wildtype genotypes when compared to *Atf6*^{+/+}, *Atf6*^{+/-}, and *Atf6*^{-/-} mice. The results provide interesting and promising data for analyzing cone photoreceptor function in the *Atf6*^{+/+}, *Atf6*^{+/-}, *Atf6*^{-/-}, *Atf6*^{+/+Nr1}^{-/-}, *Atf6*^{+/-Nr1}^{-/-}, and *Atf6*^{-/-Nr1}^{-/-} mouse models.

Conclusions Electroretinography results show that mice with mutations in *Atf6* have compromised photopic responses compared to wildtype animals. This suggests cone photoreceptor degeneration in these mouse models of achromatopsia. We are currently investigating the cellular and

molecular changes that correlate with the ERG changes observed among *Atf6*^{+/+}, *Atf6*^{+/-}, *Atf6*^{-/-}, *Atf6*^{+/+}*Nrl*^{-/-}, *Atf6*^{+/-}*Nrl*^{-/-}, and *Atf6*^{-/-}*Nrl*^{-/-} mice.

137 MOTOR AND COGNITIVE OUTCOMES IN PRETERM NEWBORNS WITH MILD WHITE MATTER INJURY

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10.1136/jim-2016-000365.137

Purpose of Study To evaluate the association of mild white matter injury (WMI) on magnetic resonance imaging (MRI) in premature newborns with motor and cognitive outcomes at 4–6 years.

Methods Used We performed a cross-sectional analysis of neurodevelopment at 4–6 years in a cohort of preterm newborns <33 weeks gestation imaged with MRI soon after birth. WMI was scored according to our published criteria by a blinded pediatric neuroradiologist. Newborns with moderate/severe WMI and severe intraventricular hemorrhage (Papile grades 3 and 4) were excluded. Motor outcome was diagnosis of cerebral palsy (CP). Cognitive outcome was verbal and performance IQ on the Wechsler Preschool and Primary Scale of Intelligence, 3rd edition, classified as ≤85 or >85 points. Descriptive statistics and multivariable logistic regression were used to evaluate the association of mild WMI with each outcome.

Summary of Results Among 131 newborns of mean gestational age 27.9±2.3 wks, mild WMI was present in 33 (25.2%). Children with mild WMI more commonly had CP (17.9% vs. 8.2%, *P*=0.17) and performance IQ ≤85 (33.3% vs. 20%, *P*=0.19) and less commonly had verbal IQ ≤85 (22.6% vs. 30.1%, *P*=0.49), but this was not significant. Adjusting for gestational age, birthweight, gender, chronic lung disease, and hypotension, mild WMI was not statistically associated with CP (OR 1.9, 95% CI 0.49–7.39, *P*=0.35), performance IQ ≤85 (OR 1.97, 95% CI 0.64–6.04, *P*=0.24), or verbal IQ ≤85 (OR 0.98, 95% CI 0.32–2.95, *P*=0.97).

Conclusions Adverse motor and cognitive outcomes are common in preterm newborns at school-age, but are not independently associated with mild WMI in this cohort. Quantitative MRI may help identify which newborns with absent/mild WMI develop motor or cognitive deficits.

Pulmonary and Critical Care I

Concurrent Session

3:15 PM

Thursday, January 26, 2017

138 PATIENT-CENTERED STRUCTURED INTERDISCIPLINARY BEDSIDE ROUNDS (SIBR) IN THE MEDICAL ICU

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Purpose of Study The patient or family is not commonly included in ICU daily rounds. The aim of this project was to determine the effectiveness of patient-centered SIBR on patient/family experiences and communication amongst team members when compared to the traditional physician-centered rounds.

Methods Used This study was a prospective observational quality improvement project examining patient encounters on rounds in a medical ICU from June 21 to July 29, 2016. Two teams (SIBR and non-SIBR) were observed for length of rounds, tasks completed, teaching points and family participation. Healthcare provider and patient/family surveys assessed satisfaction and perceived efficiency of rounds. Chi-square and t-test were used to compare variables of interest between the two rounding teams.

Summary of Results 468 patient encounters were observed, including 273 patients on the SIBR team. Total rounding time per patient was 16.3±9.9 vs 25.4±15.9 min for SIBR vs non-SIBR (*p*<0.01). Comparing SIBR vs non-SIBR, assigned tasks completed by team members was 90.6% vs 83.3% for residents, 64.9% vs 40.2% for nurses, and 65.2% vs 44.4% for respiratory therapists, respectively (all *p*<0.01). Teaching points were observed in 51.3% vs 36.4% (*p*<0.01). Patient/family was included in rounds in 31.9% vs 11.8% encounters (*p*<0.01). Healthcare providers indicated patient care plans were discussed 96.9% vs 91.2% (*p*<0.01), long term goals discussed 90.0% vs 88.4% (*p*=0.03), attending obtained input from the team 97.7% vs 89.7% (*p*<0.01), and task responsibilities made clear 86.8% vs 75.1% (*p*<0.01). On a 5-point Likert scale, care providers noted rounds efficiency at 4.0±0.8 vs 3.7±1.0 (*p*<0.01), and adequate teaching at 3.9±0.9 vs 3.8±0.9 (*p*=0.13). Patients/families reported satisfaction of communication with the care team at 4.7±0.6 vs 4.2±0.8 (*p*=0.03).

Conclusions SIBR significantly improved task completion by physicians, nurses and respiratory therapists, while decreasing total rounding time and improving family satisfaction. Compared to non-SIBR, healthcare providers reported improved efficiency during rounds with adequate teaching opportunities being maintained.

139 INNOVATIVE WEARABLE MINIATURIZED WIRELESS WRIST-WORN ULTRASOUND SYSTEM DEVELOPED FOR EXTENDED FAST EXAM WITH INTEGRATED DUAL-FREQUENCY FINGER PROBE

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10.1136/jim-2016-000365.139

Purpose of Study Portable ultrasound (US) has proven to be a valuable triage tool for civilian trauma emergency services. Wilderness medicine and evacuation groups have different limitations regarding portable US. Essentially, they need wearable ultrasound (WU), which is light and efficient. The objective of this study was to further develop WU for dangerous and non-threatening arenas.

Methods Used Literature search was conducted on WU. We collaborated with Sonivate to develop a dual-plane ultrasound finger probe (DPFP). Previous WU prototypes were

wearable and successfully acquired images, but size and weight were unacceptable. Fukuda-Denshi UF-760AG US system will be integrated with SonicEye DPFP to address weight and size. The system will communicate wirelessly with a “smart” phone, tablet or computer. WU will be tested with medical students conducting the extended FAST exam on donor cadavers and subsequently with healthy individuals.

Summary of Results Literature search revealed no known results. The 3rd has conducted previous research with WU. This study successfully acquired diagnostic quality images with acceptable size and weight considerations. Literature search revealed one previous study by the research team. Novel DPFP is 2nd generation device based on Sonivate’s original prototype. It was developed and built for the military arena with benefits to civilian medicine. WU with integrated DPFP was successfully designed. It is extremely difficult to manage US technology in the field. The research team has experience with designing and developing WU. This project demonstrates the design and development of the evolving WU technology. Second generation design will be tested on donor cadavers and healthy individuals for image acquisition, quality of imaging and wearable practicality. Testing on donor cadavers has proven a useful training ground for medical students and could be used to train providers. It will enable the provider to become efficient with US while learning relevant anatomy.

Conclusions This study successfully demonstrated a DPFP which acquired quality images, integrated with a newly designed 2nd generation wearable US to be used efficiently by providers in both dangerous and non-threatening arenas.

140 CANCELLED

141 DEVELOPING A TRAINING TOOL FOR NOVICE ULTRASOUND USERS IDENTIFYING SKULL AND FACIAL FRACTURES WITH UNEMBALMED CADAVERIC TISSUE USING MULTIPLE PROBES

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10.1136/jim-2016-000365.141

Purpose of Study Skull and facial fractures commonly present to Emergency Departments (ED). Current CT results in increased cost, exposure, and scanner backlog. Previous studies revealed diagnostic utility of ultrasound (US) in identifying skull & facial fractures (SFF). The objective of this study was to develop a training tool that could be used in an anatomy lab to identify skull and facial fractures on unembalmed cadaveric tissue.

Methods Used Literature search was conducted investigating US identification of SFF. Nine unembalmed (UC) head & neck specimens were examined. Twenty 1st-year medical students conducted a total of 840 independent trials; 420 (80 nasal, 170 zygomatic, 170 temporal) using novel Sonivate Finger Probe (SFP), 420 using classic linear probe (CLP), 5–12 MHz. True-positives, true-negatives, false-positives and

false-negatives were recorded. Students were chosen with previous US experience with limbs and cavities but not with bony head & neck structures. Identification of fractures was compared between SFP and CLP Likert scale questionnaire was conducted regarding value of the training session.

Summary of Results Literature search revealed no known studies of US identification of SFF by novice users. Sensitivity and specificity of trials on fractures of: nasal-64%, 83%; temporal-90%, 95%; zygomatic-94%, 89%. Likert score was 4.85/5 regarding value of the training tool. All 20 students in this study successfully provided a diagnosis within 1 minute. While there was no statistically significant difference between fracture detection using SFP and CLP, the difference may be clinically significant in detection of zygomatic fractures (p-value=0.09). In order to facilitate a shift in US education, a training tool needs to be integrated at the medical school or resident level. An ideal time to expose medical students to this training tool is following head & neck dissection and previous exposure of US of the torso cavities during anatomy lab.

Conclusions This study demonstrated an US training tool could be successfully implemented using UC and either SFP or CLP probes. This could be a triage tool, expedite diagnosis and improve treatment.

142 PREVALENCE OF INFERIOR VENA CAVA FILTER IN PATIENTS REFERRED FOR PULMONARY THROMBOENDARTERECTOMY: SINGLE CENTER REPORT

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10.1136/jim-2016-000365.142

Purpose of Study The role of inferior vena cava (IVC) filter in chronic thromboembolic pulmonary hypertension (CTEPH) has not been studied. There is lack of consensus regarding IVC filter insertion prior to pulmonary thromboendarterectomy (PTE) surgery—a practice followed at the University of California, San Diego (UCSD) but one abandoned at other major centers due to cost or risk-benefit concerns. Furthermore, the treatment guidelines for newly diagnosed CTEPH do not address the role of IVC filters. We reviewed the frequency of IVC filter use in a consecutive series of PTE patients referred to UCSD.

Methods Used We performed a retrospective review of all consecutive PTE cases at UCSD from July 2013 through June 2015. We analyzed IVC filter status, mode of anticoagulation therapy, history of lower extremity deep vein thrombosis (LE DVT), history of vitamin K antagonist (VKA) failure, and history of pulmonary embolism (PE). We compared these data with those patients presenting without an IVC filter. Chi-squared tests were performed to determine significance.

Summary of Results Of 342 patients, 116 had received an IVC filter prior to arrival. Over half (56%) the patients with an IVC filter had a history of LE DVT (p<0.02). The remaining 44% with an IVC filter had no history of LE DVT. IVC filter presence was not associated with non-VKA anticoagulation therapy (p=0.127), history of VKA failure

($p=0.109$), or history of PE ($p=0.092$).

Conclusions Treatment guidelines do not address the role of IVC filter insertion in patients with CTEPH. In this series, 1 out of 3 CTEPH cases referred for PTE surgery already had an IVC filter. A substantial number of patients without documented LE DVT received a filter anyway. Whether the decision to insert a filter was influenced by concerns for possible anticoagulation failure remains unanswered by this retrospective review. The role of IVC filters in the treatment of CTEPH remains unclear and in need of further investigation.

143 INTEGRATING ULTRASOUND WITH 3D-CT FOR TEACHING MEDICAL STUDENTS ASSESSING TIBIA-FIBULA FRACTURES DURING ANATOMY DISSECTION LAB

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10.1136/jim-2016-000365.143

Purpose of Study Tibia-fibula (TF) fractures are a relatively common fracture presenting among trauma to emergency services. Ultrasound (US) has been proven to be effective in identifying fractures, especially for displaced fractures by inspection of the skeletal cortex. SECTRA visualization table (SVT) is a technology rendering CT/MRI DICOM files into 3D. SVT-ORTHO assists restoring anatomy for surgery. The objective of this study was to see if medical students could recognize and assess TF fractures from undissected cadaveric tissue following an imaging protocol involving SVT imaging.

Methods Used A literature search was conducted regarding the integration of US and 3D-CT software of TF from donor cadavers and healthy volunteers. First-year medical students (MS1) dissected the TF region, and then viewed TF x-rays, CT, and SVT. 18 MS1 used 5–12 and 18 MHz probes on the TF during dissection and were divided into formal 20-min tutorial groups three times weekly to view and assess TF fractures on the SVT. Students were given the autonomy to access US and SVT outside of formal hours. Each had a minute and a half to engage with SVT before they were asked to leave the room and complete an illustration (AP and PA view) of the TF they had examined. 24 hours later, students were asked to draw AP and PA views of the same fracture after an additional exam with the US.

Summary of Results Literature search revealed no known studies. Students successfully conducted the 5–12 and 18 MHz probes to identify the TF and were able to utilize the SECTRA with success to better understand the fracture. Approximately 80–90% of TF fractures are displaced, most of which require surgery. Typical protocol for TF fractures includes X-rays with CT scans. US is an evolving tool for fracture recognition, used during triage or on early admission, expediting and improving patient care. The SVT-ORTHO was designed to assist in the rehearsing of morphologies for orthopedic surgery. With combined palpations, visualizations, and dissections, students were able to use US to improve in accuracy on subsequent illustrations.

Conclusions This study used various viewing mediums in chronological order with positive identification of the TF,

suggesting that this technique may be a useful teaching tool for ultrasound fracture identification.

144 CIRCULATING LYMPHOCYTE SUB-POPULATIONS DEFINE MOLECULAR SUBTYPES OF COPD

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10.1136/jim-2016-000365.144

Purpose of Study To study the relationship between circulating immune cell sub-populations in COPD and COPD molecular subtypes, using genomic deconvolution methods to evaluate peripheral immune signatures in smokers.

Methods Used We used three cell-type deconvolution methods, all based on whole-genome microarray gene-expression, to infer lymphocyte sub-population quantities for a cohort of 229 subjects from the ECLIPSE Study. Lymphocyte sub-populations were broken into 17 groups: 12 groups of mature or terminal cell-type lineages and 5 super-groups of cell-types from closely related lineages, composed of different combinations of the individual 12. For validation, we repeated the cell-type deconvolution on a replication cohort of 135 subjects from the COPD Gene Study and also compared our deconvolution results to CBC data from the ECLIPSE subjects, measured from the same blood samples that were used on the microarrays.

Summary of Results Cell type deconvolution confirms previously reports of down-regulation of T-cells and decreased CD4+/CD8+ ratio in subjects with COPD compared to non-COPD smokers. Stronger differences in immune sub-populations were seen in molecular-defined COPD subtypes, with T-cells, specifically CD4+ memory cells, and activated natural killer cells significantly decreased in the more impaired COPD molecular phenotype group as compared with the less impaired group ($p<0.05$ in a majority of methods across primary and replication datasets). In contrast, Helper T-regulatory cells and B-cells were increased in the more impaired COPD molecular phenotype group ($p<0.05$ in a majority of methods across primary and replication datasets).

Conclusions Deconvolution techniques identify immune cell subsets that are associated with COPD and COPD molecular subtypes. Circulating CD4+ T-cell subsets and natural killer cells demonstrated the largest relative changes in specific COPD subgroups.

145 INTEGRATING 3D/4D ULTRASOUND SKILLS TO FACILITATE STEREOSTRUCTURAL ANATOMY OF THE ABDOMINAL AND PELVIC REGIONS DURING MEDICAL ANATOMY DISSECTION COURSE

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10.1136/jim-2016-000365.145

Purpose of Study In the last decade, ultrasound (US) training has been incorporated into undergraduate medical education. Currently, there is an emphasis to train medical students in point of care US during the clinical years; however, there appears to be limited usage of US within

the basic science years. Within the teaching of medical anatomy, US helps reveal stereostructural relationships and serves as a valuable educational tool. The objective of this study was to integrate 3D/4D US into the anatomy curriculum to enhance student learning of abdominal and pelvic anatomy, which was traditionally more abstract.

Methods Used First-year medical students attended 6 3D/4D US modules focused on imaging abdominal and pelvic organs. Each module during anatomy course was taught to small groups of students (4–8 students) up to 10 minutes on a single structure with 3D/4D US including mandatory probe time. Modules focused on instruction of appropriate landmarks and techniques for imaging the kidney, spleen, abdominal aorta, urinary bladder, uterus and ovary. Post-module surveys utilizing Likert scale were administered assessing student competence to effectively acquire and interpret 3D/4D images, the educational benefits of 3D/4D US, and learning anatomy. During formal lab assessments, students were examined on their ability to correctly acquire 3D/4D image and identify the tested structure.

Summary of Results 126 students individually completed 6 US modules and each demonstrated at least 36 image acquisitions. The percentage of correct responses by students during laboratory examination was consistently over 90%. Overall, student self-assessment revealed that on average students either “agreed” or “strongly agreed” that use of 3D/4D US improved their understanding of the stereostructural relationships of abdominal and pelvic anatomy. While more commonplace in the OB/GYN field for fetal imaging, 3D US has recently expanded successfully to other medical fields.

Conclusions 3D/4D US can be implemented within basic science curriculum, improving learning, didactic, and dissection instruction during a first-year medical anatomy course. Additionally, the integration of US training into first-year medical anatomy courses offers students early access to acquiring valuable clinical skills.

146 CANCELLED

147 ONE LUNG TO LIVE

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10.1136/jim-2016-000365.147

Case Report A 24 y/o non smoking African American female with a history of morbid obesity, premature birth, exercise induced asthma, presented with complaints of progressive shortness of breath, cough, fever of 103, and chills. On arrival to the ER, she was noted to be in severe respiratory distress despite non-rebreather mask and eventually required intubation. Arterial blood gas revealed: pH 7.32, pCO₂ 46 mmHg, pO₂ 41 mmHg, HCO₃ mEq/L, O₂ Saturation 63.6% on 100% FiO₂ on mechanical ventilation. Chest x-ray was limited due to body habitus, therefore spiral CT was done to rule out pulmonary embolism given the degree of hypoxia. CT angiography was remarkable for dense right lower lobe consolidation, patchy infiltrates though out both lungs, an enlarged pulmonary trunk and

Abstract 147 Figure 1

right pulmonary artery, however absent left pulmonary artery. No definitive filling defects in the pulmonary arteries existed to suggest pulmonary emboli and timing of contrast was appropriate. Respiratory status worsened precipitously and patient eventually required extracorporeal membrane oxygenation (ECMO) for severe ARDS. She had a prolonged hospitalization complicated by sepsis, bacteremia, transient renal failure requiring CRRT and tracheitis. With extensive rehabilitation the patient improved and no longer requires supplemental oxygen. Four months after discharge, pulmonary function tests revealed a total lung capacity 79% predicted, residual capacity 58% predicted, FEV₁- 2.88 L (92%), FVC- 3.37 L(86%) and a DLCO 69% predicted.

Surgery II Concurrent Session 3:15 PM Thursday, January 26, 2017

148 PREDICTIVE VALUES OF THE ASEPSIS AND SOUTHAMPTON SCORING SYSTEMS IN EVALUATING BREAST RECONSTRUCTION SURGICAL SITE INFECTION

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10.1136/jim-2016-000365.148

Purpose of Study Infection is the most significant complication for breast reconstruction. While the Center for Disease Control (CDC) is the most standard tool for surgical site infection (SSI) diagnosis, ASEPSIS and Southampton scoring methods have been shown to be more sensitive. ASEPSIS also demonstrated much better inter-rater reliability than the CDC. We sought to assess the predictive value of various wound-scoring methods in breast reconstruction SSI.

Methods Used A retrospective analysis of all intradepartmental breast reconstruction infections from January 2013-June 2016 was performed. Patients' preoperative risks and postoperative wound-related complications were collected. Southampton and CDC scores, along with a modified ASEPSIS score—extended to 30 postoperative days—were calculated. Relative predictive values for implant-based reconstruction were evaluated.

ASEPSIS Score Distribution versus Outcomes

Abstract 148 Figure 1

Summary of Results Among the 22 reviewed cases, ASEPSIS scores greater than 25 resulted in a more than 50% rate of implant-based breast reconstruction failure [Figure 1]. A Southampton classification of III—indicating presence of discharge—had a greater associative risk of reconstruction failure than a classification of IV—indicating presence of pus (67% versus 40% failure). All assessed wounds were categorized as Superficial Incisional SSIs by the CDC definition.

Conclusions While the CDC criteria offers little clinical use, the ASEPSIS and Southampton scoring systems show substantial predictive value for breast reconstruction surgical site infections. New procedure protocols should be implemented to require detailed surgical notes including the proportion of the wounds affected by inflammatory responses to allow for easier wound score calculation by these alternate scoring systems.

149 CAN WE DO IT: CORRESPONDING PATIENT SATISFACTION WITH RESIDENT TRAINING AND LEGISLATION

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10.1136/jim-2016-000365.149

Purpose of Study Patients have the ability to rate their physicians on physician rating websites (PRW). The categories listed on the websites are similar to categories seen that score physicians under MACRA. Under this legislation, physician reimbursements will be based off scores they receive from patients. Furthermore, the required core competencies of plastic surgery residents have similar categories as seen in MACRA. The purpose of this study was a literature review of articles discussing PRWs and identifying patient satisfaction commonalities among them. These were then compared to core competencies plastic surgery (PS) residents must complete to find which ones related to patient satisfaction the most and therefore raise physician scores under MACRA.

