Department of Pediatrics
University of Saskatchewan
presents

Thursday June 18, 2020
11:00am-2:00pm

UNIVERSITY OF SASKATCHEWAN
College of Medicine
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SASKKIDS PEDIATRICS

JIM PATTISON CHILDREN'S HOSPITAL FOUNDATION

spring
SASKATCHEWAN PEDIATRIC RESEARCH AND INNOVATION GROUP

Child Health Research Trainee Day
Thursday, June 18, 2020
11:00am-2:00pm

11:00-11:05am	Welcome and Open Remarks **(Dr. Darryl Adamko)**
11:05-11:45am	**Dr. Brandy Wicklow** (Key Note Speaker) *The Accidental Tourist - Navigating a personal journey of research and discovery.*
11:45am-12:15pm	**Lightening Round**
	Matthew Chapelski (Undergraduate – Kinesiology)
	Devon Lieffers (Undergraduate – Kinesiology)
	Gloria Yoo (Pediatrics Resident)
	Sarah Ames (Pediatrics Resident)
	Katherine Backman (Pediatrics Resident)
	Nicole Bechard (Pediatrics Resident)
	Supraja Rengan (Pediatrics Resident)
12:15-12:20pm	*Break (Trivia Questions)*
12:20-12:30pm	**Tracey-Ann Stitchell** (PhD-Community Health & Epidemiology)
12:30-12:40pm	**Rostami Haji Abadi Mahdi** (PhD-Kinesiology)
12:40-12:50pm	**Yuwen Zheng** (PhD-Kinesiology)
12:50-12:55pm	*Break (Trivia Questions)*
12:55-1:05pm	**Chloe Johnson** (Undergraduate - Medicine)
1:05-1:15pm	**Megan Gallagher** (Undergraduate – Medicine)
1:15-1:20pm	*Break (Trivia Questions)*
1:20-1:30pm	**Seyara Shwetz** (Emergency Medicine Resident)
1:30-1:40pm	**Maple Liu** (Pediatrics Resident)
1:40-1:50pm	**Kaitlyn Lopushinsky** (Pediatrics Resident)
1:50-2:00pm	**Gloria Yoo** (Pediatrics Resident)
2:00pm	*Closing Remarks*

Dr. Brandy Wicklow
Presents
The Accidental Tourist - Navigating a personal journey of research and discovery.

Brandy Wicklow is a Pediatric Endocrinologist at the Winnipeg Children's Hospital, Associate Professor at the University of Manitoba, and Clinician Scientist at the Children's Hospital Research Institute of Manitoba (CHRIM). Her research is focused on the determinants of type 2 diabetes T2D) in children, with a particular interest in the Indigenous population of Northern Manitoba, Canada with whom she works closely in clinical care and research. She is the Principle Investigator of a birth cohort of children born to mothers and fathers diagnosed with childhood T2D (The Next Generation Cohort) examining the effects of in utero T2D exposure on growth, development and the natural history of T2D in offspring. She is the co-lead of the iCARE (Improving Renal Complications in Adolescents with Type 2 Diabetes through Research) cohort with Dr Allison Dart; a cohort study which aims to determine modifiable risk factors in the natural history of diabetes related renal disease.

Lightening Rounds PRESENTATIONS

11:45am-12:15pm

The Effect of a 12-week Physical Activity Intervention on the Body Composition of Children with Congenital Heart Disease

Matthew Chapelski, Ashley Libke, Dana S. Lahti, Kristi D. Wright, Charissa Pockett, Timothy J. Bradley, Scott Pharis, Corey R. Tomczak, Marta C. Erlandson

Introduction: Obesity is a common comorbidity in children with congenital heart disease (CHD). This is concerning as this population already has a shortened life expectancy and a higher risk of acquiring other chronic diseases such as hypertension. Obesity is caused by excess fat mass (FM) which is associated with more health problems throughout the lifespan. Physical activity (PA) in children with CHD may have a positive effect on body composition thus preventing or slowing the severities of associated comorbidities. The purpose of this study was to examine the effect of a 12-week physical activity intervention on the body composition of children with CHD.