Methods Used A peer-reviewed literature search of 25 articles discussing PRWs was done on PubMed. A datasheet was created that recorded the commonalities mentioned of patient quality care practices and then tallied. These were compared with the core competencies required in PS residency programs.

Summary of Results Of the 25 articles, 17 mentioned the office staff—being the most stated variable effecting physician ratings. Fifteen articles mentioned communication between physician and patient, patient trust in physician, and bedside manner of the physician as having an impact on physician reviews. The least mentioned quality factor was cost to the patient. Of the 14 articles that mentioned patient recommendations of physicians, 10 also discussed the importance of communication. Seventy-six percent of the articles mentioned variables—communication, bedside manner, and time spent with patient—that can be classified under 2 of the 6 PS core competencies—interpersonal/communication skills and professionalism.

Conclusions The data obtained revealed that the majority of patient satisfaction variables correspond with 2 of the core competencies required of PS residents. This suggests that more emphasis should be placed on interpersonal/communication skills and professionalism in residency. As MACRA emerges and physician ratings become a customary practice in medicine, focusing on patient satisfaction within the realm of residency requirements will not only increase patient quality care but improve physician reimbursements as well.

150 PEDIATRIC MORTALITY ASSOCIATED WITH DELAYS IN ACCESS TO EMERGENT SURGERY: A RISK STRATIFIED ANALYSIS

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10.1136/jim-2016-000365.150

Purpose of Study Literature demonstrates that acute surgical emergency operation delay may contribute to morbidity and mortality. Emerging evidence from our institution demonstrates delays to the operating room were most likely to occur in the population requiring Stat, emergency surgery in ≤60 minutes. SNAP II and PRISM are physiological scoring systems for NICU and PICU mortality risk assessment. Our hypothesis was that in the predicted high risk patient population, delays to surgery were associated with increased mortality.

Methods Used An REB approved retrospective review of ORSOS (prospectively collected patient and operating room information) database was undertaken from June 15, 2011–2015 on all Stat (≤60 minutes) surgeries at BCCH. All patient charts and EMRs were reviewed. Patient chart data collected included variables required for PRISM and SNAP II scores, time from booking to OR and incision, risk of limb or organ loss and outcome. Patients were classified as low or high mortality risk. Descriptive statistics were used.

Summary of Results There were 395 Class 1 cases with complete data available for 305. Of these, 87 met high-risk criteria and 218 had low mortality risk. Delays to the OR (>60 minutes) occurred in 59 high-risk patients (68%) and 212 low risk patients (97%). Of 31 mortalities, 29 were high-risk and 27 (93%) had delays to OR; both low risk mortalities had delays to OR of >60 minutes. In the high risk group, delay of >60 minutes to OR was significantly associated with mortality ($p=0.00044$); delay to incision

>60 minutes in this group was associated with an increased death risk ($p=0.00036$). There was no significant mortality increase associated with delay to OR in the low risk group of patients.

Conclusions In our institution, the majority of Class 1 cases experienced a delay to operation. This did not significantly increase the mortality risk for the low risk group, however, for the high risk patients, delay to the operating room and delay to incision of >60 minutes resulted in a significantly increased risk of death. Collection data on the reasons for delay will be critical to improve surgical access and ensure timely surgical intervention to our most critically ill children.

151 ANTI-FACTOR Xa MEASUREMENTS IN CRITICALLY-ILL SURGICAL PATIENTS TO EXAMINE ENOXAPARIN METABOLISM AND OPTIMIZE ENOXAPARIN DOSE

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10.1136/jim-2016-000365.151

Purpose of Study Critically-ill patients are particularly at high risk of developing venous thromboembolism. The purpose of this study was two-fold: 1) to examine patient-level factors, including gross weight and severity of illness (APACHE II) as potential predictors of enoxaparin metabolism and 2) determine the effectiveness of enoxaparin dose adjustment in acute care and trauma surgical patients.

Methods Used Acute care and trauma surgical patients placed on enoxaparin prophylaxis (30 mg BID) within 36 hours after surgery at their surgeon's discretion were enrolled. Patients' peak and trough aFXa levels were drawn 4 hours and 12 hours, respectively, after their third or fourth dose of enoxaparin. Goal aFXa range was 0.2–0.4 IU/mL, and a real time dose adjustment algorithm was implemented for patients with out of range levels (Figure 1). Patient follow-up was done 1 month and 3 months after surgery to screen for VTE events.

Summary of Results 30 patients (55.6%) had a low aFXa levels, 27 patients (42.6%) had in range levels, and 1

patient (1.9%) had a high level. Gross weight and APACHE II score were correlated with aFXa levels. 1 month follow-up revealed 5 VTE (16.7%) and 1 bleeding event in the below-range group. There was 1 VTE (3.6%) event in the in-range group. Patients with initial inadequate aFXa levels were more likely to have post-operative VTE (16.7% vs 3.6%, $p=0.195$).

Conclusions Standard enoxaparin dosing is inadequate in the majority of patients. Real time aFXa level monitoring and dose adjustment can increase the proportion of patients who receive adequate prophylaxis and may result in reduced VTE outcomes.

152 OPHTHALMIC SEQUELAE OF MAXILLECTOMY WITH AND WITHOUT RADIATION THERAPY IN MIDFACE MALIGNANCIES

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10.1136/jim-2016-000365.152

Purpose of Study Maxillary malignancy includes a poor prognosis, difficult treatment, and high rate of morbidity. Maxillectomy with adjuvant radiation therapy (XRT) is the standard of care for such malignancies, but the effects of such treatment on surrounding tissues are not completely understood. This study compares the rates of ophthalmic complications in patients who underwent maxillectomy with and without XRT for sinus malignancies.

Methods Used This study represents a retrospective chart review from a major tertiary referral center over a ten-year period. Included subjects received maxillectomy with or without radiation therapy and had sufficient ophthalmologic records for post-operative characterization. Demographic, therapeutic, and ophthalmic data were extracted and subjects were organized by their exposure to XRT.

Summary of Results Of 206 patients who underwent maxillectomy, 32 had sufficient records to satisfy the inclusion criteria. These were organized into two groups by exposure to XRT: "+XRT" (n=24), and "-XRT" (n=8). Age at maxillectomy was 60 and 48 years in the +XRT and -XRT groups respectively. Rates of right and left maxillectomy were equal between the two groups. The average radiation dose for those in the +XRT group was 83 Gray. Both groups reported similar ophthalmologic complications yet the rates of such diagnoses differed depending on exposure to XRT. Epiphora (38%), retraction/ectropion (33%), and exposure keratopathy/dry eye syndrome (29%) were most common among those in the +XRT group while retraction/ectropion (50%), diplopia (38%), and epiphora (25%) were most common among those in the -XRT group. Other diagnoses included: lagophthalmos, fistula, irregular eyelid contour, significant scar, and midface deformity.

Conclusions The rate and type of sequelae differed depending on XRT exposure. These results provide guidance as to the risks of such treatment while encouraging early identification and treatment of these ophthalmic complications in patients with midface malignancies.

Abstract 151 Figure 1 Treatment Protocol

153 MACRA LESGISLATION AND MIPS SCORES: EFFECTS ON COST EFFECTIVE ANALYSIS FOR NEGATIVE PRESSURE WOUND THERAPY DEVICES

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10.1136/jim-2016-000365.153

Purpose of Study The Medicare Access and CHIP Reauthorization Act (MACRA) changes reimbursement from a fee-for-service payment system to fee-for-value. Physicians will be scored according to the quality of their care in the MIPS program and will receive a positive or negative modifier to their Medicare reimbursement based on that score. The goal of this study is to analyze a cost-effective model for Negative Pressure Wound Therapy (NPWT) devices with attention to how a MIPS score is affected.

Methods Used Three devices from KCI and Smith & Nephew each were compared for cost-effectiveness and MIPS score impact. From KCI, the V.A.C.Ult, ActiV.A.C., and SNaP devices were compared to the S&N RENASYS, RENASYS GO, and PICO devices respectively. Impact on the MIPS sections of Quality, Cost, and Clinical Practice Improvement Activities (CPIA) were taken into account. Participation in Alternative Payment Models was not analyzed.

Summary of Results Due to the variability of wound treatment, the devices were compared to each other based on the types of wounds they are typically indicated for. If a wound requires inpatient care, the KCI V.A.C.Ult with instillation therapy is the better choice over the RENASYS device because it reduces infection rates and treats more complex wounds faster than traditional NPWT. This improves the Quality score because of lower infection rates and it improves the Cost score because wounds heal faster and discharge comes earlier. If the wound can be cared for on an outpatient basis, the KCI SNaP mechanical device is the best option because it is the cheapest, most cost-effective choice over the S&N PICO device. The SNaP and PICO devices are better options than the ActiV.A.C and RENASYS GO devices because they are ultra-lightweight, require no canister for exudate, and can fit in a discreet pouch or pocket which is highly beneficial for patient satisfaction and the CPIA section score. If the wound can be cared for on an outpatient basis, but is too large or produces too much exudate for the SNaP and PICO devices, the KCI ActiV.A.C and S&N RENASYS Go devices are better options. Between these two devices the RENASYS GO is more cost effective.

Conclusions Inpatient care—KCI V.A.C.Ult
Outpatient care low exudate—KCI SNaP
Outpatient care high exudate—S&N RENASYS GO

154 A COMPARISON BETWEEN PATIENT EXPERIENCE AND PHYSICIANS' BELIEFS: CROWDSOURCED INFORMATION ON WOUND CARE

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10.1136/jim-2016-000365.154

Purpose of Study Online health communities (OHCs) have become a resource for patients but also provide healthcare professionals an unsolicited perspective of what the patient is truly feeling. Researchers have taken advantage of OHCs by crowdsourcing. Currently, no medical research exists that evaluates the effects of wounds on patients. The purpose of this study examined crowdsourced data of patients living with wounds—finding discrepancies between what patients actually experienced against what plastic surgery residents believed patients felt.

Methods Used The Google search engine was used to find OHCs where we crowdsourced patient reported information on wounds, compiling patient responses; including the timeline, location, cause of wound, their emotions, and negative feelings towards their healthcare professionals. A survey was completed by 10 plastic surgery residents that enabled us to compare the crowdsourced data to beliefs held by the residents.

Summary of Results A total of 72 responses were recorded from OHCs. Of those responses, 66 referenced a negative emotion in their wound-care experience. However, only 33 reported negative sentiments towards healthcare professionals. See Table 1 for the crowdsourced data and the tallied physician responses regarding their beliefs on what chronic wound patients experience emotionally.

Conclusions The data shows that most patients experience negative emotions when inflicted with wounds—discouragement being the most prevalent. The survey completed by the residents revealed that 90% of them believed that 51% or more patients with a chronic wound would experience discouragement. However, the remainder of the results showed that at least 80% of the residents overestimated the number of patients that would experience depression, fear, and anger, revealing a discord among the expected emotions of patients. Consequently, crowdsourcing OHCs offers a valuable resource for physicians, enabling them to better understand patient experience.

Abstract 154 Table 1

Percentage of Patient Reported Responses		Depression 12.2%	Discouragement 52.7%	Hopelessness 8.3%	Anger 6.9%	Fear 26.6%
Number of Residents' Estimates	0–25% of patients	1	0	3	2	2
	25–50% of patients	2	1	2	4	5
	51–75% of patients	4	2	1	2	2
	76–100% of patients	3	7	4	2	1

POSTER SESSION

Adolescent Medicine and General Pediatrics

6:00 PM

Thursday, January 26, 2017

155 PROLONGED MUSCLE WEAKNESS FOLLOWING RHABDOMYOLYSIS IN A PEDIATRIC SEPTIC SHOCK PATIENTBurke K, Agarwal H. *University of New Mexico, Albuquerque, NM.*

10.1136/jim-2016-000365.155

Case Report Background: Rhabdomyolysis leading to acute renal failure (ARF) is uncommon in septic shock patients. We report prolonged muscle weakness following rhabdomyolysis and ARF in a pediatric septic shock patient.

Case Report: A 14 year-old previously healthy male presented with 6 days of abdominal pain, fever and chills. Abdominal CT scan showed perforated appendicitis with retrocecal abscess. He progressed to septic shock requiring antibiotic therapy, vasopressors and non-invasive ventilation. On day 3, he developed abdominal compartment syndrome requiring laparotomy and appendectomy. Postoperatively, he had sustained temperatures of $>40^{\circ}\text{C}$ despite cooling therapy along with dark colored and decreased urine volume. His creatine kinase (CK) was elevated to $>100,000$ Units/L (normal: 65–451 Units/l) and serum myoglobin was elevated to 92,085 ng/mL (normal: 28–72 ng/ml). He soon became anuric and continuous veno-venous hemofiltration (CVVH) was initiated. 2 weeks later, he was transitioned to intermittent hemodialysis for 7 weeks until he started making urine. He remained hypotonic with limited response to touch/painful stimuli, despite improvement in kidney function and normalizing CK and serum myoglobin levels. Electromyography (EMG) and nerve conduction (NC)

studies revealed severe denervation, low amplitude sensory action potential and severe muscle atrophy consistent with critical illness polyneuropathy (CIP) with superimposed critical illness myopathy (CIM). He failed extubation trial, requiring tracheostomy and mechanical ventilation support. 10 months later he is in rehabilitation services with gradual recovery of facial, oropharyngeal and proximal limb muscle function.

Discussion: Dark colored urine in septic shock patients should trigger early investigation and management of rhabdomyolysis. CIP and CIM are being recognized more frequently in sick patients, although have not been previously reported in severe rhabdomyolysis patients. CIP and CIM can occur concomitantly, manifesting as limb and respiratory muscle weakness as seen in our patient. EMG, NC studies and muscle biopsy must be undertaken to confirm CIP or CIM in prolonged muscle weakness.

Conclusion: Prolonged muscle weakness secondary to CIP and CIM should be considered in children with rhabdomyolysis associated with septic shock.

156 EFFECT OF INHALED CORTICOSTEROIDS ON HEIGHT IN PEDIATRIC PATIENTS WITH ASTHMA

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10.1136/jim-2016-000365.156

Purpose of Study Inhaled corticosteroids (ICS) are commonly used for treatment of asthma in children but their effect on adult height has been a subject of debate. The purpose of this study is to examine previous studies that investigated the effects of inhaled corticosteroids on the growth and adult height in asthmatic children.

Methods Used A search of PubMed, Cochrane, Google Scholar, and EBSCOhost databases for studies that examined height of asthmatic children under 12 years of age

Abstract 156 Table 1 Overview of Examined Studies

1st Author, Year	Subjects Steroids/Control	Dose mcg/daily ICS	Duration of treatment	Measured GV of FAH	Effect	P value	Comments
Bever, 1999	42/43	1000–1500 BDP	>1 year	FAH	↓	.04	No difference in FAH but lower compared to target height in BDP group
Erceg, 2012	545/245	0–1200 BDP	3 years	GV	↔	>0.05	
Agertoft, 2000	216/62	100–800 BUD	3–6 years	GV	↔	<0.05	
Agertoft, 1994	216/62	100–800 BUD	3–6 years	GV	↓	<0.05	Difference only with higher dose >400
Becker, 2006	119/121	200 BDP	1 year	GV	↓	<0.001	0.78
Bensch, 2011	70/75	170 FL	1 year	GV	↔	0.289	
Jónasson, 2000	34/88	100–200 BUD	12 years	GV	↓	0.06	1.09–1.49 cm only for 7–11 year age group
Kannisto, 2000	15/30	200 FP, 400 BUD	1 year	GV	↓	<0.01	Difference only in 400 dose group
Kelly, 2012	281/377	400 BUD	4–6 years	FAH	↓	0.001	1.2 cm
Martinez, 2011	72/74	80 BDP	44 weeks	GV	↓	<0.001	1.1 cm
Merkus, 1993	22/44	600 BUD	3 years	GV	↔	>0.17	
Skoner, 2011	30/34	200 MF	1 year	GV	↓	<0.02	0.7 cm/yr

who were treated with inhaled corticosteroids for a minimum of one year. Only studies which used controls and measured final adult height (FAH) or growth velocity (GV) were included.

Summary of Results Twelve studies met our inclusion criteria (see table below). The following abbreviations were used: budesonide (BUD), mometasone furoate (MF), beclomethasone dipropionate (BDP), Flunisolide (FL), fluticasone propionate (FP), growth velocity (GV), final adult height (FAH), reduced GV/FAH effect (↓), augmented GV/FAH effect (↑), and no effect (↔).

Conclusions The majority of the reviewed studies showed a decreased adult height (up to 1.2 cm) or suppression of growth velocity (up to 1.5 cm) while on inhaled corticosteroids; this effect was only seen with higher doses of steroids. The benefits of steroids in control of asthma may outweigh the potentially negligible decrease in growth. Prospective studies that examine the long-term effect of ICS on FAH and lung function while including other co-variables such as concurrent medications, diet, and exercise are needed.

Behavior and Development

6:00 PM

Thursday, January 26, 2017

157 A CASE OF RAPIDLY PROGRESSIVE FRONTOTEMPORAL DEMENTIA TRIGGERED BY LIFE STRESSORS

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10.1136/jim-2016-000365.157

Case Report Frontotemporal Dementia (FTD) may present in multiple variants, behavioral type variant being the most common. FTD causes significant changes in social behavior, and personality, due to its association with degeneration of the frontal and temporal lobes of the brain. Typically it progresses over three to five years, and presents in the sixth decade of life. We describe a 34 year old male with a Master's Degree in Education who presented with worsening headaches for three months. Initially, the headaches were attributed to life stressors. At the time patient was dealing with the death of three family members, domestic and financial hardships, and did not receive the promotion at work he was expecting. His headache did not resolve and the patient returned one week later. CT-scan of the head was found to be normal. Lumbar puncture was performed which showed normal pressures and unremarkable cytology. The patient was sent home on Norco, and Zofran. Three days later, he returned with severe headaches, nausea and vomiting. The patient's wife also described a sudden onset of aggressive behavior, where the patient physically abused his wife and daughter. The patient was admitted for full work up. MRI of the head, EEG, and MR angiogram of head and neck were performed and also found to be unremarkable. Bio-patch was placed at the site of the lumbar puncture which resulted in the resolution of his headache, nausea and vomiting. PET brain was performed and showed hypometabolism

involving the frontal lobes, anterior cingulate gyrus and anterior portions of the temporal lobes in a pattern typical for FTD. It has been 4 months since initial interaction with the patient. Today his cognitive function has deteriorated tremendously. He remains mostly bedbound, shows little apathy, and when he is active he stand purposelessly in the middle of a room for prolonged periods of time. FTD seldom presents in the third decade and is generally not this acutely progressive. Furthermore, the patient's sudden onset of life stressors may have triggered the acuity and early onset of his disease. More studies are required to establish this correlation.

158 SCREENING EMERGENCY DEPARTMENT PATIENTS FOR ABERANT DRUG-RELATED BEHAVIORS

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10.1136/jim-2016-000365.158

Purpose of Study The recent rise in opioid related drug deaths has paralleled the increased availability of opioid analgesics (OA). OAs are commonly prescribed from the emergency department (ED) for moderate to severe pain. Unfortunately, ED physicians do not have the benefit of validated risk stratification tools. This project evaluated three office based OA risk-screening tools in the ED: Screener and Opioid Assessment for Patients with Pain – Revised (SOAPP-R), Drug Abuse Screening Test (DAST-20) and Opioid Risk Tool (ORT).

Methods Used This observational study had a convenience sample of ED patients ≥18 years old with a painful condition for whom the clinician considered prescribing an OA. Subjects filled out three tools on an android tablet. The statewide prescription drug monitoring program (PDMP) was accessed as part of routine care. Risk tool scores and PDMP controlled medication prescription data were linked in a de-identified data set. Results were analyzed relative to aberrant behavior, defined as ≥4 OA prescriptions by ≥4 different prescribers in the prior 12-months.

Summary of Results Over 2 months, 154 patients were approached and 121 patients were enrolled from two urban, teaching hospitals: University of Colorado Hospital ED (109 patients) and Brigham and Women's Hospital ED (12 patients). Two patients were excluded because of missing PDMP data. Median age of subjects was 35 years old (IQR: 27–48). 60% were female. Past OA use was reported in 68% (104/121) with 23% (28/121) using within the past 7 days. SOAP-R was the only tool with a significant likelihood ratio 4.0, (ORT=0.179 and DAST20=0.283). SOAP-R had the highest sensitivity at 33%, 95% CI 17–54% (ORT 22%, 95% CI 9–40%; DAST 10%, 95% CI 1.0–37%), specificity at 85%, 95% CI=76–91% (ORT=82%, 95% CI 72–89%; DAST 79%, 95% CI 69%–86%), and positive predictive value at 39%, 95% CI=20–61% (ORT=30%, 95% CI 13–53%; DAST=8.7%, 95% CI 1.1–28%) for aberrant OA related behavior.

Conclusions Screening patients with a tablet in the ED seems feasible as 100% of patients were willing to participate and able to finish. Previous studies have shown

SOAP-R was significant, but DAST20 and ORT have not been tested in the ED before. We found SOAP-R is more SN, SP, and a higher PPV in patients where OAs are being considered.

Cardiovascular

6:00 PM

Thursday, January 26, 2017

159 GLYCEMIC CONTROL IN INSULIN AND NON-INSULIN DEPENDENT DIABETIC PATIENTS WITH ST ELEVATION MYOCARDIAL INFARCTION PREDICTS TIME TO PRESENTATION

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10.1136/jim-2016-000365.159

Purpose of Study Worldwide, the annual number of people diagnosed with diabetes continues to increase. Classically, Diabetes Mellitus (DM) has been associated with silent or atypical initial symptoms and increased time to presentation in patients presenting with ST elevation myocardial infarction (STEMI) compared to non-DM patients. It is less clear whether the type of treatment or the adequacy of glycemic control impacts the time to presentation and type of symptoms. Therefore, we sought to evaluate the impact of poor glycemic control on these outcomes as measured by hemoglobin A1c.

Methods Used In this retrospective study, we collected and analyzed data from 766 patients who presented to a tertiary-care university medical center with STEMI from 2008–2015. Over that timeframe, 238 of the 766 (31%) patients who presented with STEMI had DM. A T-test was performed comparing mean time to presentation in diabetics vs. non-diabetics, whereas both t-tests and χ^2 tests were used to compare presenting symptoms between the two groups. Regression analysis was performed comparing time to presentation to hemoglobin A1c.

Summary of Results Diabetic patients presenting with STEMI on average presented 50 minutes later than non-diabetic patients (194.8 minutes vs. 144.7 minutes, $p=0.0054$). Furthermore, time to presentation increased ($p=0.0035$) for every unit increase in hemoglobin A1c level ($p=0.0035$). Chest pain was the most common presenting symptom in diabetic and non-diabetic patients with similar rates in both groups (87.4% v 89.1%, $p=0.561$). No statistically significant difference was found in rates of shortness of breath, syncope, or GI symptoms between the two groups.

Conclusions Diabetic patients have delayed time to presentation compared to non-diabetic patients with STEMI. Additionally, the worse the glycemic control the longer the time to presentation. However, in contrast to prior observations, both diabetic and non-diabetic patients presented with similar rates of chest pain.

Community Health

6:00 PM

Thursday, January 26, 2017

160 ADDRESSING HIGH BLOOD PRESSURE IN YAKIMA, WASHINGTON WITH DASH EDUCATION IN A COMMUNITY-BASED SETTING

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10.1136/jim-2016-000365.160

Purpose of Study This intervention combats high blood pressure and related heart disease in Yakima, Washington by encouraging older adults to make food choices in line with the Dietary Approach to Stop Hypertension (DASH) diet. Heart disease is the leading cause of death in the U.S. for adults >65 years old. Yakima (pop. approx. 90,000) has a 24% greater rate of deaths due to heart disease than WA state. One major risk factor for heart disease is high blood pressure. The DASH diet—high in fruits, vegetables, whole grains, lean proteins, and lowfat dairy products, and low in saturated fats, sodium, and added sugars—has been shown to significantly lower blood pressure in hypertensive individuals and help prevent development of hypertension in those with normal blood pressure.

Methods Used Meetings with the recreation coordinator and members of the Yakima Harman Senior Center demonstrated that older adults wanted to learn how to improve their heart health, beyond the Center's physical activities and weekly blood pressure screenings. The Center does not currently provide easily accessible, individualized information about dietary choices as they relate to heart health. A literature review showed the DASH diet was effective in addressing high blood pressure and that several community-based programs involving lifestyle and dietary changes have been successful.

Summary of Results The program was piloted through two sessions at the Center. DASH educational materials adapted from national and state health agencies were given to individuals who underwent blood pressure screening. The materials included a self-assessment of current diet, tips for incorporating DASH principles, a goal-setting worksheet, and a food journal. Many individuals who had their blood pressure checked also spoke with a medical student about their diet and took home materials related to the DASH diet.

Conclusions The two pilot sessions were successful in that many older adults were interested in learning more about a heart healthy diet. The program will continue through the volunteer nurses who conduct blood pressure screenings at the Center. Copies of materials were provided to the nurses. Future challenges include maintaining the program through nurse turnover and cost of materials. To expand on the program, the Center can offer cooking classes using DASH recipes.

161 INCREASING YOUTH AWARENESS OF LOCAL MENTAL HEALTH SERVICES IN KETCHIKAN, AK WITH A RESOURCE GUIDE DELIVERED THROUGH PEER EDUCATION

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10.1136/jim-2016-000365.161

Purpose of Study To reduce mental health issues among high school students in Ketchikan, AK with the promotion of community mental health resources through a peer education model.

Ketchikan Gateway Borough School District conducted the 2015 Youth Risk Behavior Survey (KYRBS) to high school students (n=485) and found that 34.9% of students felt sad or hopeless almost every day for two weeks or more in a row that they stopped doing usual activities over the past year (AK 33.6%, US 29.9%). Another survey by the Ketchikan Wellness Coalition (KWC) found that adults reporting mental or emotional difficulty less, a higher percentage had received counseling or therapy before the age of 18 and used services less as an adult. Therefore, a program designed to be delivered to high school students to increase awareness of community services was justified.

Methods Used Community assessment was performed by meeting with local coalitions and the 2015 KYRBS was obtained and evaluated. Literature review on evidence-based interventions was conducted and revealed help seeking behavior can be facilitated with a modest investment of time, such as brief training and resource access, resulting in increased referrals for mental health services. During an action meeting with KWC, Women In Safe Homes (WISH) and youth leaders, it was decided to develop a youth mental health resource guide (YMHRG) to be delivered in a peer-educated model during a leadership training for high school students. Program success will be evaluated with pretest, posttest, and follow-up surveys.

Summary of Results Literature review and project design were presented to KWC and WISH, and discussions with the target population revealed that the YMHRG would positively impact high school students. Youth resources were compiled and each institution was contacted for resource verification. The YMHRG will be distributed to high school students at the annual youth leadership training scheduled for 9/2016 and PDF copies were provided to local organizations.

Conclusions The development of the YMHRG was completed with the intention of implementation at the annual youth leadership training this September in Ketchikan, AK. Survey results will be used to determine if a simple resource guide can increase awareness and utilization of local mental health resources.

162 IDENTIFICATION OF UNREPORTED SOURCES OF OBJECTS CONTAINING HIGH RELEASE NICKEL

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10.1136/jim-2016-000365.162

Purpose of Study Nickel allergy has a significant impact on the quality of life of many US children and also imparts a significant financial burden on the healthcare system. Skin-piercing practices correlate with high sensitization rates in both adults and children worldwide; however, there remains a significant subset of children that are sensitized that are not pierced. This study sought to identify high nickel releasing items found within community buildings frequented by children to gain information on potential sources of contact and exposure.

Methods Used Dimethylglyoxime (DMG) spot testing was used to identify metal objects found in community facilities throughout California that released detectable nickel. These facilities included schools, libraries, grocery stores, pay telephones, crosswalks, public restrooms, parks/playgrounds, bus stops, and newspaper stands. A single drop of solution was applied to a cotton-swab, which was rubbed on metal objects for 15 seconds. A pink precipitate indicated a positive test.

Summary of Results In the 79 different Southern California locations surveyed, 3,466 items were inventoried and categorized. DMG testing of indexed items revealed that 1,731 (49.9%) of the items in the areas frequented by children were found to be DMG positive. These included daily use items such as chairs, desks/tables, drinking fountain knobs, file cabinet handles, locker handles, and pencil sharpeners. Items consistently testing negative for nickel included bus stops, trash cans, benches, metal street signs, and metal crosswalk buttons.

Conclusions These newly identified high-nickel release items could contribute to flare-up allergy reactions in sensitized persons or potentially to sensitization itself. Additional studies are needed in other communities to show the significance of nickel contact from high traffic public areas.

163 CORRELATION OF CHILDREN'S BODY IMAGE WITH ATTITUDES TOWARDS NUTRITION AND EXERCISE

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10.1136/jim-2016-000365.163

Purpose of Study In children, being overweight is correlated with unfavorable social feedback. How a child perceives their body image is important to their overall esteem. This study evaluates the correlation between a child's body image and their attitudes regarding exercise and making healthy food choices.

Methods Used 372 children ages 7–17 (Male=191, Female 181) enrolled in Operation Fit, a day camp emphasizing nutrition and fitness education. Children chose yes or no on a Body Esteem Survey stating: “My weight makes me unhappy (WU)”, “I often feel ashamed of how I look (FA)”, “My looks upset me (LU)”, and “I’m looking as nice as I’d like to (LN)”. These questions were compared by multinomial logistic regression with; “What option best describes your attitude towards: making healthy food choices/exercise?” Children answered these questions with: “I’ve never thought about it”, “I’ve thought about it but

Abstract 163 Table 1

Variable	P-value	OR
I often feel ashamed of how I look (FA) vs starting to make healthy food choices	0.03	5.26
My looks upset me (LU) vs starting to make healthy food choices	0.05	0.19
My weight makes me unhappy (WU) vs recently started exercise	0.03	2.50
I'm looking as nice as I'd like (LN) to vs recently started exercise	0.002	3.37
My looks upset me (LU) vs never thought of exercise	0.05	0.27

have no plan", "I've thought about it and have a plan", "I've recently started", and "I've been... for at least 6 months" ($P < 0.05$).

Summary of Results Nutrition: Children who answered yes to FA and LU were correlated with recently starting to make healthy food choices ($P = 0.03$, $OR = 5.26$; $P = 0.05$, $OR = 0.19$).

Exercise: Children who answered yes to LU were correlated with never having thought of exercise ($P = 0.05$, $OR = 0.27$). Children who answered yes to WU and LN were correlated with recently starting exercise ($P = 0.03$, $OR = 2.50$; $P = 0.002$, $OR = 3.37$).

Conclusions Negative body esteem correlates with healthy eating habits in children. However, positive and negative body image were correlated with having begun exercise. It seems that children who's looks upset them are more likely to turn to diet interventions before exercise.

164 SEATTLE INDIAN HEALTH BOARD REFERRAL FOR MIGRANT AMERICAN INDIAN/ALASKA NATIVE PATIENTS TO THE MIGRANT CLINICIANS NETWORK

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10.1136/jim-2016-000365.164

Purpose of Study The Seattle Indian Health Board (SIHB) has a number of patients who are highly mobile and are not guaranteed continuity of care when they move to a new area. American Indian/Alaska Native (AI/AN) folks have a higher rate of chronic disease. The Migrant Clinicians Network (MCN) is an organization that serves migrant populations and provides several medical and social services that ensure continuity of care for marginalized and migrant populations.

Beginning a referral system at the SIHB to the MCN works towards providing continuity of care to the migrant AI/AN folks at the SIHB.

Methods Used After speaking with providers and patients at SIHB, it was clear that many of the AI/AN folks move around often. A literature analysis showed that referrals for migrant populations who receive chronic treatments can be effective if case management for families who have barriers to accessing healthcare is provided. After discovering this aspect of the population of the SIHB, contact with a manager at the MCN was made to determine how to include patients from the SIHB in the services provided by the MCN. It was found that an enrollment form for each

patient was required. Discussion with referral and EHR coordinators at the SIHB began and it was found that adding a referral code into the EHR, developing a patient brochure, and providing a brief training handout for staff and providers would be the best next steps.

Summary of Results The SIHB referral to the MCN is in the process of being added to the EHR. A brochure and a training handout has been created. The training of staff and providers will occur at the next all clinic meeting within the next month. The medical director and referral coordinators have been provided the enrollment forms for the MCN, contact information for tele-trainings with the manager from the MCN, and many resources from the MCN that will help integrate the referral system in a way that is efficient for the SIHB.

Conclusions The implementation of a referral code for the MCN at the SIHB is currently in progress, and appears to be successfully moving forward. By establishing the referral and knowledge of the program, hopefully more providers will begin to utilize the MCN throughout the Seattle area.

165 OKANOGAN COUNTY MIGRANT AND SEASONAL FARM WORKER ALCOHOL EDUCATION AND SCREENING INITIATIVE

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10.1136/jim-2016-000365.165

Purpose of Study Agriculture is the major industry for Okanogan County. The agricultural workforce consists of migrant and seasonal farm workers (MSFWs), primarily Latinos. Risk factors including stressful work situations, immigration status, and isolation make this population vulnerable for alcohol abuse. This project has two objectives: 1) to increase knowledge of safe alcohol use amongst MSFWs in the county, 2) to develop a community-based alcohol screening and brief intervention (SBI) program for the MSFW population.

Methods Used Discussions with Family Health Centers' Outreach Program prompted investigation into the need for interventional alcohol education and SBIs. FHC Outreach *Promotores* provide educational and screening health services to the MSFW community. Educational lectures were developed for *Promotores* to address unsafe alcohol use in MSFW communities.

Summary of Results The alcohol education and screening initiative commenced with a presentation at the Community/MSFW Health & Resource Coalition meeting. The presentation included plans to work with FHC Outreach to initiate community-integrated alcohol education events at orchards in the county, and future plans to work with behavioral health clinics to assimilate SBIs into the *Promotores* program.

Educational presentations were developed using information from the literature, The Alcohol Education Trust, The CDC, and consultation with Dr. Victoria Vasquez and Dr. India Ornelas, and were produced in Spanish and English. Presentations included recommendations for safe alcohol use, culture-specific discussions regarding consequences of

excess alcohol consumption, and community resources for substance abuse. Presentations were given in Spanish at 3 MSFW communities.

Conclusions Workers displayed minimal understanding of safe drinking practice, and often quantified ‘problem drinking’ by the consequences that followed. MSFW populations are at high risk for alcohol abuse. Studies have shown that up to 80% migrant workers drink in excess, and 39% showed signs of alcohol dependence.

Culturally sensitive educational and SBI programs have been shown to be a successful means to educate MSFW populations and reduce unhealthy alcohol use. FHC Outreach will continue to utilize developed material to promote safe drinking with MSFWs in the county, and develop the *Promotores* program to include alcohol SBIs.

166 AN INNOVATIVE HEALTH AND SCIENCE ENRICHMENT PROGRAM FOR MIDDLE SCHOOL STUDENTS

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10.1136/jim-2016-000365.166

Purpose of Study The objective of this study is to evaluate the effectiveness of a highly interactive program in garnering the interest of middle school students towards health and science careers.

Methods Used The Health and Science Enrichment Summer Academy’s curriculum is based on a cascading mentorship model in which school of medicine faculty mentor medical students, who in turn mentor college and high school students, who mentor middle school students. The interactive workshops include a research project, pig dissection, patient -doctor communication, bedside ultrasound, radiology lectures, and simulation. A feedback questionnaire was distributed at the end of the program.

Summary of Results Of 28 middle school students who participated in the 2016 summer program, all 28 completed the questionnaire. The feedback evaluation results are summarized in the table below. When asked if the program was effective in increasing their interest toward health and science careers, 100% of the participants gave a positive response. Qualitative comments from the middle school students included: “*I learned more information in one day of this program compared to what I learned in one year of school*”, “*I loved the hands-on activities*”, “*The talks could be shorter*”. The coaches expressed that the experience was very fulfilling and they would love to come-back again and serve as a mentor for the program.

Abstract 166 Table 1

Workshop Name	Rating (out of 5) N=28
Research Laboratory	4.32
Beside Ultrasound	4.5
Intubation and Lumbar Puncture Simulation	4.93
Radiology Lecture	4.29
Pig Dissection	4.87
Patient-Doctor Communication	4.71

Conclusions The Health and Science Summer Academy at UC Irvine School of Medicine was very effective in increasing the interest of middle school students towards health related careers. The workshops with highly interactive and hands-on nature were more popular. The replication of this program in other institutions could encourage a larger population of youth at different levels of education to enter health and science fields. Long term data will be collected to measure the impact of the program on future career choices of the participants.

167 ASSESSING PATIENTS’ UNDERSTANDING OF A HEALTH EDUCATION PROGRAM IN GHANA

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10.1136/jim-2016-000365.167

Purpose of Study This study investigates the effectiveness of a health education talk given to patients at eye care camps in Ghana. The talks go over the basics of eye diseases, their management, and the use of eyeglasses and medicine. The importance of these talks is to better inform patients about their eye care options, and spread awareness about Western-based eye care in communities with a high prevalence of traditional and herbal medicine use.

Methods Used Talks were evaluated through participant’s understanding of survey questions which were given in an interview format. 160 participants were interviewed at the outreach camps that were conducted either by Crystal Eye Clinic and St. Thomas Eye Clinic. All participants at Crystal Eye Clinic received a health education talk before care was given (n=77), while those at St. Thomas Eye Clinic only received eye care (n=83).

Summary of Results St. Thomas Eye Clinic patients reported an overall lower comprehension for the health education material, scoring lower in 8 of the 11 questions. 20% fewer participants from St. Thomas Eye Clinic knew how to properly handle a chemical eye spill. Only 2% of participants from St. Thomas Eye Clinic were able to correctly explain what cataract surgery involves, compared to 21% from Crystal Eye Clinic. As well, less than 35% of St. Thomas Eye Clinic’s participants thought that eye drops were needed after cataract surgery, while 70% Crystal Eye Clinic patients agreed to this statement.

Conclusions The differences in responses between the two patient groups stress the importance of the health education talk at these eye camps. Without proper education, poor compliance and risky behaviour can lead to major complications in the eye care management of patients.

168 FOOD NICKEL CONTENT AWARENESS SURVEY

Rasmussen A, Rundle CW, Parker JK, Eng DJ, Bergman D, Jacob S. *Loma Linda University, Loma Linda, CA.*

10.1136/jim-2016-000365.168

Purpose of Study Worldwide, nickel is the most common metal allergy causing allergic contact dermatitis (ACD) costing an estimated \$5.7 billion annually in the US. Sensitization is believed to be increasing and with that consumer awareness of the problem. The role of systematized

exposure is unclear, yet low nickel diets have been reported to reduce frequency and severity of hand eczema flare-ups in Systemic Contact Dermatitis (SCD), a subset of ACD, following an oral dose-dependent relationship. Research is needed to assess the public's awareness of the problem and public practices. This study aimed to evaluate public awareness regarding nickel content in foods and the extent of dietary avoidance as a treatment intervention for presumed Systemic Contact Dermatitis (SCD).

Methods Used An assessment survey tool was created to identify respondents with allergic dermatitis that had knowledge about nickel content in food and whether they practiced dietary restriction. Canvassing methods included in person surveying at public venues, online postings on sites including Reddit and Facebook, health care provider engagement and survey distribution (dentists, physicians and dietitians), and college professor distribution to classes.

Summary of Results A total of 2300 responses were received. It was found that overall 39% (322/825) of those allergic to nickel surveyed were aware of nickel's presence in food. A total of 13% (108/825) of those allergic to nickel purposefully avoided foods high in nickel, 76% (82/108) contacted through online sources. Overall, participants following a low nickel diet consistently listed foods known through the literature to be high content including chocolate (52%, 56/108), nuts (32%, 35/108), soy (28%, 30/108), canned foods (23%, 5/108) and beans (24/108). Less frequently mentioned were food preparation methods, such as cooking acidic foods in stainless steel cookware or drinking/using tap water in food preparation.

Conclusions Results indicate the need for increased patient education concerning nickel content in foods, especially for those with recalcitrant ACD and the high rate of responses from online sources suggest social media and forum sites may prove effective means of disseminating educational information.

169 FROM FARMERS TO CHILDREN: INCREASING FRUIT AND VEGETABLE CONSUMPTION AMONGST THE WIC POPULATION IN WHITE SALMON, WASHINGTON

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10.1136/jim-2016-000365.169

Purpose of Study "From Farmers to Children" program seeks to increase fruit and vegetable consumption amongst the Women, Infants, and Children (WIC) population by improving the Farmers' Market Nutrition Program (FMNP) check redemption rates in White Salmon, Washington. In 2014, only 51.9% of FMNP checks issued were redeemed in Klickitat County overall. Though the area recently has been getting an influx of retired people, the county has 23% of its children living in poverty, and 59% of infants born in the county are served by WIC.

Methods Used Conversations with the Public Health Department showed that the county had a very diverse population from low-income farmworkers to wealthy outdoorsmen. Among those that were in need was the WIC clientele, who were not redeeming their FMNP checks and thus not getting \$20-worth of free fresh produce. A

literature search showed that combining both education and financial incentives led to the greatest increase in consumption of and positive behaviors towards fruits and vegetables. When interviewed, WIC clients expressed little experience with farmers' markets.

Summary of Results A proposal was made to provide an educational component to WIC clients along with the FMNP checks. The county Health Educator and WIC Coordinator expressed concern about the feasibility of having physical classes, so it was decided that an educational video about farmers' markets and how to use the FMNP checks would be created. The YouTube video showed what the local White Salmon Farmers' Market was like, how to use the checks, and why fresh produce was beneficial to one's health. The finished video, literature review, and the project proposal were given to the community partners for community implementation.

Conclusions "From Farmers to Children" was successfully started with the appropriate educational materials and future direction. The Klickitat County Public Health Department was very receptive to the idea of an educational video and began advertising it in on their WIC homepage. The video link will be given to WIC clients to increase their awareness of farmers' markets and show how easily their checks could be used there. To expand this project, FMNP checks will be more regularly given to the WIC clients as well as implementing more children's activities at the market.

170 STRENGTHENING MEDICAL HOMES FOR CHILDREN WITH DOWN SYNDROME: PARENT AND HEALTH CARE PROVIDER FOCUS GROUPS

Manalo R, Der D, Singh B. *UCSF Fresno, Madera, CA.*

10.1136/jim-2016-000365.170

Purpose of Study To investigate barriers to health care access facing children with Down syndrome by conducting focus groups with both parents of children with Down Syndrome and their primary care providers in the San Joaquin Valley.

Methods Used Focus group interviews were conducted with adult caregivers of Down syndrome children, with participants recruited by study researchers, designated research staff, and via flyers posted on the Down Syndrome Association Facebook Group. Primary care providers were recruited through email or in-person. Guiding questions were developed based on Social Cognitive Theory and a Down syndrome literature review. Questions explored parental and provider perceptions of social support, expectations, and barriers to health care access. Group discussions were facilitated by a trained moderator and recorded. Demographic data were tabulated and frequencies calculated.

Summary of Results Most care providers felt their primary care providers were attentive to their needs and were up to date with current Down syndrome health supervision guidelines. Nearly all families were involved with Down syndrome support groups. Care providers concerns included improving both pre- and post-natal counseling about the diagnosis, the lack of a "one stop shop" in which

patients could receive multidisciplinary care, the limited access to mental health care for the developmentally disabled, and the ultimate transition to adult care. Barriers to care included limited transportation, behavioral issues of the child, and work/family obligations. An additional concern noted by primary care providers was the challenging issue of addressing caretaker concerns and emotional needs due to time constraints. Primary care providers felt that the integration of a Down syndrome checklist into the electronic medical record would improve patient care.

Conclusions The focus group interviews highlight the importance of comprehensive family-centered care for children with Down syndrome and identifies the critical need to improve access to appropriate mental health programs for the developmentally disabled. It also highlights a need to create one-stop shops (e.g. medical homes) that can provide the multidisciplinary care that these patients and their care providers require.

Gastroenterology

6:00 PM

Thursday, January 26, 2017

171 GIANT RECTAL TUBULOVILLOUS ADENOMA IN A PREGNANT FEMALE

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10.1136/jim-2016-000365.171

Case Report Villous adenomas of the colon have been reported to cause secretory diarrhea. They typically present in the fifth decade and rarely below the anal verge. This case describes a 26 year old G1P0 patient with intrauterine pregnancy at 8 weeks gestation who presented with chronic constipation and bloating for one week. Vaginal examination was positive for a large swelling in post cul-de-sac with tenderness to palpation, and rectal exam was limited due to the presence of a large mass in the rectum. Potassium was found to be 1.9 mEq/L, EKG significant for U waves. The frequency and volume of the diarrhea caused her to have severe hypokalemia, contraction alkalosis and hyponatremia. Her electrolytes were repleted and she was subsequently discharged home. The patient returned one week later with the same complaints. The physicians provided her with the same electrolyte replacement therapy discharged her from the emergency room. It wasn't until her third admission that the gastroenterologist was consulted and a bedside sigmoidoscopy revealed a large rectal mass involving the entire rectal lumen at the anal verge. MRI of the pelvis was positive for colonic mass measuring 12.5×8.3 cm in diameter. CEA, CA-125 and CA19-9 were found to be normal. Patient continued to require daily replacement of potassium until postpartum resection of the mass. Low resection of the primary rectal tumor with anastomosis and colostomy and mucus fistula was performed. A 13.2×13.0×2.5 cm polypoid tumor was removed and biopsy confirmed villous adenoma with low grade dysplasia. Villous adenomas arising from the anal canal are extremely rare. Most cases described are squamous cell or basal cell in origin. This case describes an atypical presentation of a secretory villous adenoma in the sense that our

patient is considerably younger when compared to other published case reports. Furthermore, it highlights the importance of considering a gastrointestinal pathology in the work up of patients presenting with a history of GI symptoms and unexplained electrolyte disturbances.

Health Care Research

6:00 PM

Thursday, January 26, 2017

172 CAN PROXIMAL FIBULAR FRACTURES BE IDENTIFIED WITH ULTRASOUND BY NOVICE USERS IN THE ANATOMY LAB

Abu-Alya A, Chen W, Wang D, Herrin S, Benninger B. *Western University of Health Sciences, Lebanon, OR.*

10.1136/jim-2016-000365.172

Purpose of Study Proximal fibular fractures (PFF) occur most often with other lower limb injuries, but frequently reported overlooked during initial physical examination (>11% of cases). Ultrasound (US) has been found to identify fractures in long bones. The objective of this study was to investigate if medical students without previous US experience could identify PFF with variable probes on embalmed cadavers.

Methods Used Literature search was conducted regarding US diagnosis of PFF on embalmed cadaveric specimens. Fukuda Denshi and eSoate ultrasound systems were used with a novel SonicEye finger probe (SFP) and an eSoate 18 MHz classic linear probe (CL). 10 embalmed cadavers (n=18 sides) were imaged by 10 novice participant (NP) medical students (n=360 trials). These students had dissected the leg with no previous experience with US but had US tutorial. Students initially used the SFP on the first pass and the CL on the second. Trial 2 included 6 other NP who performed US on 2 sides with significant displacement on one side (with US tutorial). Trial 3 included 10 novice participants who performed US on 2 sides with moderate displacement (no US tutorial).

Summary of Results Literature search revealed no known studies. Trial 1 SFP demonstrated higher sensitivity and specificity vs. CL (SFP sensitivity: 56%, specificity: 76%, CL sensitivity: 35%, specificity: 68%). Trial 2 demonstrated 66% sensitivity and 100% specificity (4/6 TP, 6/6 TN). Trial 3 demonstrated 100% false positives using CL and SFP. Students omitted fractures better than identifying them. Trial 1 favorable results of SFP may have been due to control by placing their hand in a particular position allowing stable image acquisition. CL was prone to movement with slight body changes from users rendering it less stable acquiring images. Although CL was expected to reveal better results, SFP was favorable. CL has a wider footplate for viewing compared to SFP, which has a relatively narrower footplate. This may explain the better stability of image acquisition by the SFP. Trial 2 revealed successful results from an US fracture tutorial. Trial 3 demonstrated effectiveness of brief US tutorial.

Conclusions This study revealed true first time US users could identify proximal fibular fractures favoring SFP when preloaded with US tutorial.

173 ULTRASOUND AS A TEACHING TOOL FOR DISTAL RADIAL FRACTURES FOR MEDICAL STUDENTS DURING ANATOMY DISSECTION LAB

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10.1136/jim-2016-000365.173

Purpose of Study Many believe there are four relatively commonly recognized types of distal radius fractures (DRF); Colles' (CF), Reverse Colles' or Smith's (SF), Chauffer's (ChF), and Barton's (BF). These fractures, by most students and qualified physicians, are loosely identified as CF due to their semblance. However, a CF is defined as a fracture 2.5 cm proximal to the distal end of the radius. X-rays have been the protocol for presentations of DRF to emergency services, but ultrasound (US) has been proven to be effective in identifying fractures. The objective of this study is to determine whether 1st year medical students (MS1) are able to perform US on the distal radius to identify DRF.

Methods Used First-year medical students (MS1) were introduced to the DRF types via means of lecture, x-rays, CT, and CT-3D. Fractures were induced on undissected cadaveric tissue. MS1 were taught to identify fractures using US, then asked to use 5–12 and 18 MHz probes to identify specific DRF's. Results for DRF's were recorded as true positives (TP), true negatives (TN), false positives, and false negatives.

Summary of Results Literature search revealed no known studies. 17/18 MS1 were able to identify TP and TN of DRF. Presentation of DRF to emergency care are frequent, and are often diagnosed and treated as a CF. Using US during patient triage or early admission may facilitate speedy diagnosis and appropriate care of the specific DRF. Not only will this decrease patient wait time, US may better achieve differential diagnosis as a conjunct imaging technique.

Conclusions This study revealed that MS1 were able to use US to identify TP and TN of fractures on the distal radius.

174 HEALTHCARE WORKER HAND HYGIENE IN A RURAL UGANDAN HOSPITAL – WHAT ARE SOME WAYS TO CLEAN-UP COMPLIANCE?

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10.1136/jim-2016-000365.174

Purpose of Study Healthcare associated infections (HAI) occur in multiple healthcare settings, with the highest rate of infections occurring in developing nations. Hand hygiene (HH) plays an important role in reducing HAI. Staff at Soroti Regional Referral Hospital (SRRH) demonstrated an interest in assessing current healthcare worker HH practices. The objective of this study was to assess the perceptions and practices of healthcare worker HH and to identify methods to maximize HH compliance in low-resource settings.

Methods Used A prospective, observational study on the current hand hygiene practices was conducted at SRRH in

Soroti, Uganda. The WHO Clean Care is Safe Care Tools for Evaluation and Feedback were utilized to assess healthcare professional HH compliance, ward infrastructure, and perceptions regarding hand hygiene. Semi-structured interviews were also conducted on a convenience sample of healthcare workers, aimed at identifying themes around barriers to HH performance and to attempt to identify areas of improvement.

Summary of Results In total, 50 healthcare workers were surveyed and 76% identified that they received formal HH training in the last 3 years and 48% reported using alcohol hand sanitizer on a regular basis. Despite this, 66% acknowledged that HH was a high priority in their job, however, 70% noted that performing HH was a big effort. Observed HH was completed appropriately in 11% of situations. Nurses had an observed HH compliance rate of 18%, compared to 5% for physicians. In addition, 16 participants were interviewed and thematic analysis identified that high patient-load, access to sinks with clean/running water, and access to alcohol hand sanitizer were major barriers to performing HH.

Conclusions Many healthcare workers recognize the importance of HH in preventing HAI. Despite this, HH compliance remains low in many clinical settings. This study identifies areas of improvement, including increasing access to sinks with clean water and alcohol hand sanitizer, as well as reducing patient load for individual healthcare worker.

175 7D INTERACTIVE ULTRASOUND SOFTWARE PROGRAM CAN TUTOR NOVICE USERS THREE CLINICALLY IMPORTANT UPPER LIMB STRUCTURES DURING ANATOMY DISSECTION COURSE

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10.1136/jim-2016-000365.175

Purpose of Study Ultrasound (US) is increasingly being applied for life-threatening diagnosis of the cavities; however, there are numerous accounts of everyday musculoskeletal (MSK) complaints. This study investigated if the 7D US educational software could train future US users on three clinically important upper limb structures.

Methods Used Literature search was conducted to find MSK US educational software use while teaching anatomy. The 7D Imaging interactive educational software (mskNAV) was available to 50 students to navigate through the proximal upper limb during a two-week period while dissecting the shoulder to hand region. Students were asked to study the shoulder region (supraspinatus), elbow region & wrist (neurovascular structures) and the cortex layer of radial and ulnar bones. The students were evaluated on US machine use, probe skill, structure identification, clinical application and didactic knowledge. Fukuda Denshi UF-760AG ultrasound machine with SonicEye finger probes was used.

Summary of Results Literature search revealed no known studies with interactive MSK US software. Students scored an average of 86% when evaluated on all aspects of the US examination (machine & probe use, structure identification and clinical relevance). Medical students and residents are

keen to learn MSK US techniques but there are not enough qualified users to instruct them. There is a great need for interactive US education software that allows comprehensive self-teaching. This study used the mskNAV iPad app to assess whether students can acquire ultrasound skills and knowledge during an anatomy course. Three upper limb regions highlighting a common tendon injury (supraspinatus), important neurovascular injury site (brachial artery, median & ulnar nerve), and common fracture (distal radial & ulnar cortex) were successfully identified following anatomy dissection and 7D US software.

Conclusions This study revealed the interactive upper limb mskNAV module was successful in integrating US skills and anatomy teaching with relevant structures and important clinical applications.

176 INTEGRATING CLAY MODELS, X-RAYS, DISSECTION, CT, SECTRA AND ULTRASOUND TO UNDERSTAND COLLES FRACTURE MORPHOLOGY ENHANCING POINT OF CARE USE BY MEDICAL STUDENTS DURING ANATOMY DISSECTION LAB

Johnson J, Benninger B. *Western University of Health Sciences, Lebanon, OR.*

10.1136/jim-2016-000365.176

Purpose of Study Abraham Colles was an innovative physician with treatment modalities ahead of his time. In 1814 he describes a distal radial fracture (DRF) 3.81 cm (1.5 in) proximally from the distal radial end with dorsal angulation. Ultrasound (US) is effective in identifying fractures. Colles fracture (CF) accounts for 70% of DRF. Despite how common CF occurs, few providers can accurately describe it. The objective of this study was to integrate multiple mediums of CF teaching medical students while integrating US.

Methods Used Literature search was conducted regarding teaching CF (morphology, triage, diagnosis, treatment). 6 mediums of CF were taught during anatomy lab. Sculpted clay models revealed shape of CF with dorsal angulation. An X-ray of CF was followed by CT scan augmenting CF morphology. CT file was uploaded into SECTRA visualization table rendering a 3D interactive image. Dissections (n=42 wrists) of forearm and wrist was completed. US conducted using 5–12 and 18 Mhz probes identifying radial cortex in healthy individuals and cadavers. Medical students (MSt) were exposed to all 6 mediums in formal tutorials during anatomy dissection lab. MSt were formally assessed and filled out a Likert scale regarding usefulness of 6 mediums.

Summary of Results Literature search revealed several studies on diagnosis, treatment and CF outcomes. A study by the authors teaching CF morphology with US during anatomy dissection was noted. MSt were exposed to formal tutorials during dissection lab with autonomy to access to all mediums 24/7. Assessment revealed 89% of MSt understood CF morphology. Likert scale was 4.6 from questions regarding usefulness of the 6 mediums. CF frequently present to emergency departments and take an average of 6–10 hours from triage to treatment prior to discharge. This study looked at teaching the morphology of a CF during anatomy course using six mediums to aid understanding of CF in 3D. Likert scale confirmed MSt appreciated the chronological order of clay models, X-rays, CT, dissection, 3D-CT and US.

Conclusions This pilot study integrated multiple mediums to facilitate understanding CF and using US for triage, diagnosis and management to expedite patient care and quality.

177 WHAT ATTRIBUTES DEFINE EXCELLENCE IN A TRAUMA TEAM – A QUALITATIVE STUDY

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10.1136/jim-2016-000365.177

Purpose of Study Hospital trauma teams consist of a diverse spectrum of healthcare professionals who work together to deliver quality care. While a well performing trauma team is often believed to be self-evident, little is objectively known about the personal and professional characteristics associated with quality care in a trauma setting. The purpose of this study is to determine the traits and characteristics deemed of greatest value for trauma team leaders and team members. Together, these attributes will define what characteristics are necessary to create a “good” trauma team.

Methods Used Semi-structured interviews were conducted with purposefully selected trauma team leaders and trauma team members at a tertiary, urban Canadian trauma center. Standard qualitative research methodology was utilized. Thematic saturation was achieved after 5 interviews, and 5 further interviews were conducted to ensure a breadth of trauma care disciplines were included. Interviews were recorded, transcribed, and analyzed via an inductive analysis approach.

Summary of Results A total of 6 attributes were identified to be of greatest value for trauma team leaders. These attributes are: communication, role clarity, experience, anticipation, management, and decisiveness. A total of 4 attributes were identified to be of greatest value for trauma team members. These attributes are: engagement, efficiency, experience, and collaboration. We further characterize the language, defining the ranking of performance for each of these attributes.

Conclusions The results of this qualitative study involving an experienced and diverse spectrum of trauma team practitioners provides unique insight in identifying characteristics that are critical to establishing a “good” trauma team. These findings are useful to inform future trauma quality determination, education of trauma practitioners, and continuing medical education assessment tools. Future directions for this study include conducting a quantitative investigation using discrete choice experiments (DCE) with a larger sample size of trauma team practitioners.

178 CAN MEDICAL STUDENTS VISUALIZE THE VOLAR PLATE OF THE FIRST METATARSOPHALANGEAL JOINT IN CADAVERS AND HEALTHY VOLUNTEERS USING HIGH-FREQUENCY ULTRASOUND PROBES

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10.1136/jim-2016-000365.178

Purpose of Study First metatarsophalangeal (MTP) joint injuries significantly affect the standard and longevity of

play by professional and aspiring amateur athletes. Work-related injuries affecting the 1st MTP joint causes significant debilitation and loss in work hours. The anatomy of this injury is not understood as well as it could be. The objective of this study was to assess whether the volar plate of the 1st MTP could be identified in cadavers and healthy volunteers using ultrasound (US) for volar plate anatomy.

Methods Used Literature search was conducted to evaluate texts, atlases and journals regarding 1st MTP anatomy and ultrasound thereof. Classic 5–12 MHz, 18 MHz and SonicEye finger probes were used with Fukuda-Denshi and eSoate systems. Unembalmed (n=4sides), embalmed (n=20sides) and young healthy volunteers (n=68sides) were assessed. Ultrasound protocol consisted of palpating MTP joint, placing probe transversely, identify sesamoids, fan probe to identify joint space and volar plate.

Summary of Results Literature search revealed no known studies. 2 medical students averaged 17/20 volar plate US acquisitions using a classic 5–12 MHz probe, 18/20 with SonicEye finger probe followed by dissection and 18/20 with 18 MHz probes (64/68 seen in live subjects). All volar plates were identified on unembalmed donors. Search revealed inconsistent anatomy and one study from one of the above authors using 5–12 MHz probe to identify volar plate. It was positive for a few studies using US to view the volar plate, however, no cadaver studies using 18 MHz probes. We understand the mechanism of injury resulting in turf toe or a hyperextended 1st MTP. Unfortunately, the anatomy is not well delineated around the great toe. CT/MRI scans are prohibitively expensive. This study successfully used variable US probes to identify the volar plate. An 18 MHz high frequency MSK probe and a finger probe appeared most successful. This may have been due to the shorter footplate crystal layout versus the longer footplate of the classic 5–12 MHz probe.

Conclusions This study demonstrated volar plate anatomy of the 1st MTP can be identified on cadavers and healthy volunteers using variable probes. This could lead to improved diagnosis and management.

179 SECONDARY ANALYSIS OF 15 CLINICAL PERFORMANCE MEASURES OF THE FEDERALLY QUALIFIED HEALTH CENTER OF A LOCAL HEALTH DEPARTMENT IN SOUTHERN CALIFORNIA

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10.1136/jim-2016-000365.179

Purpose of Study Federally Qualified Health Centers (FQHC) are required to report annually to the Health Resources and Services Administration (HRSA) on their progress on 15 clinical performance measures. This study further examines the data reported collectively by the four clinic sites of a local health department's FQHC in Southern California to identify gaps in performance and formulate recommendations for improvement.

Methods Used As most reported measures were based on samples of 70 patients or less, we first calculated confidence intervals around the reported estimates, and assessed

whether they included the HRSA target. When relevant, we calculated the various components of the measures to highlight services that determine the gap in performance. For each measure, we then merged individual level data used in 2015 with corresponding data on age, gender, ethnicity, zip code of residence, insurance and clinic location. We performed relevant cross-tabulations and tests of significance. We identified overall and clinic-specific trends in performance using the data reported to HRSA since the beginning of the FQHC in 2012. Finally, for selected measures, we calculated the distribution of the patient population of each clinic by their zip code of residence and prepared the corresponding choropleth maps of San Bernardino County.

Summary of Results In 2015, the FQHC met the HRSA target in five measures, and demonstrated improvement in performance in eight measures as compared with 2014. Two clinics performed significantly better in four measures and the two others performed significantly better in only one measure. Ethnicity made a statistically significant difference in four measures, while gender did not have any significant effects on performance. Decomposing measures in their components provide valuable insight on the specific elements of the related service that can be improved.

Conclusions One of the main goals of HRSA's health center program is to ensure the quality and equity of primary care services. The 15 clinical measures that HRSA requires FQHCs to report on provide valuable assessment of their performance. FQHCs can gain more insight on their performance by performing additional analyses of the data they already collect and report to HRSA.

180 EFFICACY OF VARIOUS MODALITIES OF DATA COLLECTION FOR CONTACT DERMATITIS SURVEY

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10.1136/jim-2016-000365.180

Purpose of Study To compare the efficacy of surveying methods (face to face versus internet based) with a nickel contact dermatitis survey.

Methods Used Wufoo-Survey Monkey Inc. was utilized to create a questionnaire to explore several aspects of patients' nickel contact allergies/reactions and how they received access to the survey. The survey was distributed through medical and dental offices/libraries/cafes, canvassed face to face at public venues and university classrooms, presented on free access websites (Loma Linda University's webpage, Nickel Allergy Alliance webpage www.contactderm.net), and posted on Facebook, Reddit, Instagram and Twitter.

Summary of Results More than twenty-three hundred surveys were completed. Of the forty different methods utilized, the most efficacious were: Facebook (21.4%), Reddit (20.8%), paper flyers (15.3%) and classroom surveys (13.4%); less efficacious were the LLU webpage (5.9%) and friends and family (2.2%). The remaining 18.2% were collected from over 20 other methodologies termed "miscellaneous," which included various webpages and journal publications hosting the survey. Surveys collected from

Reddit were posted in forums and approximately 30–50 surveys were filled out over the following seven days. To provide incentives for survey completion, a \$25 gift certificate drawing was provided. Classroom sizes varied between 50–200 people and had greater than 90% response rate. Face to face survey allowed for consumer interaction and education. However the rate of survey completion averaged 5 surveys/hour.

Conclusions Overwhelmingly, online media sources prevail in survey acquisition possibly suggesting an access point to better engage and educate our patients. Distribution of hard copy surveys still comprises a significant portion of overall results, but more time consuming. While legislative safe use guidelines are needed to help protect consumers from nickel exposure, educating patients is equally important. Of those surveyed, 31% obtained their medical information from doctors, 30% from the internet and 21% from friends and family. As seen with survey acquisition, the internet serves as an important tool in outreach and the education of patients.

181 PERCEPTIONS AND ATTITUDES TOWARDS CHILDREN WITH HEARING AIDS

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10.1136/jim-2016-000365.181

Purpose of Study Hearing aids are critical for the normal development of hearing impaired children; however, stigma has played a major role in why patients reject their use. Research since the 1970s has reported overall negative impressions when adults and children rated images of kids wearing hearing devices. This may lead to negative psychosocial consequences in terms of bullying and lower self-esteem for hearing impaired children. As wearable technology becomes increasingly ubiquitous, we hypothesize there is likely to be a trend in greater acceptance towards children with visible hearing devices. In this prospective cross-sectional study, we investigate the perceptions of non-hearing impaired children and parents towards children with and without visible hearing aids.

Methods Used 6 subjects (3 male, 3 female) of 3 different ethnicities between the ages 8–10 were photographed, once wearing a conventional behind-the-ear hearing aid and once not. Subjects were photographed with the same facial expression, angle, and background. A survey was then administered to parents and children in the hospital, who were randomly shown 3 photos, with 1–2 children wearing a hearing aid. They rated the pictures across 5 attributes: healthiness, friendliness, intelligence, happiness, and physical fitness on a 0–100 scale. Participants were not told of the study's true intentions until after completion of the survey.

Summary of Results A total of 216 subjects, 113 parents (mean age 44.2 years) and 103 children (mean age 12.3 years), were enrolled. Children wearing hearing aids were rated more positively than children without across 4 attributes for adults and 2 attributes for children. While statistically significant differences were found in the rating of 3

out of 4 attributes towards children with hearing aids vs. children without in surveyed adults (p-values=0.04, 0.18, 0.006 and 0.04), there were no significant differences in surveyed children (all p-values>0.05).

Conclusions Our study shows a lack of negative bias towards children with visible hearing aids compared to their normal hearing peers. Potential response bias may influence the ratings in adults, although this does not seem to be the case in children. This suggests a trend towards acceptance of children with visible hearing aids in the general population.

182 CAN VARIED HIGH FREQUENCY ULTRASOUND PROBES (5–12, 18, 22 MHZ) USED BY MEDICAL STUDENTS IDENTIFYING THE MEDIAN NERVE IN THE WRIST AND HAND REGION FROM CADAVERS AND HEALTHY INDIVIDUALS

Tran J, Benninger B. Western University of Health Sciences, Lebanon, OR.

10.1136/jim-2016-000365.182

Purpose of Study The median nerve is the most commonly injured nerve in the forearm and wrist region. It anastomoses significantly with the ulnar nerve, affecting innervation patterns to the hand. MRI demonstrates low sensitivity and specificity while ultrasound (US) reveals high sensitivity and specificity for detecting median nerve lesions. The objective of this study was to investigate if medical students (MS) could identify the median nerve using multiple US probes.

Methods Used Literature search was conducted regarding use of US on the median nerve of donor cadavers and healthy subjects by MS. Recently deceased unembalmed donor cadavers (RDUD) received 432 (144 per probe) trials from MS using 3 different US probes (5–12 MHz, 18 MHz, 22 MHz) and 42 trials on healthy individuals. All MS conducted timed trials bilaterally.

Summary of Results Literature search revealed no known studies. 432/432 trials successfully identified the median nerve with all 3 probes (100%). 144 trials with 5–12 MHz probe were more difficult to visualize than 18&22 MHz probes. 42 trials with 18 MHz probe on a healthy individual revealed 33% accuracy on the left side and 52% accuracy on the right. The high-frequency probes allowed MS to identify the median nerve from cadaveric specimens and healthy volunteers more clearly than the 5–12 MHz probe. Carpal tunnel syndrome is the most common nerve entrapment syndrome in the upper limb. Mobile devices have increased prevalence of carpal tunnel syndrome significantly, reported to represent 90% of all entrapment neuropathies. Literature search revealed no known studies regarding MS identifying the median nerve with multiple US probes on RDUD and healthy subjects. US can be used to diagnose carpal tunnel syndrome by assessing the morphologic characteristics and caliber of the median nerve. High frequency US probes can reveal considerable median nerve detail, including its fibers in situ.

Conclusions This study demonstrated MS with novice ultrasound skills identified the median nerve using high-frequency probes (18&22 MHz).

183 FEMALE INJURIES IN COLLEGIATE RODEO ATHLETES

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10.1136/jim-2016-000365.183

Purpose of Study There is very limited research focused on describing injuries occurring to collegiate rodeo athletes, specifically female athletes. The research aim is to provide a descriptive study of injuries occurring within National Intercollegiate Rodeo Association collegiate female athletes.

Methods Used An anonymous electronic survey was sent to 148 NIRA coaches with 36 responses collected.

Summary of Results The most common type of injury reported was strain/sprain (88%) followed by fractures (50%) and concussions (44%). For female athletes, they were sprain/strains (83%), other (19%), which includes tendinous knee, rotator cuff and non-specific muscular injuries, fracture (17%) and concussion (14%). Knee (75%), ankle (67%) and shoulder (67%) were the most common body regions to be injured. Females most commonly injured ankles (64%), knees (53%), shoulders (28%) and other (28%), which includes head, facial, torso and lower-extremity injuries. In contrast to previous studies, the results showed goat tying (83%) was the event associated with the highest number of injuries followed by bull riding (58%), steer wrestling (42%) and bareback riding (35%). Of the 36 respondents, 44% had some form of required fitness element. No significant difference was found between injury rates and the required fitness training element. Of the 56% of coaches that replied to not have a fitness element, 70% reported a required fitness training element would increase overall performance of athletes and the rodeo program.

Conclusions In conclusion, female athletes suffer sprains/strains of the ankle and knee most commonly and are frequently a result of participation in the goat tying event. While this descriptive study provided initial data on female injuries in collegiate rodeo, further investigation of injury patterns and risk-factors are needed for future injury prevention.

184 INTEGRATION OF 3D/4D ULTRASOUND TECHNOLOGY INTO AN ANATOMY DISSECTION LABORATORY WITH 3D VISUALIZATION OF THE THYROID GLAND

Weston C, Benninger B, Carter J, Hocum G, Patel A. *Western University of Health Sciences, Lebanon, OR.*

10.1136/jim-2016-000365.184

Purpose of Study Innovative surgeons are successfully utilizing 3D/4D ultrasound (US) imaging of the thyroid gland (TG) preoperatively. Benefits of visualizing volume and structure of TG can influence a surgeon's approach and procedure to diminish unexpected scenarios. Anatomy aids to better understand clinical imaging modalities to navigate surgical and invasive procedures. The objective of this study was to investigate perceptions of first-year medical students regarding integration of 3D/4D US visualization of spatial anatomy of TG during anatomy.

Methods Used 123 first-year medical students were introduced to 3D/4D US imaging of TG through detailed a 20-minute tutorial taught in small groups. Students

practiced 3D/4D US imaging on volunteers and donor cadavers before assessment through acquisition and identification of TG on at least 3 instructor-verified images. After the tutorial, students practiced via peer-to-peer teaching averaging 20–40 minutes of probe time. Each student experienced an estimated hour of passive learning during this time from watching peers perform 3D/4D imaging on each other. Post-training survey was administered assessing student impression about 3D/4D US.

Summary of Results All students visualized TG using 3D/4D US. Students revealed 88.0% strongly agreed or agreed 3D/4D US is useful revealing TG and surrounding structures and 87.0% rated the experience “Very Easy” or “Easy”, demonstrating benefits and ease of use including 3D/4D US in anatomy courses. Students felt 3D/4D US was useful teaching structure and surrounding anatomy of TG, 90.2% responded “Strongly Agree” or “Agree”. 18 of the 123 student participants were assessed in an medical anatomy laboratory examination setting, where 89% of the students were able to correctly image and identify TG using 3D/4D US. Students thought the 3D/4D probe was useful in learning the anatomy, but not easier to use compared to 2D probe.

Conclusions This study revealed 3D/4D US was successfully used and preferred over 2D US by medical students during an anatomy dissection course to accurately identify TG. Additionally, 3D/4D US may nurture and further reinforce stereospatial spatial relationships of TG and other head-neck structures taught during anatomy dissection.

Hematology and Oncology

6:00 PM

Thursday, January 26, 2017

185 HERPES SIMPLEX VIRUS TRIGGERING HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS

Averitt G, Averitt T, Howard K, Al-Rahawan MM, Levent F. *TTUHSC, Lubbock, TX.*

10.1136/jim-2016-000365.185

Case Report We describe a case of neonatal herpes simplex virus type 2 (HSV-2) which we suspect triggered hemophagocytic lymphohistiocytosis (HLH). Hemophagocytic lymphohistiocytosis is a life-threatening condition caused by uncontrolled activation of the cellular immune system which can lead to multisystem inflammation, organ failure, or death if untreated. We present a six-day-old African American term male with neonatal fever in the setting of elevated liver function tests, who was otherwise asymptomatic. He was started empirically on ampicillin, cefotaxime, and acyclovir after cultures were obtained. All cultures were negative; however, blood HSV-2 PCR and maternal testing later confirmed the diagnosis of disseminated HSV-2 infection. He developed significant pancytopenia on day three of treatment, and his condition rapidly deteriorated with hypothermia, bradycardia, and respiratory distress requiring mechanical ventilation. He also developed significant disseminated intravascular coagulation requiring multiple blood product transfusions. Because of his deteriorating status,

despite appropriate antiviral treatment, and extreme hyperferritinemia, HLH was considered. Our patient fulfilled 4 of 8 diagnostic criteria for HLH (5 required for diagnosis): fever, cytopenia, hypofibrinogenemia, and ferritin greater than 100,000 µg/L. Due to high suspicion for HLH and worsening clinical status, treatment was started with dexamethasone, and later etoposide when the patient did not respond to dexamethasone. Further diagnostic studies for HLH were performed: Bone marrow biopsy did not reveal hemophagocytosis. Soluble IL-2 and NK cell activity were below diagnostic thresholds. Molecular studies for familial HLH had variants in two of the familial HLH genes; however, the clinical significance of this is unknown. Despite maximal treatment, the patient continued to decline with multi-organ failure, and expired after fifteen days of hospitalization. The common signs shared between overwhelming infection and HLH may result in under-diagnosis of HLH. An elevated ferritin level greater than 10,000 µg/L is more than 90% sensitive and 96% specific for HLH while some other confirmatory tests might be normal. Testing for this disease should be considered when the clinical course deviates from the expected pathogenesis.

186 SEVERE APLASTIC ANEMIA AS A COMPLICATION OF AUTOIMMUNE HYPERTHYROIDISM

Chahal RS, Gupta S, Heidari A, Cobos E. *Kern Medical, Bakersfield, CA.*

10.1136/jim-2016-000365.186

Introduction There is growing evidence that aplastic anemia can develop secondary to insult or injury to the pluripotent stem cell in the setting of a T-cell mediated autoimmune pathology. We present a case in which autoimmune hyperthyroidism associated with severe aplastic anemia achieved clinical remission after treatment of patient's hyperthyroidism with methimazole.

A 29 year El Salvadoran male presented to the Emergency Department in September 2014 with complaint of palpitations, lightheadedness, night sweats, and 50 lb weight loss over several weeks. Complete blood count showed a white blood cell count of $2.9 \times 10^3/\mu\text{L}$, an absolute neutrophil count of $0.9 \times 10^3/\mu\text{L}$, hemoglobin of 4.9 gram/deciliter, and platelet count of $13 \times 10^3/\mu\text{L}$. Patient's thyroid stimulating hormone was noted to be less than 0.01 µIU/mL and free T4 of 2.2 ng/dL. Thyroid peroxidase antibodies were 187 IU/mL and thyroid stimulating immunoglobulins were noted to be 419. A radioactive thyroid scan was positive for multiple goiters consistent with hyperthyroidism. Bone marrow biopsy was performed and was consistent with less than 5% cellularity, flow cytometry for CD55/CD59 was negative. Patient was started on methimazole 2.5 mg by mouth three times daily and was discharged with outpatient follow-up. During evaluations in December 2014 and January 2015 patient experienced improvement in all hematopoietic cell lineages and experienced a weight gain of 36.5 lb along with complete resolution of his clinical symptoms without any treatment of his aplastic anemia. Patient was subsequently lost to follow-up and discontinued methimazole. Patient experienced a relapse of his clinical symptoms in July 2016 with a decrease in all cell lineages.

Discussion T-cell mediated autoimmune pathology has been hypothesized to play a central role in the pathogenesis of both hyperthyroidism and aplastic anemia. The presence of autoantibodies against stem cell antigens has been proposed as a mechanism to explain correlational relationships between aplastic anemia and autoimmune diseases including hyperthyroidism, hypothyroidism, celiac's disease, and autoimmune hepatitis. It is our contention that treatment of the underlying autoimmune phenomenon may induce remission of aplastic anemia.

187 CATASTROPHIC B12 DEFICIENCY AND PERNICIOUS ANEMIA WITH UNDETECTABLE B12 LEVELS IN A SCHIZOPHRENIC MALE, A CASE REPORT

Chahine H, Ammar A, Cobos E, Heidari A. *Kern Medical, Bakersfield, CA.*

10.1136/jim-2016-000365.187

We present a 45 year old hispanic male with schizophrenia who was brought to the Emergency Department for bilateral lower extremity paralysis, generalized weakness, urinary and stool incontinence for 2 months. He reports to us that he kept to himself in his room for the last 2 months, and that people around him thought for a long time that his symptoms were not legitimate. Upon admission, vitals were within normal limits. Physical exam was significant for scleral icterus, 3+ lower extremity edema to mid-calf and asterixis. Motor exam was consistent with 0/5 bilateral lower extremity muscle strength and 3/5 muscle strength in upper extremities. Patient had decreased positional sense bilaterally in upper and lower extremities

Purpose of Study To present an interesting case of severe B12 deficiency in a schizophrenic male, a patient population in which many reported symptoms are many times not adequately addressed.

Methods Used Case study, statistical analysis was not performed.

Summary of Results CBC was significant for Hb: 4.9 gm/dL, Hct:13.7, Plt: 86000, MCV: 119.0 fl; further workup showed LDH: 2189 U/L, T Bili: 5.1 mg/dl, Bili C: 2.7 mg/dl, Alk Phos:112 U/L AST: 105 U/L ALT: 99 U/L. Patient's peripheral blood smear consisted of immature myeloid shift with severe macrocytic anemia. Iron studies showed Iron 152 ug/dl, TIBC: 158 ug/dl, Ferritin: 675 ng/ml, Transferrin:118 mg/dl, Reticulocyte count: 4.2% Corrected Reticulocyte count:1.28, Haptoglobin: <15, Folate-RBC was 11.9 ng/ml and serum B12 was undetectable.

An MRI of spine showed subacute combined degeneration of the spinal cord most prominent in C2-C7. He was then found to have a positive intrinsic factor autoantibody.

Conclusions Patient was treated with Cobalamin IM 1 g BID and Thiamine 500 mg IV TID×3 weeks before being discharged to a nursing facility on Cobalamin 1000 mg IM weekly. Unfortunately, he had no improvement on his neurological exam on the day of discharge.

Vitamin B12 deficiency should be part of the differential diagnosis for weakness, particularly in those who suffer from mental illness. In many instances, those suffering from psychiatric diseases are dismissed when they report physical symptoms, and in our case, it further prolonged the time to diagnosis, and resulted in what may be irreparable neurological dysfunction and paralysis.

188 CLASSIC KAPOSI'S SARCOMA IN A THAI FEMALE TREATED WITH RADIATION THERAPY

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10.1136/jim-2016-000365.188

Case Report Infection with Human Herpesvirus 8 (HHV-8) is necessary but not sufficient to develop Kaposi's Sarcoma (KS). Risk factors include immunocompromised status and male gender. Thailand has a low prevalence of HHV-8 infection, estimated at 1%, and Kaposi's Sarcoma is exceedingly rare.

An 80-year-old immunocompetent female, born and raised in Thailand, developed purple plaques and papules on her distal extremities shortly after a series of hospitalizations. In March 2016, she presented to the emergency department (ED) with shortness of breath and was found to be positive for human metapneumovirus. She was admitted to the hospital and received a 5-day course of prednisone for acute bronchitis.

Four days after discharge, she was readmitted due to vomiting and weakness, ultimately found to have urosepsis and pre-renal acute kidney injury. It was at this time that she noticed skin changes with an physical exam noting a "faint ecchymosis over the dorsum of the left foot without tenderness."

Two months later, she presented with progression of left foot skin findings: a purple and black plaque with papules on the dorsum of her left foot. A similar plaque now appeared on the dorsum of the right foot, and a purple patch on the plantar aspect of the left foot. The lesions were smooth, non-tender, non-blanching and well demarcated. A July biopsy revealed histology of KS and immunohistochemistry positive for HHV-8. Staging showed no visceral involvement. She was not a candidate for surgical excision or systemic therapy and was referred for palliative radiation.

Photon radiation provided a favorable dose distribution covering the distal left foot to a dose of 20 Gy in 10 fractions. The patient tolerated procedure well with no pain or fatigue. Three weeks post treatment there was blurring of the well-demarcated borders and dulling of purple pigmentation.

This case illustrates Classic KS in an unsuspected patient, due to her origin and female gender, and the value in a thorough physical exam and documentation of notable abnormalities, even if not immediately pertinent. It also reviews treatment options for Kaposi's Sarcoma considering both patient characteristics and disease extent.

189 RARE CASE OF EXTRAMURAL ADENOCARCINOMA OF ANUS

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10.1136/jim-2016-000365.189

Background Adenocarcinoma of the anal canal is very rare with two types, colorectal type vs extramural type which can arise from anorectal fistulae or anal glands.

Objective To present a rare case of extramural adenocarcinoma of anus

Case Report 61-year-old female presented with 6 months progressive abdominal pain with defecation without bleed per rectum. Colonoscopy showed a anorectal lesion and subsequent flexible sigmoidoscopy with Endoscopic Ultrasound showed 2 cm anal mass from the muscularis propria without anorectal fistula, initially thought to be a gastrointestinal stromal tumor. She underwent wide excision and pathology with immunochemistry (IHC) of tumor markers was consistent with invasive adenocarcinoma from anal glands growing from muscularis propria to subcutaneous mucosa, PET/CT scan showed uptake only in anus. One pelvic lymph node biopsy was negative for metastasis. She completed perioperative chemoradiation and then abdominoperineal resection. She was treated with post-operative chemotherapy for 6 months due to high rate of distant recurrence.

Conclusions This is a rare case of extramural adenocarcinoma of anus from anal gland where location of tumor and pathology with IHC can guide to differentiate the type of tumor. This anal gland adenocarcinoma in the absence of fistula showed unique feature of invading the wall of anorectal without intraluminal involvement.

190 RARE PRESENTATION OF METASTATIC PROSTATE CANCER LEADING TO FACIAL NERVE Palsy AND PARANASAL SINUS MASSES

Gupta S, Heidari A, Williams E, Barrett T, Cobos E. Kern Medical, Bakersfield, CA.

10.1136/jim-2016-000365.190

Introduction Prostate cancer is the most common malignancy of males in the United States, and the second leading cause of cancer death. Primary metastases sites of prostate cancer are blastic bone lesions, however rarely there can be metastases to the brain and paranasal sinuses.

Case report A 51 year old Hispanic male presented to the emergency department in January 2015 due to paraspinal pain. Physical examination was significant for thoracic and lumbar spine point tenderness, and enlarged, nodular prostate by digital rectal examination. Initial PSA levels were elevated at 73 ng/mL and elevated alkaline phosphatase of 927 unit/liter. He underwent prostate biopsy, consistent with adenocarcinoma of the prostate, Gleason grade 9. Due to extensive metastases, patient was started on androgen deprivation therapy. Patient showed initial clinical improvement as well as serologic improvement with normalization of PSA and alkaline phosphatase levels 6 months after initiation of therapy. In July 2016 patient presented to the emergency department with worsening right facial numbness, facial asymmetry, right eye pain, right eye diplopia and decreased visual acuity. Neurological examination was notable for right cranial nerve III palsy with moderate to severe right ptosis, limited medial, up and downward gaze and enlarged nonreactive right pupil; right cranial nerve V palsy with decreased sensation; right cranial nerve VII palsy; and right cranial nerve XII palsy with rippling fasciculations of the tongue. PSA was elevated at 377 ng/mL. MRI of the brain showed an enhancing right temporal lobe mass near the right sphenoid wing, multiple enhanced masses in the sphenoid, ethmoid and maxillary

sinuses and an enlarged pituitary gland with associated enhancing mass.

Discussion Prostatic metastasis occurs in 70% of cases with bone being the most common site; however, metastases to the brain and paranasal sinuses are extremely rare. Incidence of brain metastases from prostate cancer is approximately 0.16%. Paranasal cavity metastases are usually associated with renal, breast, thyroid or prostate carcinomas. Brain and paranasal cavity involvement indicate extensive dissemination and palliative therapy is the only possible treatment option.

191 FULMINANT HEPATIC FAILURE FROM AN EXCEEDINGLY RARE CASE OF T-CELL PROLYMPHOCYTIC LEUKEMIA

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10.1136/jim-2016-000365.191

Case Report T-cell prolymphocytic leukemia (T-PLL) is a rare aggressive mature T-cell leukemia that comprises <2% of all adult lymphocytic leukemia. It is generally unresponsive to standard cytotoxic and immunotherapy-based regimens. Clinical presentation is similar to other lymphoproliferative disorders (LPDs), but the immunophenotypic signature is unique. We present a very rare presentation of such a case.

A 70-year-old African American male was referred to a hematology clinic for leukocytosis. The patient was noted to have a WBC count of 14,200 cells/uL with 78% lymphocytes and a hemoglobin of 13.3 g/dL and platelets of 146 million cells/uL. Peripheral blood showed prolymphocytes and flow cytometry was consistent with T-PLL. On evaluation, there was no clinical B-symptoms nor a palpable spleen or lymph nodes. During active surveillance, he presented emergently with a 2-week history of progressive fatigue and malaise. CBC revealed WBCs of 171,000 cells/uL with 85% lymphocytes, anemia and thrombocytopenia. The patient had evidence of tumor lysis syndrome, hepatic and renal injury. Imaging revealed visceral lymphadenopathy, hepatomegaly, and splenomegaly. The patient was treated with alkylating agent bendamustine for 2 days and alemtuzumab 3 times weekly for 6 weeks. Around week five, his liver function deteriorated with his ALT rising to 1,960 IU/L and total bilirubin rising to 4.3 mg/dL. Alternative etiologies were ruled out. The patient eventually became anuric. Imaging showed persistent hepatomegaly and splenomegaly. The patient and family declined dialysis and liver biopsy and the patient passed shortly after from cardiopulmonary arrest.

This patient's clinical course demonstrates the aggressive behavior and progression of T-PLL. Like most other T-cell LPDs, randomized clinical trials are lacking and hence the ideal mode of therapy is not clear. Treating upfront or upon clinical progression is controversial. Alemtuzumab has been shown to provide benefit however allogeneic stem cell transplantation should be offered when possible. Liver failure resulting from T-PLL has been reported in the past, but is confined to a few case reports. We present this case

to highlight the aggressive nature of this disease as well as a unique manifestation of progression.

192 SEVERE PRESENTATIONS OF EPSTEIN-BARR VIRUS ASSOCIATED HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS (HLH) IN TODDLERS

Newman R, Seth R, Abraham S. University of New Mexico, Albuquerque, NM.

10.1136/jim-2016-000365.192

Case Report HLH is a life threatening condition caused by uncontrolled immune activation. EBV is the most common cause of secondary HLH. Here we compare presentations of two EBV related cases of HLH. Patient A had significant hepatic dysfunction and developmental regression CNS positive HLH. Patient B presented with a rare documented skin eruption associated with EBV positive HLH.

Patient A is a previously healthy 20-month-old female who presented with fever, emesis and URI symptoms who was found to have acute liver failure. She had significant CNS involvement resulting in developmental regression with loss of strength, balance, swallow and speech abilities. Her treatment has been complicated by pneumatoxis and several episodes of Klebsiella bacteremia.

Patient B is a previously healthy 21-month-old female who presented with one week of fever and URI symptoms. The patient developed a bullous skin and oropharyngeal mucosal eruption diagnosed as Erythema Multiforme vs. TEN. She was found to have perforated appendicitis and sepsis. There is possible CNS involvement based on MRI brain.

Discussion This case series demonstrates the unusual but severe presentations of EBV associated HLH. EBV appears to trigger a dramatic immune response in younger patients compared to teenagers. Patient A demonstrated significant hepatic and neurologic involvement with developmental regression. Patient B showed significant skin and mucosal involvement. Both patients met the HLH diagnostic criteria and were started on standard HLH therapy with etoposide and dexamethasone and have shown evidence of clinical and laboratory response to treatment. It is crucial to identify these patients early on with the constellation of clinical symptoms and laboratory findings and start treatment in a timely fashion.

Abstract 192 Table 1 Patient Labs

Labs at Presentation	Patient A	Patient B
Age	20 months	21 Months
Ethnicity	Native American	Vietnamese
WBC	3.2	16.1
Hgb	13.3	10.9
Platelets	24	60
PT/INR/Fibrinogen	34.9/3.54/66	15.6/1.25/106
AST/ALT	2294/311	1494/348
Ferritin	29657	102140
LDH	2281	8729

193 CONGENITAL FACTOR XIII DEFICIENCY

Parekh A, Chahine H, Petersen G, Heidari A, Cobos E. *Kern Medical, Bakersfield, CA.*

10.1136/jim-2016-000365.193

Case Report Congenital factor XIII deficiency is a very rare bleeding disorder. Patients with heterozygote Factor XIII deficiency can sometimes exhibit increased bleeding after surgical procedure. Factor XIII also plays a role in maintenance of pregnancy and risk of spontaneous abortion. Hyperhomocystinemia with methyltetrahydrofolate reductase (MTHFR) has been detected in patients with venous thrombosis and recurrent pregnancy loss. We report here a case of a female pregnant patient from Iran with genetic profile positive for heterozygote Factor XIII deficiency and homozygous MTHFR C677T mutation. The patient was placed on prophylactic dose of Lovenox and folic acid throughout her pregnancy and peripartum period. She had an uneventful pregnancy and did not have increased bleeding associated with delivery. This case report takes a look into interpreting the two genetic findings and assesses the precaution that should be taken during pregnancy. Recommendation in management can also be found in this case report.

Infectious Diseases

6:00 PM

Thursday, January 26, 2017

194 LOCUS MINORIS RESISTENTIAE AS CONTRIBUTING FACTOR FOR BILATERAL OLECRANON COCCIDIOIDOMYCOSIS OSTEOMYELITIS

Heidari A, Shah R. *Kern Medical – UCLA, Bakersfield, CA.*

10.1136/jim-2016-000365.194

Case Report We are presenting a case of 18-year-old Filipino male from Delano (San Joaquin Valley of California). He initially developed influenza like illness with fever, body ache, fatigue and dry cough.

Three weeks later he developed generalized “rash” on his hands, forearms and shins. His skin rashes resolved over 2 weeks but cough and fatigue persisted. He started practicing Karate in order to gain more energy about six weeks later and during his practices he traumatized both of his elbows without any skin breaks.

He noticed that his painful elbows became swollen, tender and red over 2 days. Warm compressions and other home remedies for 2 weeks were not helpful. Finally, he went to the emergency department (ED) and diagnosed with bilateral bursitis and received a course of oral antibiotics. Two weeks later without any improvement he noticed skin breaks over both elbows and drainage of purulent discharges bilaterally. This time he came back to ED and he was admitted to the hospital.

The initial imaging revealed bilateral osteomyelitis of both olecranon. This was confirmed with whole body

bone scan. Also he was found to have a large left lower lobe infiltration. He underwent incision and drainage of both elbows. Deep tissue cultures were positive for fungal elements resembling *Coccidioides immitis* bilaterally. Subsequently, microscopic pictures from pathology confirmed existence of spherules with endosporeulation on both sides.

His serologies for coccidioidomycosis, EIA (IgM) and Immuno diffusion, IgM and IgG came back reactive with complement fixation titers of 1:256.

He was initially started on Amphoteric B Liposomal Complex (ABLC). Parenteral ABLC continued for 4 more weeks and changed to oral Fluconazole. He was followed up in the clinic with improvement of his wounds, serology and chest x-ray.

This is an interesting case of bilateral dissemination of osseous coccidioidomycosis due to Locus Minoris Resistentiae due to trauma.

195 DEVELOPING A TAILORED BROCHURE FOR HEPATITIS B PREVENTION AMONG TRANSGENDER WOMEN IN LIMA

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10.1136/jim-2016-000365.195

Purpose of Study In 2008, hepatitis B virus (HBV) accounted for 7% of liver-related mortality in endemic areas of Peru. Transgender women (TW) are a key target group for HBV vaccination due to high risk from unprotected anal intercourse and sex work, but vaccine uptake has been low. The project's goal was to create a tailored brochure that would help educate TW attending the Alberto Barton clinic about their free HBV vaccination program.

Methods Used Because few programs specifically target TW, literature on programs for men who have sex with men provided initial guidance. To adapt this work for TW, a community assessment was conducted. A focus group with 10 TW was held and key informant interviews were conducted with 4 physicians, a medical technologist, and a TW with healthcare experience. Based on this research, a tailored brochure was created to serve as an educational aid for clinic staff. Evaluation consisted of qualitative feedback from a physician who sees many TW and 6 TW who assessed overall presentation, ease of comprehension, adequacy of images, and likelihood to accept vaccination after reading the brochure.

Summary of Results Only 5 of 10 TW who attended the focus group were vaccinated. All were interested in learning more about HBV, since they knew many people affected by HBV. Knowledge of HBV transmission routes and prevention was lacking. Separately, 3 of 6 TW ranked the brochure a 3 on a scale of 0–4, with 4 as the highest score. The provider and the 6 TW all suggested that images be exclusively of women and photos be sexualized, with more images and less writing. After reviewing the brochure, 3 TW said they would like to be vaccinated, 2 wanted more information, and 1 said she would not be vaccinated. Text and images were revised, emphasizing why TW are at risk for HBV. Ninety copies of the revised brochure were printed for use at Barton by the

physician or social workers, to aid in teaching this low-literacy population.

Conclusions To our knowledge, this project is one of the first HBV prevention efforts specifically addressing the TW population. Sustainability relies on the clinic to continue printing brochures and promoting HBV vaccination to TW. In future, community-based health promotion tailored to the needs of this population may begin to address disparities in meeting general health needs of TW.

196 BACTEREMIA CAUSED BY ENTEROCOCCUS AVIUM IN HIV AND PULMONARY COCCIDIOIDOMYCOSIS: CASE REPORT AND REVIEW OF LITERATURE

Parekh A, Petersen G, Heidari A, Williams E. *Kern Medical, Bakersfield, CA.*

10.1136/jim-2016-000365.196

Case Report *Enterococcus avium*, formerly “group Q streptococcus,” is a pathogen regarded as having very low virulence. It is a part of the normal flora often found in the feces of chickens, pigs, and humans. *E. avium* most frequently originates from the biliary tract and abdomen and is associated with a considerable mortality rate. We report here a case of a 35 year old African-American homeless male with HIV and pulmonary Coccidioidomycosis who was not on treatment having bacteremia with *Enterococcus avium* sensitive to Vancomycin. This individual reported having chronic diarrhea and imaging of the abdomen positive for multiple small mucosal ulcerations of the rectosigmoid and descending colon. This patient had a poor prognosis ultimately leading to death. This case report takes a look into the unique presentation of *Enterococcus avium* bacteremia in an immunosuppressed individual. The literature on *Enterococcus avium* and the previous cases reported are also reviewed.

197 BACTEREMIA WITH PSEUDOMONAS LUTEOLA: CASE REPORT

Parekh A, Ragland S, Heidari A. *Kern Medical, Bakersfield, CA.*

10.1136/jim-2016-000365.197

Case Report *Pseudomonas luteola* is an aerobic, Gram negative rod. It is a rare human pathogen. There have been previous cases that *P. luteola* may cause bacteremia in association with pancreatic abscess, endocarditis, peritonitis, and indwelling vascular catheters. We present a case of 44 year old male with complex medical history of gastric bypass, splenic vein thrombosis, chronic pancreatitis, and amphetamine abuse who presented to us with right hand cellulitis, left gluteal abscess, and bacteremia with *P. luteola*. He had very recent history of persistent bacteremia with gram negative rods with *Klebsiella*, *Pseudomonas*, and *Stenotrophomonas maltophilia* due to an indwelling catheter. *P. luteola* was sensitive to tobramycin, gentamicin, ciprofloxacin, imipenem, meropenem, and zosyn. We treated our patient initially with zosyn and 7 days of gentamicin and remainder 35 days with Levofloxacin.

Pulmonary & Critical Care Adult

6:00 PM

Thursday, January 26, 2017

198 DIFFUSE ALVEOLAR HEMORRHAGE AND RITUXIMAB

Parekh A, Garcia-Pacheco R, Lara J. *Kern Medical, Bakersfield, CA.*

10.1136/jim-2016-000365.198

Case Report Diffuse Alveolar Hemorrhage (DAH) is due to disruption of the alveolar-capillary basement membrane and entities of diseases are associated with it, but autoimmune disorders are most common. We present a case of DAH in a 32 year old male with hemoptysis with autoimmune profile positive for antinuclear antibody (ANA) and antiphospholipid antibody. His bronchoalveolar lavage was positive for moderate CD45. This patient was not improving on high dose steroids but improved drastically after one dose of Rituximab. His improvement was remarkable and eventually tapered off steroids with full return of respiratory status. His DAH could be due to antiphospholipid syndrome with positive lupus anticoagulant vs isolated pulmonary capillaritis. We present a case with a unique presentation and profile. The role of Rituximab will be addressed in this report as well, along with the available literature and recommendations will be reviewed.

199 IDENTIFYING NASAL BONE FRACTURES WITH ULTRASOUND DURING MEDICAL ANATOMY LAB COURSE COMPARING FINGER VERSUS CLASSIC LINEAR PROBES

Overton-Harris P, Patel S, Benninger B. *Western University of Health Sciences, Lebanon, OR.*

10.1136/jim-2016-000365.199

Purpose of Study Ultrasound (US) has traditionally been a soft-tissue medium. Recent studies suggest diagnostic use of US identifying fractures. Skull and facial fractures commonly present to Emergency Medicine departments. The objective of this study was to assess whether medical students could identify nasal bone fractures using varied ultrasound probes from donor cadavers.

Methods Used Literature search was conducted on US training to identify nasal fractures using variable probes on unembalmed cadavers (UC) for first-year medical students (MS1). Nine UC head & neck specimens were examined (ages 34–85: avg 70, 5F:4 M). Twenty MS1 each had nine separate trials (n=160); 10 performed 80 trials using novel Sonivate Finger Probe (SFP), 10 using a classic linear probe (CLP, 5–12 MHz) on Fukuda Denshi UF-760AG system. Examinees were not provided examples of intact or fractured nasal bones. True-positives (TP), true-negatives (TN), false-positives (FP) and false-negatives (FN) were recorded for the nasal region. Students (13 male, 7 female) were chosen who had previous US experience with limbs and cavities during anatomy lab, but not with bony structures of head and neck regions.

Summary of Results Literature search revealed no known studies. Data revealed 71.9% of the 20 students were able

to correctly identify the presence or absence of a fracture. Although more TP and TN were identified with the CLP versus the SFP, the difference was not statistically significant (p -value=0.217). Early studies suggest that US can be used diagnostically to identify skull and facial fractures. The value of using US for identifying skull and facial fractures could expedite treatment regimen and reduce overall waiting times in the Emergency Medicine departments. Although a 71.9% success rate of TP and TN is not ideal, the results revealed that US can identify and exclude nasal bone fractures by true novice US users.

Conclusions This study suggests that unembalmed cadavers can be used successfully as an US training method for medical students, residents, and post-residency physicians to identify and exclude nasal fractures using novel finger and classic linear probes.

200 COMPARING ULTRASOUND: FINGER VERSUS CLASSIC LINEAR PROBES TO IDENTIFY ZYGOMATIC FRACTURES IN MEDICAL ANATOMY LAB

Patel S, Tavangary F, Tang W, Benninger B. *Western University of Health Sciences, Lebanon, OR.*

10.1136/jim-2016-000365.200

Purpose of Study Ultrasound (US) was initially used as a diagnostic tool for orbital wall fractures in 1981. Despite this, US is not consistently being taught as a diagnostic fracture identification tool. A training method with assessment would be ideal to prepare medical students and residents to accurately identify zygomatic fractures in the emergency department. The objective of this study was to assess whether medical students could identify zygomatic fractures using various ultrasound probes on donor cadavers.

Methods Used Literature search was conducted regarding US training to identify zygomatic fractures using variable probes on unembalmed cadavers (UC) for 1st year medical students (MS1). Nine unembalmed head & neck specimens were examined (ages 34–85:avg 70, 5F:4 M). Twenty MS1 conducted a total of 340 independent trials; 10 performed 170 trials using novel Sonivate Finger Probe (SFP), 10 using a classic linear probe (CLP, 5–12 MHz). True-positives (TP), true-negatives (TN), false-positives (FP) and false-negatives (FN) were recorded for the zygomatic region. Students (13 M, 7 F) who were chosen had previous US experience with limbs and cavities, but not with bony structures of the head and neck region.

Summary of Results Literature search revealed no known studies using US to identify zygomatic skull fractures on UC. 20 students correctly identified the presence or absence of a fracture 87.9% of the time. More TP and TN were identified with the SFP versus the CLP (p -value=0.09). US is safe and can be conducted in real-time to diagnose zygomatic fractures, with high sensitivity and specificity (94% and 89%, respectively, using the novel SFP). Plain radiographs and computed tomography (CT) imaging are the gold-standard for zygomatic fractures. Both require departmental imaging and deliver radiation

exposure, and, with CT, a high associated cost. US, however, is safe, cost efficient, and can be conducted in real-time. In order to have a cultural educational shift, training methods should be integrated into medical school curriculum.

Conclusions This study suggests UC can be successfully examined as an US training method to identify and exclude zygomatic fractures using novel finger and classic linear probes with high sensitivity and specificity.

201 ULTRASOUND INTEGRATED INTO ANATOMY DISSECTION LAB IDENTIFYING TEMPORAL BONE REGION FRACTURES COMPARING SONICEYE FINGER VERSUS CLASSIC LINEAR PROBES

Tavangary F, Patel S, Overton-Harris P, Benninger B. *Western University of Health Sciences, Lebanon, OR.*

10.1136/jim-2016-000365.201

Purpose of Study Trauma to the temporal bone commonly presents to the emergency department (ED) and can lead to life-threatening extradural hemorrhage. Given suspicion of an extradural bleed, computed tomography (CT) is the gold-standard. In acute presentations, US could expedite treatment and save lives. The objective of this study was to assess whether medical students could identify temporal bone region fractures using varied ultrasound probes from donor cadavers.

Methods Used Literature search was conducted regarding US training to identify temporal bone fractures on unembalmed cadavers (UC) for 1st year medical students (MS1). Nine UC (head & neck) were examined (ages 34–85:avg 70). Twenty MS1 conducted a total of 340 independent trials; 10 performed 170 trials using novel Sonivate Finger Probe (SFP), 10 using classic linear probe (CLP) (5–12 MHz). True-positives (TP), true-negatives (TN), false-positives and false-negatives were recorded for TBF. Students (13 M, 7 F) were chosen who had previous US experience with limbs and cavities but no bony structures of the head and neck region.

Summary of Results Literature search revealed no known studies. 90.6% of students were able to correctly identify fracture or no fracture. Sensitivity and specificity of detection of the TBF were found to be 90% and 95%, respectively. Although more TP and TN were identified with the finger probe vs the classic linear probe, the difference was not statistically significant (p -value 0.234). Plain radiographs and CT imaging are commonly used diagnostic tools for TBF, with the gold-standard being CT. Both require departmental imaging, deliver radiation exposure, and, with CT, a high associated cost. US, however, is safe, cost efficient, and can be conducted in real-time. In order to have a cultural educational shift, training methods should be integrated into medical school curriculum.

Conclusions This study suggests that UC can be used successfully as an US training method to identify TBF. This work represents a novel study to provide a clinically relevant tool for medical students, residents, and post-residency positions.

Surgery

6:00 PM

Thursday, January 26, 2017

202 FAMILY HISTORY OF AORTIC AND ARTERIAL ANEURYSMS AND DISSECTIONS IS ASSOCIATED WITH TYPE B AORTIC DISSECTION

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10.1136/jim-2016-000365.202

Purpose of Study The genetic basis of thoracic aortic disease is well established with an estimated 25% of non-syndromic type A aortic dissection cases having a family history of aortic aneurysms and/or dissections. In contrast, the genetic basis of type B aortic dissection (TBAD) is not well established. We sought to determine if patients with TBAD have a heritable component to their disease by delineating the family history contribution.

Methods Used This is a case series study whereby patients with TBAD at the University of Washington and the University of Texas at Houston were interviewed to obtain detailed family pedigrees. We queried patients about family history of aortic/arterial dissection/aneurysms at any age, sudden death, and premature vascular disease. Premature vascular disease was defined as arterial occlusion or stenosis, coronary artery disease, or cerebrovascular accident at <55 years old for males and <60 years for females. Analysis focused on whether a family history of the above conditions was present in first and second degree relatives (FDRs, SDRs).

Summary of Results A total of 74 patients with TBAD were interviewed. (72% male, median age at TBAD 55 years, range 33–89 years). A family history of aortic/arterial aneurysms/dissection in a FDR, a SDR, or both was ascertained in 30% of the patients. Among those, 13.5% specifically recalled a family history of “aortic” aneurysm/dissection. When sudden death and premature vascular disease were included, 57% had a positive family history. Of interest, patients with younger age of TBAD onset (age 55 years or younger), had a higher percentage of family history (64%) when compared to older patients (52%), though this was not statistically significant.

Conclusions These preliminary data are the first to specifically demonstrate a heritable component of TBAD. While a family history of aortic disease specifically was not as prevalent as in type A aortic dissections, there was a significant correlation between TBAD and aortic/arterial aneurysms/dissections, sudden death, and premature vascular disease. Understanding the heritable component of TBAD will yield insights into the pathophysiology underlying the disease.

203 CANCELLED

204 CAN MEDICAL STUDENTS IDENTIFY THE ULNAR COLLATERAL LIGAMENT OF THE FIRST MCP WITH HIGH FREQUENCY ULTRASOUND PROBES ON CADAVERS AND HEALTHY SUBJECTS

Goddard S, Wang D, Benninger B. Western University of Health Sciences, Lebanon, OR.

10.1136/jim-2016-000365.204

Purpose of Study The ulnar collateral ligament (UCL) of the first metacarpophalangeal (MCP) joint is commonly injured from a fall causing hyperextension and abduction of the thumb. Diagnosis is made following physical examination and X-ray to rule out avulsion fracture and/or Stener lesion. This study investigated if medical students (MS) could use ultrasound (US) to identify UCL from cadavers and healthy subjects.

Methods Used Literature search was conducted regarding US of UCL by MS. Recently deceased unembalmed donor cadavers (RDUDC) received 324 (108 per probe) trials from MS using 3 different US probes (5–12, 18, 22 MHz) and 42 trials on healthy individuals. All MS conducted timed trials bilaterally.

Summary of Results There is an estimated 200,000 cases annually of ulnar collateral ligament tear at the 1st MCP joint. 216/216 trials successfully identified UCL with 18 & 22 MHz probes, (108 trials failed to clearly identify UCL with 5–12 MHz probe). 42 trials with 18 MHz probe on a healthy individual revealed 57% accuracy on the left side and 74% accuracy on the right. Literature search revealed no known studies regarding medical students identifying UCL with ultrasound. This study demonstrated MS with novice ultrasound skills could identify the UCL using high-resolution probes. UCL injury of the first MCP joint is confirmed by physical diagnosis and X-ray to exclude fractures. However, ultrasound is now becoming the standard to identify UCL tears with or without Stener lesions. Ultrasound allows for dynamic examination during passive movements to review injuries to the UCL distal attachment at the base of the proximal phalanx of the thumb. The 18 MHz probe allowed those students to identify the UCL from RDUDC and healthy volunteers while the 5–12 MHz probe made viewing the UCL very difficult.

Conclusions This study revealed medical students could successfully scan the UCL on cadaveric specimens and healthy volunteers with high resolution probes.

205 CAN NOVICE ULTRASOUND USERS IDENTIFY THE ULNAR COLLATERAL LIGAMENT OF THE ELBOW DURING AN ANATOMY COURSE FROM CADAVERS AND HEALTHY SUBJECTS USING MULTIPLE FREQUENCY PROBES

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10.1136/jim-2016-000365.205

Purpose of Study The elbow joint participates in prehension of the hand, contributing to the fine motor

movements of the upper limb. The elbow has 3 articulations and communicates with the proximal radioulnar joint, in contrast to the wrist, which does not communicate with the distal radioulnar joint. The dominant stabilizing ligament is the ulnar collateral ligament which has 3 sections, of which the anterior band is under the greatest tension and most commonly injured. Chronic, repetitive microtrauma may lead to injury or rupture of the UCL. It would be useful to identify UCL injuries for patients to modify activity before complete ligamentary rupture. The objective of this study was to investigate if multiple ultrasound (US) probes could identify the UCL of the elbow in cadavers and volunteers.

Methods Used Literature search investigated use of US probes on UCL of cadavers. Four recently deceased unembalmed donors (n=8 sides) were imaged with 5–12 MHz classic linear (CL), finger probe (FP), 18 MHz (18), and 22 MHz (22) probes by three users 3x each station (72 trials per probe x4 probes=288 trials). 21 volunteers imaged UCL bilaterally on each live control subject with the 18. Users followed a template for probe placement.

Summary of Results Literature search revealed no known cadaveric studies using 18 & 22 MHz probes on UCL. Novice users identified UCL in 20/42 examinations. Interestingly, students either correctly identified both sides or none at all, suggesting an anatomical confidence factor. All three intermediate users successfully identified UCL using all 4 probes at each of the 8 sides. The different probes were used to produce images of varied qualities. Lower frequency probes revealed less detail than higher frequency probes. This study demonstrated multiple US probes can be used to identify elbow UCL.

Conclusions An unstable elbow can be debilitating physically and mentally, especially on the dominant side. This study revealed multiple US probes can identify UCL in cadavers and volunteers, which could improve UCL awareness to prevent debilitating side effects.

206 POST-OPERATIVE INTRAVENOUS FLUID ORDERING PRACTICES FOR PEDIATRIC PATIENTS BY PLASTIC SURGERY TRAINEES IN NORTH AMERICA

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10.1136/jim-2016-000365.206

Purpose of Study Hypotonic intravenous (IV) fluids have traditionally been ordered post-operatively in children. However, there is increasing evidence in favour of the use of isotonic fluids, with reports of hyponatremia and adverse events caused by the administration of IV hypotonic fluids. In Europe, hospital regulations against using hypotonic fluids have led to improved safety of children, but in the United States (US) and Canada, there is no standardization of practice. Our objective was to determine the current North American post-operative IV fluid ordering practices for children by plastic surgery trainees, and the hospital policies that influence their choices.

Methods Used An ad-hoc online survey was distributed to plastic surgery trainees. The survey investigated the

demographics, preferred IV fluids based on clinical scenarios, as well as hospital restrictions and factors contributing to the trainees' decision. Analysis was conducted using descriptive statistics.

Summary of Results There were 66 responses, of which 53 were complete and used for analysis. Hypotonic fluids were preferred by 44% of respondents, isotonic by 42%, and 14% of respondents indicated that they did not know the best choice. Regardless of level of training, pediatric clinical experience, hospital type, and province or state, there was no significant difference in the tonicity of fluid ordered. The main factor that influenced the trainees' decision was their personal education (82%), followed by staff preference (31%). There were no known hospital restrictions in 70% of cases. Several respondents commented favourably for evidenced based post-op fluid recommendations and guidelines to improve patient safety.

Conclusions A large proportion of plastic surgery trainees would order hypotonic IV fluids post-operatively in children, despite safety concerns. The majority of respondents were not aware of any hospital restrictions. Hospital guidelines may help improve the safety of post-operative fluid ordering practices among surgical trainees.

207 CONTINUOUS CAUDAL EPIDURAL ANALGESIA AFTER PEDIATRIC COARCTATION REPAIR

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10.1136/jim-2016-000365.207

Purpose of Study Postoperative analgesia in patients undergoing thoracotomy for aortic coarctation repair is often provided through caudally-threaded epidural technique at our institution. We examined the practice patterns and complications associated with the insertion and management of these epidurals.

Methods Used With REB approval, a retrospective audit of a 5-year experience (June 2011-June 2016) at our tertiary academic hospital was undertaken. Subjects were identified from the Acute Pain Service records and Operating Room booking system. Definitions of functional success (insertion and use for >24 hrs) and complications were established. Demographic, procedural, pharmacological and complication data were extracted from patient records. Descriptive data analysis was performed.

Summary of Results Seventy-one subjects with median (range) age 0.75 (0.03–108) months, and weight 3.9 (1.4–28.9) kg were identified. Four anesthesiologists attempted caudal catheter insertion in 48/71 (68%) of cases; the success rate was 88% (42/48). Of the remaining 29 subjects, 11/29 received direct thoracic epidural analgesia and 18/29 received systemic opioids. Routine postoperative x-ray confirmed catheter tip location in 31/42 (74%) of subjects – 10% cervical and 90% thoracic. Of the 3 cervical placements, the catheter was repositioned in 2 and removed in 1 subject. Bupivacaine was used in 33/42 (79%) and bupivacaine/hydromorphone in 9/42 (21%). Continuous systemic opioid supplementation was used in 18/42 (43%) cases. The introducer needle size and type

Abstracts

were not documented in 17/42 (40%) and 22/42 (52%) cases, respectively. Catheter size was not recorded in 21/42 (50%). The number of catheters in use at 24 hrs was 50% (21/42). Indication for discontinuation before 24 hrs was not documented in 10/21 (48%) of cases. Overall complication rate was 25% (12/48), with contamination of dressing, vascular puncture, hypotension and abandoned block being more common.

Conclusions In this series, the functional success of this technique was under 50%. More rigorous documentation would better inform practice. A focused prospective audit guided by information from this series is planned to more accurately evaluate our practice and to determine if risk-benefit trade-offs favour this invasive technique in a vulnerable population.

208 OPTIMAL TIME FOR PERFORMING SURGERY ON PATIENTS WITH INFANTILE ESOTROPIA: A COMPREHENSIVE LITERATURE REVIEW

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10.1136/jim-2016-000365.208

Purpose of Study The timing of surgery for patients with infantile esotropia has been a subject of debate. The purpose of this study was to investigate the optimal time to operate on patients with infantile esotropia by comparing the effect of early and late surgery on stereopsis (depth of vision) and need for additional surgery.

Methods Used A literature search for clinical studies about the timing of surgery for infantile esotropia was completed using PubMed and Google Scholar. Only studies published in the last 30 years that included postoperative stereopsis and compared early and late surgeries in patients younger than 7 years of age were included in our analysis. Studies that involved preterm infants, patients with exotropia, and non-human subjects were excluded from this review.

Summary of Results Four studies met our inclusion criteria. The table below summarizes the results. In all of the studies, preoperative stereopsis and alignment was not

significantly different among the early and late groups. Of 4 studies, 3 reported a higher stereopsis rate when surgery was done before one year of age. Two studies reported higher risk for additional surgery for infants who had the initial surgery at a younger age.

Conclusions Studies that compare early and late surgery in patients with infantile esotropia are limited. Our review suggests that patients who had surgery before one year of age had a higher likelihood of achieving stereopsis. Further studies are needed to determine the exact age of surgery within the first year of life and its effect on stereopsis, alignment, visual acuity and need for additional surgeries.

209 DOES WRIST MOVEMENT ALTER RADIAL ARTERY POSITIONING DURING CORONARY ANGIOGRAPHY CANNULATION AND BLOOD GAS DRAW: SONICEYE VERSUS CLASSIC ULTRASOUND PROBES

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10.1136/jim-2016-000365.209

Purpose of Study "Extend the wrist and the radial artery will come to the surface and make that cannulation or arterial blood gas draw easier." Often spoken words, but are they an old wives tale or accurate? The radial artery (RA) has gained popularity within the cardiac arteriogram discipline. Many users are shifting from the old gold standard of the femoral artery to the RA. The anatomy just proximal to the wrist is dense in structures. Each structure lives within a plane that is relatively finite. The objective of this study was to use ultrasound to investigate if the RA moves significantly to the surface during wrist movement enabling invasive procedures.

Methods Used Literature search was conducted to investigate dynamic RA measurements in multiple positions during wrist movement with different ultrasound probes. Healthy volunteers (N=152:304 sides, Age 20-42) were used. Exclusion criteria consisted of wrist or upper limb vascular surgery. Fukuda-Denshi ultrasound system UF760-AG was used with a classic linear probe (5-12 MHz) and a novel SonicEye finger probe (5-12 MHz).

Abstract 208 Table 1

Reference	Total n	Age at Surgery	Postop Stereopsis Present	P value	% That Needed Additional Surgery	P value
Altinsoy, 2016	108	Early <1 yr (n=20) Middle 1-2 yrs (n=34) Late >2 yrs (n=54)	35% 32.4% 27.8%	0.8	65% 38.2% 27.8%	.03
Assaf, 2009	101	Early <2 yrs (n=49) Late 2-7 yrs (n=52)	16.3% 7.7%	<.05	16.3% 7.7%	>.05
Ing, 2002	90	Early 0-6 months (n=20) Middle 7-12 months (n=46) Late 13-24 months (n=24)	80% 80% 58%	<.05	Not reported	Not reported
Birch, 2000	129	Early 3-5 months (n=6) Middle 6-8 months (n=54) Middle 9-11 months (n=24) Late 12-18 months (n=32) Late 19-24 months (n=13)	100% 48% 24% 28% 8%	.0001	32% in those lacking random dot stereopsis (RDS) vs 14% in those with RDS 32% (without stereopsis)	.05

Two examiners performed 3 measurements at 3 positions of the RA from a set proximal wrist point to skin surface (wrist in neutral, 45 degrees flexion and extension).

Summary of Results Literature search revealed no dynamic measurement studies of RA in multiple positions. RA moved up to 2.5 mm deeper or posterior from the neutral position during 45 degrees flexion and moved up to 0.7 mm superficially or anteriorly during 45 degrees wrist extension. Statistical analysis of RA depth demonstrated no statistical significance between Rt and Lt sides in neutral position. Extension may also reduce risk of damage to neighboring structures (median nerve) which may also be beneficial. Compression of veins during extension, which lie adjacent to the RA could also be useful.

Conclusions Ultrasound can be used to determine RA location, depth and relation to intimate anatomic structures in various positions to allow safe, confident and consistent cannulation and ABG draws. Wrist extension may protect the surrounding structures more than causing anterior RA movement.

210 WHEN VENIPUNCTURE BECOMES THE AURORA BOREALIS

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10.1136/jim-2016-000365.210

Purpose of Study Ultrasound (US) guided venipuncture has several positive attributes. Today's vertical curriculum is trying to include US as a component of education. It is easier to do this in years three and four, but is this ideal? If a task can orchestrate several skill sets, be simple to conduct and provide real-time feedback, this would be an ideal task to acquire. The objective of this conceptual study was to investigate the benefits of venipuncture involving actual US, syringes and Blue Phantom artificial upper limb.

Methods Used Literature search was conducted to investigate the benefits of conducting venipuncture using an actual US and syringe as an exercise to improve US skills, two-handed coordination and spatial awareness. This pilot study involved 27 medical students performing minimum of 5 venipunctures using real-time US and syringe on artificial prosthesis. Fukuda Denshi UF-760AG and eSoate US systems were used with classic linear and SonicEye finger probes on Blue Phantom upper limb prosthesis including integrated venous system.

Summary of Results Literature search revealed no known studies. All 27 users were successful at one task of palpating, probe image acquiring, conducting and recognizing a penetrating needle. Each student initially struggled with conducting two to three tasks simultaneously. Each student managed to conduct multiple tasks more successfully and timely with each subsequent trial. This study created a simple medical task, such as venipuncture, and included technology to produce several skill sets that would involve the understanding of spatial anatomy. The medical student is learning surface anatomy. The skills, knowledge and experience gained from this task would be: (1) palpatory skills, (2) two-handed coordination (one hand operating probe and the other inserting the needle), (3) ultrasound

image acquisition, (4) identifying neurovascular bundle, (5) developing spatial anatomical awareness, (6) developing US needle tracking by observing tissue displacement. This pilot conceptual study revealed multiple skillsets and experiences can be acquired by a "simple" venipuncture task.

Conclusions The development of this concept will be to assess whether the spatial anatomy acquired from this task will benefit users when they interpret cross-sectional imaging.

211 DESIGNING A PALPABLE SURFACE ANATOMY FOOTPLATE FOR BLIND AND ULTRASOUND GUIDED POSTERIOR TIBIAL NERVE BLOCKS

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10.1136/jim-2016-000365.211

Purpose of Study Lacerations, warm bodies, plantar fasciitis and fractures are common foot trauma presenting to the health services. Posterior tibial nerve blocks (PTNB) are reported to provide anesthesia to the ankle, heel and sole of the foot effectively, get used in frequently in acute services. The objective of the study was to design and develop a surface anatomy template for blind and ultrasound-guided posterior tibial nerve blocks for novice healthcare professionals.

Methods Used Literature search was conducted regarding PTNB for novice users. PTNB area was dissected (n=40) to assess landmarks, structures, and ratios. Ultrasound (US) was integrated with bony and soft-tissue landmarks. Colored Ink was used to determine success of PTNB. The template used was center of medial malleolus (MM) to the apex of the heel as a vector. Distance between center of MM and medial border of the Achilles was measured. Half this distance was applied from center of MM to apex of the heel, marking the window for injection. 24 US-guided and 14 blind injections were performed.

Summary of Results 23/24 US-guided injections and 14/14 blind injections were successful. PTNB is known to be an effective procedure. However, no obvious surface landmarks with ratios had been identified. Novice 1st year medical students could successfully perform blind and US-guided PTNBs.

Conclusions This pilot study revealed a surface anatomy template which could be used for both blind and US-guided PTNBs by novice users, and data supports larger studies.

212 UNDERSTANDING ATTITUDES TOWARDS AND TECHNIQUES OF PREOPERATIVE RISK ASSESSMENT

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10.1136/jim-2016-000365.212

Purpose of Study Surgical risk is an integral component of informed consent and shared decision-making between physicians and patients. While current literature indicates the importance of shared-decision making as a factor in building a trusting patient-physician relationship, there are no published standards for surgical preoperative risk

assessment. Risk assessment ranges from a “best guess” on likelihood of outcomes by the surgeon, to citation of literature on risk associated with specific procedures, to use of formal online risk assessment tools characterizing individual patient outcomes based on their specific risk factors. This study aims to understand the current trend in assessment of preoperative surgical risk values among surgeons.

Methods Used In order to understand attitudes towards and techniques of surgical risk assessment utilized in current practice, a survey was designed for administration to surgeons. The survey has 20 questions, and will be administered to up to 200 surgical faculty at the University of Colorado School of Medicine. In addition to understanding the current attitudes towards surgical risk assessment, data from this survey will be used to optimize a formal surgical risk assessment tool currently being developed, to facilitate implementation and utilization.

Summary of Results This study is on-going and results will be reported at the time of the conference.

Conclusions This study is on-going and results will be reported at the time of the conference.

213 USING VARIABLE LINEAR PROBES TO CREATE AN ULTRASOUND TEMPLATE TO IDENTIFY THE ANTEROLATERAL LIGAMENT

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10.1136/jim-2016-000365.213

Purpose of Study The recently (re)defined anterolateral ligament (ALL) has been a hot topic in the media recently. It has become particularly relevant in sports medicine due to its importance in rotational stability of the knee, anterior cruciate ligament injuries and Segond fractures. The anatomy and morphology of the ALL has been sufficiently described in multiple anatomical studies; however, imaging of this ligament has been elusive. The objective of this study was to develop a protocol to identify the ALL, using ultrasound (US) probes.

Methods Used Literature search was conducted regarding US protocol for the ALL. 12 hz and 18 hz US probes were used to identify the ALL in 5 un-embalmed (n=10 knees) and 2 embalmed (n=4 knees) donor cadaver patients (DCPs). MRI was completed on one un-embalmed DCP. Deep dissection of the DCPs was completed to reveal the morphology of the ALL. The US protocol was designed using a ratio from bony palpable landmarks and a footplate for an US probe was implemented on 40 healthy knees in an attempt to consistently identify the ALL. The protocol was then taught to 34 novice US users and subsequently US identification was attempted on two healthy knee controls (group 1 n=20 & group 2 n=14).

Summary of Results The ALL was successfully identified from deep dissections, MRI and the US protocol. Dissection confirmed the morphology of the ALL as visualized on US imaging. The ALL was successfully identified by novice US users in group 1 (n=20/20) and group 2 (n=14/14) on the human control knees using the US developed protocol. The ALL is becoming of increasing interest in sports medicine and orthopedics. Reliance on MRI to

diagnose ALL injuries has been inconsistent.

Conclusions This pilot study demonstrated US can successfully identify the anterolateral ligament of the knee in healthy human knees and may be of future value in diagnostic evaluation of rotational instability of the knee, or injuries of the anterior cruciate ligament, lateral collateral ligament, or posterolateral corner.

214 PERCUTANEOUS EXTERNALLY ASSEMBLED LAPAROSCOPIC INSTRUMENTS FOR FOWLER-STEPHENS ORCHIOPEXY: A NEW CLINICAL PARADIGM

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Purpose of Study Conventional laparoscopy is the gold standard for non-palpable testes. However, therapeutic laparoscopic procedures routinely require three 5 mm ports that result in 9–10 mm scars. We have developed novel percutaneous externally assembled laparoscopic (PEAL) instruments which allow for nearly scarless laparoscopy. We present here a clinical series of 3 pediatric patients who underwent a Fowler-Stephens orchiopexy using these instruments.

Methods Used Using the PEAL instruments, two patients underwent a first stage, and one patient underwent a second stage Fowler-Stephens orchiopexy. In all cases, a 5 mm port was placed at the umbilicus for the camera. The PEAL instrument, which consists of a reusable handle and a 2.96 mm shaft was then introduced lateral to the rectus sheath at the level of the umbilicus using a special introducer tip under direct visualization. The introducer is then brought out through the camera port and switched to a 5 mm grasper tip. An additional 5 mm port was placed on the right at the same level for insertion of a hook electrode and clip applier.

Summary of Results A 10 month-old boy with bilateral cryptorchidism and an 11 year-old boy both underwent a first stage Fowler-Stephens orchiopexy. The PEAL instruments functioned well for all dissection and grasping tasks, similar to 5 mm conventional instruments. The third patient was a 9 year-old who had previously undergone bilateral laparoscopic first stage Fowler-Stephens orchiopexy, so a second stage procedure was performed. Using these innovative new instruments, all patients underwent successful Fowler-Stephens procedures. Operative times ranged from 65 to 180 minutes. Blood loss was minimal in all cases. All three patients were discharged the day of surgery. The procedures were well tolerated without any perioperative or postoperative complications. At follow up, the average length of the PEAL scars was 3.25 mm, while the 5 mm port scars were 10 mm.

Conclusions We describe a novel paradigm for performing a pediatric laparoscopic Fowler-Stephens orchiopexy. This paradigm offers improved cosmesis compared to conventional laparoscopy, and may show promise in other laparoscopic applications.

215 DOES MARIJUANA INTAKE AFFECT OUTCOMES IN LIVING RENAL DONORS AND THEIR RECIPIENTS?

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Purpose of Study To investigate the effect of marijuana use by living kidney donors upon outcomes in both donors and recipients.

Methods Used A retrospective chart review for living kidney donors and their recipients between January 2000 and May 2016 was performed, stratifying patients based upon prior donor marijuana usage. Demographics and intra-operative variables were reported and compared for all groups. Outcomes compared included absolute and percent creatinine change and absolute and percent glomerular filtration rate (GFR) change in both donors and recipients, stratified by duration of marijuana usage. Baseline values for recipients were calculated based on their 1 week post-op creatinine values. Statistical analysis was performed using the t-test for numerical variables and the chi-square test for categorical variables with $p < 0.05$ considered significant.

Summary of Results 294 living renal donor charts were reviewed including 31 marijuana using donors (MUD) and 263 non marijuana using donors (NMUD). 230 live kidney recipient charts were reviewed including 27 marijuana kidney recipients (MKR) and 203 non marijuana kidney recipients (NMKR). There was no difference in donor pre-operative, perioperative, or postoperative outcomes based upon marijuana use ($p > 0.05$ for all comparisons). However, there was a trend toward better preservation of donor GFR at 1 month for MUD vs. NMUD (-33.3% vs. -38.6% ; $p = 0.07$).

MKRs and NMKRs were similar in creatinine change and percent creatinine change at all time periods. At 1 month MKRs showed a significant decline in GFR (-4.9 vs. $+3.4$; $p = 0.010$) and a lower percent change in GFR ($+0.9\%$ vs. $+20.4\%$; $p = 0.035$) compared to NMKR. However, for all other time points (6 months, 1 year, and 5 years), there was no difference in absolute and percent GFR change between MKRs and NMKRs ($p > 0.05$ for all comparisons).

Conclusions There was no difference in renal function between NMUD and MUD groups and no long-term

differences in renal function between NMKR and MKR groups. Considering individuals with a history of marijuana use for live kidney donation could increase the donor pool and yield acceptable outcomes.

216 PRE-HOSPITAL EPINEPHRINE MAY NOT IMPROVE SURVIVAL AFTER BLUNT TRAUMATIC ARREST

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Purpose of Study Overall survival rates after traumatic cardiopulmonary arrest (TCPA) in adults are $< 2\%$. Epinephrine (EPI), a cornerstone of advanced cardiac life support for medical arrests, is not part of national trauma life support algorithms though it is often given after TCPA. We hypothesize that prehospital EPI use has no survival benefit after TCPA.

Methods Used Emergency medical services (EMS) data from King County, Washington from 2005–2012 was used to identify 103 consecutive trauma patients with prehospital CPR. Patients excluded: < 18 yo, hangings, drownings, and isolated burns. The primary outcome was return of spontaneous circulation (ROSC) at the time of hospital evaluation after prehospital care.

Summary of Results 103 patients were evaluated of which 81 had EPI exposure or not noted. There were no significant differences by exposure for sex or mechanism of injury. Those who received EPI had higher rates of atropine (0 vs. 37%, $P = 0.001$) and bicarbonate (0 vs. 54%, $P < 0.001$) use and were intubated more often (54 vs. 84%, $P = 0.002$; Table). EPI patients had a non-significant higher rate of ROSC (25 vs. 34%, $P = 0.43$). Nonetheless, EPI was not associated with increased survival at the time of hospital evaluation (RR 1.04 [95% CI 0.90, 1.2], $P = 0.558$).

Conclusions Although preliminary, there appears to be no significant difference in survival with the prehospital use of EPI in those with TCPA. The accumulation and investigation of larger EMS datasets from multiple regional trauma systems need to be performed.

Abstract 216 Table 1 Patient characteristics by epinephrine (n=103)

	No Epinephrine administered (n=24)	Epinephrine administered (n=57)	P=
Male (N, %)	20 (83.3)	41 (71.9)	0.277
Blunt mechanism of injury (N, %)	18 (75.4)	47 (82.4)	0.514
Atropine exposure (N, %)	0 (0.0)	21 (36.8)	0.001
Bicarbonate exposure (N, %)	0 (0.0)	31 (54.4)	< 0.001
Other Cardiac Meds (N, %)	0 (0.0)	5 (8.8)	0.134
Endotracheal Intubation (N, %)	13 (54.2)	49 (86.0)	0.002
Return of spontaneous circulation (N, %)	6 (25.0)	19 (33.9)	0.430
Transported to hospital (N, %)	8 (33.3)	25 (43.9)	0.379

217 INTEGRATING VIRTUAL-REALITY BASED ULTRASOUND TUTORIALS FOR DEVELOPING POINT-OF-CARE SKILL SETS AND SPATIAL ANATOMY DURING A MEDICAL ANATOMY COURSE WITH OPUS MINI HAPTIC ULTRASOUND SIMULATOR

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Purpose of Study Point-of-care ultrasound (POCUS) local anesthetic nerve blocks are commonly used in adults to attenuate postoperative pain and in pediatrics for fracture reduction and pain relief. Femoral blocks are important for hip, knee, ankle joints, and lower limb fracture surgeries. Early training of medical students (MS) with ultrasound simulation integrated with live scanning may maintain or accelerate ultrasound skills. Medical students with ultrasound basics could allow residency programs to accelerate ultrasound training. The objective of this study was to assess if MS can operate OPUS-Mini Medical Skills system (OMMS), performing femoral blocks during cadaver dissections and examinations.

Methods Used Literature search was conducted regarding OMMS integrated into a medical school curriculum. OMMS is an ultrasound simulator incorporating haptics technology to create lifelike experiences on split screen viewing of cross-sectional anatomy/ultrasound imaging while performing femoral blocks. First-year MS (n=18) received formal 20-minute tutorials using the OMMS with supplementary 3D clay model. Each student was mentored using OMMS and had access to practice 24/7.

Summary of Results Students successfully acquired skills and relevant anatomy for femoral blocks. All students (18/18) accurately identified structures and performed blocks during formal anatomy assessment. Literature search revealed no known studies with OMMS. Ultrasound is a mandatory skillset in many residencies. Medical schools are introducing students to ultrasound fundamentals during basic science/clinical years, developing a baseline while cultivating probe-time and image acquisition. Cadaver dissection, 3D clay model palpation, observations, invasive procedures, cross-modal perception, and simulation were employed during an anatomy course. Likert scale survey revealed students strongly supported skills associated with OMMS, especially during dissections. This pilot study will now be applied to sciatic and scalene blocks during other dissections.

Conclusions This study successfully integrated OMMS ultrasound simulation with haptic technology and split screen cross-sectional anatomy/ultrasound imaging, obtaining skillsets during an anatomy dissection course.

218 ASSESSING DIETARY ADVANCEMENT FOR DYSPHAGIA PATIENTS AT RISK FOR ASPIRATION

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Purpose of Study Fiber-optic endoscopic evaluation of swallowing (FEES) is a method of swallowing evaluation

commonly used to clarify questions of patient oral intake safety. This approach enables direct observation of food and liquid being swallowed. Previous work has shown FEES to be an equivalent study to a modified barium swallow exam for assessing patient swallow function and safety. FEES provides direct observation of laryngeal function and dysfunction before and after swallowing. It can be done with any type of food or liquid, and it requires no radiation exposure. The purpose of this study was to determine the status of dietary change following FEES in hospitalized patients previously diagnosed with aspiration. We hypothesized that certain findings on FEES exam—laryngeal sensation, presence of aspiration, and vocal fold mobility—influenced a change in dietary status.

Methods Used A retrospective chart review was performed for 300 FEES studies on 263 patients between June 2012 and March 2016. Data regarding laryngeal sensation, aspiration, vocal fold mobility, and pre- and post-FEES diet were collected. The data were then stratified according to changes in aspiration, laryngeal sensation, or vocal fold mobility.

Summary of Results Findings of intact laryngeal sensation were more likely to result in advancement of the patient's diet than those showing diminished laryngeal sensation (32% versus 19%). The presence of aspiration during a FEES study was less likely to result in diet advancement than no aspiration (16% versus 36%). When vocal fold mobility was found to be intact on exam, there was a small increase in diet advancement versus diminished mobility (27% versus 24%). A regression in patients' dietary status was more likely when laryngeal sensation was diminished, aspiration was seen, or vocal fold mobility was impaired.

Conclusions The use of FEES testing in hospitalized patients at risk for aspiration identified deficient laryngeal sensation, reduced vocal fold mobility, and presence of aspiration on exam as indicators for not advancing a patient's diet. These findings could potentially be used as predictive tools for dietary advancement and discharge planning.

219 CONVENTIONAL VERSUS COMPUTER ASSISTED STEREOSCOPIC ULTRASOUND NEEDLE GUIDANCE FOR RENAL ACCESS

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Purpose of Study Difficulty in visualizing needle trajectory may add complexity to ultrasound (US) procedures. A computer assisted needle guidance system exists to simplify needle targeting (Clear Guide Medical, Baltimore, MD). The purpose of this study was to compare conventional ultrasound and the computer assisted system for obtaining renal access and mass biopsy.

Methods Used A bench-top study was employed to enroll 11 physicians, 27 residents, and 32 medical students. Subjects were randomized to either a renal mass (n=46) or renal calyx model (n=25) using both conventional and computer assisted ultrasound guidance, with the initial

technique randomly selected. Outcomes included time for needle alignment prior to skin entry, time required to hit a target, number of punctures, number of course corrections, and number of successful trials. Failure was defined as inability to contact the assigned target. Prior US experience was obtained. Continuous variables were analyzed with the paired Student's *t*-test while categorical variables were compared using the chi-square test with $p < 0.05$ considered significant.

Summary of Results The computer assisted system shortened the time from skin puncture to target contact (79.4 vs. 51.1 s; $p = 0.009$). There was no significant difference in the number of punctures between US modalities (1.90 vs. 1.71; $p = 0.236$), but less needle course corrections were required using computer assisted US (2.53 vs. 0.483; $p < 0.001$). Subjects with less US exposure were faster with computer-assisted US needle guidance (107 sec vs. 70 sec; $p < 0.001$), while experienced ultrasonographers trended towards faster performance with conventional US needle guidance (91 sec vs. 126 sec; $p = 0.052$). Twelve subjects failed using conventional US and one subject failed using both conventional and computer assisted US systems (18% of subjects; $p < 0.001$).

Conclusions A computer assisted US guidance system may improve patient safety during renal access and mass biopsy by reducing needle penetration time and course corrections. In addition, this system is easier for novice surgeons to use and therefore could lead to an increased utilization of US guidance and a reduction in patient radiation exposure, although further clinical trials are warranted.

220 THE IMPACT OF A WI-FI BASED HANDS FREE AUDIO SYSTEM ON COMMUNICATION DURING A ROBOTIC SURGERY: A COMPARATIVE, PROSPECTIVE STUDY

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Purpose of Study Intraoperative miscommunication is one of the most frequently identified causes of medical errors, and the commercially available surgical robot has an integrated speaker system which may be hampered by disruptive feedback. Our group developed a Wi-Fi based hands free system designed to improve communication during robotic surgery. The purpose of this study is to compare the efficacy of a hands free communication system to the manufacturer supplied speakers of the Da Vinci Si robot.

Methods Used Subjects were positioned in the operating room (OR) at the positions of the bedside assistant, circulating nurse, anesthesia workspace, and secondary robot console. One hundred and twenty surgical phrases were read using the Da Vinci Si speakers and 120 phrases were read through the hands free system from the primary robotic console within a simulated OR environment. The reader was blinded to the systems in use. The primary endpoint was the number of correctly recorded phrases. Statistical analysis was done using the Chi-square test for categorical variables with $p < 0.05$ considered significant.

Summary of Results The hands free system significantly

increased the number of correct phrases compared to the Da Vinci Si speakers at the bedside position (96 vs. 78 total correct; $p = 0.009$), anesthesia workspace (101 vs. 69 total correct; $p < 0.001$), and the circulating desk (96 vs. 71 total correct; $p < 0.001$). The assistant robotic console did not display any significant differences between the two systems ($p = 0.430$). The assistant robotic console had significantly more correct phrases recorded compared the bedside position, anesthesia workspace, and circulating desk recorded when the Da Vinci Si speakers were used ($p < 0.05$ for all). In contrast, there were no significant differences in the number of correct phrases recorded between any positions when the hands free system was used.

Conclusions The use of the Wi-Fi based hands free system resulted in enhanced accuracy of communication among the surgical team when compared to the Da Vinci Si speakers. A hands free system is a promising tool for the reduction of miscommunication and subsequent errors that may occur during robotic surgery.

221 INCREASING FUNGAL COLONIZATION WITH INCREASED DURATION OF URETERAL STENTS

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Purpose of Study Indwelling Double-J ureteral stents placed following urologic procedures are well known to be associated with microbial colonization on stent surfaces and in urine, increasing the risk of urinary tract infections and urosepsis. However, the effect of stent duration on microbial flora has not been well characterized. The aim of this study was to evaluate the changes in microbial colonization of indwelling stents over time, and in particular, the rate of fungal colonization.

Methods Used A retrospective chart review was performed on 150 patients who underwent ureteral stent placement at a single academic institution between July 2014 and July 2015. Of these, 72 patients had cultures obtained from both bladder and kidney stent coils. Patient demographics, comorbidities, reason for stent placement, and distribution of microorganisms were examined. Patients were divided into the following cohorts based on stent duration: 0–20 days, 21–30 days, and >30 days. Statistical analysis was done using a chi-square test with a p value < 0.05 considered significant.

Summary of Results The 72 patients, 33 (46%) of which were male, had a mean age of 55 years and a mean BMI of 29 kg/m². 17 (24%) patients had diabetes mellitus. The median stent duration was 23 days. 46 (64%) patients were found to have a positive stent culture with no differences in colonization between the bladder or kidney coils.

Looking at specific cohorts, positive stent cultures were found in 14 (70%) of the patients in the 0–20 day group and the most commonly isolated organisms were diphtheroids (31%). 21 (64%) of the patients in the 21–30 day group had positive stent culture with the most commonly isolated organism being pseudomonas (30%). 11 (58%) of the patients in the >30 day cohort had positive stent

cultures where candida was found to be the most commonly isolated organism (55%) ($p < 0.05$).

Conclusions Positive culture rates did not rise with increased stent duration, however, the cultured organisms evolved over time. Stents in place > 30 days were significantly more likely to grow *Candida* compared to shorter indwelling stents. Because of this, antifungal use may be beneficial in patients with long-standing indwelling stents, prior to further endourologic surgery or stent removal.

222 THE OPTIMAL GUIDEWIRE TYPE AND EFFECT OF PRIOR USE ON THE EASE OF URETERAL STENT INSERTION

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Purpose of Study Ureteral stent insertion is a frequent procedure in endourology, with no clear consensus on the best guidewire type to facilitate placement. Use of wires may result in deterioration of their protective coating, requiring greater force for stent insertion. The purpose of this study was to identify the effect of wire type and prior use upon average insertion force needed to advance a 6Fr ureteral stent.

Methods Used Stent insertion was tested using an ex vivo porcine urinary tract model. For each trial, a new, soft, 6Fr Cook JJ ureteral stent was advanced over new and used 0.038" diameter guide wires, including the Glidewire (Terumo), Standard Teflon-coated wire (Cook), Superstiff wire (Cook), Sensor wire (Boston Scientific), Zip-wire (Boston Scientific), and Zebra wire (Boston Scientific). A Mark-10 digital force gauge was attached to the stent, and at a constant advancing rate of 2 rotations per second, the forces to advance the stent over the wire were calculated. 10 trials of stent insertion were randomly performed on 12 new and 12 used guide wires.

Summary of Results The new Glidewire had the lowest average force required for stent advancement (0.18 N). The forces for insertion of all other new wires were significantly higher; Standard (1.25 N; $p < 0.01$), Superstiff (2.03 N; $p < 0.01$), Sensor (1.87 N; $p < 0.01$), Zip (0.22 N; $p < 0.01$), and Zebra (0.61 N; $p < 0.01$). When comparing the average insertion force between new and used wires, the used wires required greater mean force in the Standard (2.42 N vs. 1.25 N; $p < 0.01$), Superstiff (2.68 N vs. 2.03 N; $p < 0.01$), and Zip-wire (0.36 N vs. 0.22 N; $p < 0.01$), but there was no statistical difference between used and new fibers in the Glidewire (0.28 N vs. 0.18 N; $p = 0.14$), Sensor (1.66 N vs. 1.87 N; $p = 0.18$) or Zebra wire (0.59 N vs. 0.61 N; $p = 0.67$).

Conclusions The Glidewire resulted in the lowest force for ureteral stent insertion. It may be used several times with no significant effect on ureteral stent insertion force due its resilient lubricious hydrophilic coating. Employing other wire types may result in additional stent insertion force. Knowledge of the forces required for stent insertion over various guide wires may allow surgeons to improve the ease and safety of stent placement.

223 EFFICACY OF ANTEGRADE AND RETROGRADE WARM SALINE PYELOPERFUSION DURING RENAL CRYOABLATION FOR URETERAL PRESERVATION

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Purpose of Study Cryoablation of renal tumors adjacent to the ureter or pelvicalyceal system risks thermal injury of the collecting system. Although cold antegrade perfusion has been described for radiofrequency ablation, antegrade and retrograde warm saline perfusion for renal cryoablation have not been well-characterized. The purpose of this study was to determine the safety and feasibility of antegrade and retrograde warm saline perfusion during percutaneous renal cryoablation.

Methods Used A retrospective review was performed of 136 patients treated with percutaneous renal cryoablation at a single academic institution between 2009 and 2015. From this series, six patients undergoing antegrade ($n = 3$) or retrograde ($n = 3$) warm saline perfusion for protection of the collecting system were identified. Warm saline was perfused through a 4 French nephrostomy tube in the antegrade technique and through a 6 French end-hole catheter in the retrograde technique. Patient demographics, tumor characteristics and intra-procedural and postprocedural complications were recorded. Outcomes were rate of tumor recurrence, success of urothelial preservation, hospital stay, blood loss and procedural time.

Summary of Results Among the six patients, 4 were male and 2 were female. Mean age was 73 and mean BMI was 27.5. Four tumors were in the lower pole and two tumors were in the middle pole. The mean distance from tumor to ureter was 6.8 mm (0.8–11.5 mm) and no patient developed ureteral stricture. There was no tumor recurrence at a mean follow-up of 37.3 months (7–65). The mean procedural time was 3 hours and 13 minutes. One patient in each group developed minor complications (Clavien I and II) and there were no major complications ($\geq$ Clavien III; $p = 1.0$).

Conclusions This study demonstrates the feasibility of antegrade and retrograde warm saline perfusion for ureteral preservation during cryoablation, without compromising oncologic outcomes. Either approach should be considered when cryoablating tumors in close proximity to the ureter.

224 PERCUTANEOUS EXTERNALLY ASSEMBLED LAPAROSCOPIC (PEAL) NEPHRECTOMY: FEASIBILITY OF A NEW SURGICAL TECHNIQUE

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Purpose of Study Laparoendoscopic single-site nephrectomy (LESS) provides excellent cosmetic outcomes, but is technically challenging due to loss of triangulation and

increased instrument collision. A novel Percutaneous Externally Assembled Laparoscopic (PEAL) surgical paradigm was developed to simplify minimally invasive surgery while providing a nearly scarless outcome. In this study, we will evaluate the feasibility and clinical outcomes of 3 PEAL nephrectomies.

Methods Used Three nephrectomies were performed using the PEAL surgical instruments at a single institution. The prototype instruments were manufactured by Teleflex Surgical (Wayne, PA, USA). The PEAL instrument is composed of a reusable handpiece, a disposable 2.96 mm shaft, and interchangeable 5 mm tips. These instruments are inserted without a trocar minimizing their cosmetic impact. Initially a multi-access port is placed at the umbilicus. A 2.96 mm shaft is then introduced using a special introducer tip, brought out through the multi-access port and switched to a 5 mm grasper tip. This PEAL instrument is able to reestablish triangulation and required no suture for wound closure. Patients' demographics and outcomes were reported.

Summary of Results One female (age 69) and 2 males (age 47 and 54) underwent right PEAL nephrectomy for either a non-functioning hydronephrotic kidney (1) or a renal mass (2). The operative times were 310, 166, and 123 minutes and estimated blood loss was 100, 15, and 50 cc, respectively. All patients tolerated the procedure well without perioperative complication. Mean hospital stay was 1.3 days. The median total IV morphine equivalent dose per 24-hour period was 4 mg. Postoperative cosmesis was excellent.

Conclusions We describe the first three nephrectomies performed using the PEAL surgical paradigm. By using instruments that are externally assembled, PEAL nephrectomy provides excellent cosmesis, simplifies LESS nephrectomy, and reduces instrument collision. This is a promising option to reduce the invasiveness of laparoscopic surgery.

225 MOHS SURGERY OR RADIATION THERAPY: WHICH IS THE MORE AFFORDABLE TREATMENT FOR NON-MELANOMA SKIN CANCERS OF THE FACE?

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Purpose of Study Many treatment options exist for basal and squamous cell carcinomas, including topical chemotherapies, electrodesiccation and curettage, surgical excision, Mohs micrographic surgery, external beam radiation therapy, and brachytherapy. Mohs surgery and radiation therapy tend to be the preferred definitive therapies for cancers located on the face because of generally excellent cosmetic outcomes. With recent changes in reimbursement by the Centers for Medicare and Medicaid Services (CMS), comparisons of Mohs surgery and radiation therapy should be evaluated. The purpose of this study is to determine whether Mohs micrographic surgery or radiation therapy, including external beam radiation and brachytherapy, is the more affordable therapy for the treatment of basal and squamous cell carcinomas, the two most common non-

melanoma skin cancers.

Methods Used Billing codes and typical fractionation of brachytherapy and external beam radiation for the treatment of basal and squamous cell carcinomas were determined. Billing codes for Mohs surgery and common repairs were also determined. The total costs for the three treatment modalities were calculated using the national payment amounts for non-facility locations on the CMS website.

Summary of Results A typical brachytherapy treatment of a basal or squamous cell carcinoma uses 6 fractions and costs \$6,331. Similarly, treatment with external beam radiation therapy uses 20 fractions and costs \$13,341. On the other hand, the three most common scenarios in Mohs surgery range in cost from \$969 to \$1,855.

Conclusions Because the cost of Mohs surgery is lower than that of both external beam radiation therapy and brachytherapy, Mohs surgery should be the preferred treatment for basal and squamous cell carcinomas of the face. However, large primary cancers, cancers not suitable for surgery due to location, patients with increased risk of bleeding, and patients who are not willing or able to undergo surgery due to co-existing health conditions, may be better treated with radiation therapy. Prospective trials comparing these two modalities are strongly encouraged in order to establish comparative effectiveness.