Methods: Eleven children (5 females, 12.5±2.0 years) with CHD were recruited through the Pediatric Cardiology Outpatient clinic at the Jim Pattison Children's Hospital. Body composition and PA were assessed pre- and post-intervention. Dual X-Ray Absorptiometry was used to assess body composition including: total body lean mass (LM) and FM, upper body LM and FM, lower body LM and FM, and trunk LM and FM. PA was measured using the self-report Physical Activity Questionnaire for Children/Adolescents (PAQ-C/A) and accelerometers were used to assess moderate-to-vigorous physical activity (MVPA). The intervention involved a home-based program that included a 10-minute warm-up of walking, followed by a stretching and resistance training program to be completed at least three days per week. Additionally, six bi-weekly check-up sessions ensured that the participants were completing the program and executing it properly. Participants had to complete 60% of the home sessions to be included in this analysis. Paired sample t-test evaluated demographic differences pre- and post-intervention and a repeated measures ANCOVA was used to examine changes LM and FM while controlling for age, sex, and PA.

Results: We found no changes in any of our body composition variables ($p>.05$) from pre- to post-intervention. We found that height significantly increased ($p<.001$) over the 12-weeks. PA as assessed by the PAQ significantly decreased ($p=.043$) after the intervention; however, there was no change in MVPA ($p>.05$).

Conclusion: While our study found no difference in body composition, it may be that our sample size was too small or that the 12-week time span was too short. PA has been found to decrease fat mass in the general population; therefore, it is imperative that PA programs are available to children with CHD, so that preventative measures can be taken for the maintenance of a healthy lifestyle.

Is bone health compromised in children with congenital heart defects and children with heart transplants?

Devon Lieffers, Matthew Chapelski, Kristi D. Wright, Charissa Pockett, Timothy J. Bradley, Scott Pharis, Corey R. Tomczak, Marta C. Erlandson.

Background: It has been suggested that children with congenital heart disease (CHD) and children with a heart transplant may have compromised bone structure and strength when compared to healthy children of the same age. Currently, little is known about the bone health of this population and studies that have sought to understand this anomaly report varying results. It is well recognized that bone health during the growing years is a significant determinant of adult bone health and osteoporosis risk. If children with CHD have compromised bone during the growing years, their risk of developing secondary diseases such as osteoporosis is increased. The purpose of this study was to examine bone parameters in children with CHD and with a heart transplant to determine if their bone health is compromised compared to healthy children.

Methods: Twelve children with CHD, four of whom have had a heart transplant, participated in the study. In place of a control group, sex- ,ethnic-, and age-specific centile curves derived from typically developing children were used. Anthropometric measures of height and weight were assessed. Physical activity levels were evaluated using the Physical Activity Questionnaire for Children/Adolescents (PAQ-C/A). High Resolution Peripheral Quantitative Computed Tomography (HRpQCT) scans of the non-dominant tibia and radius were acquired. Independent sample t-tests were used to compare anthropometric and physical activity measures. Multivariate analysis of covariance was used to compare bone area, mineral density, and content of children with CHD and with a heart transplant to the reference data while controlling for the covariates of age, sex, height, weight, and physical activity levels.

Results: There were no significant differences in anthropometric measures or physical activity levels between the children with CHD, children with a heart transplant, and the reference data ($p<0.05$). Once age, height, weight, and physical activity levels were controlled for, there were no significant differences between children with CHD, children with a heart transplant, and the reference sample for any HR-pQCT measured bone parameters ($p<0.05$).

Discussion: In contrast to previous research, we found no significant differences in bone parameters between children with CHD, children with a heart transplant, and controls. These results are inconsistent with our hypothesis that bone health is compromised in children with CHD and with a heart transplant. This highlights the need for more research to examine and understand the effect of CHD on bone health.

Congenital Hepatoblastoma: A spectrum of cases

Gloria Yoo, Veronica Samedi

Introduction: Rapid clinical deterioration and multiorgan failure in a neonate warrants investigation to rule out infection, congenital heart disease, lung disease, metabolic disorders, or gastrointestinal pathology. Rarely does a clinician consider malignancy as the primary diagnosis. In these case reports, we present the clinical presentation and outcomes in term infants with congenital hepatoblastoma (CH) in a tertiary NICU.

Case Description:

Case 1 - A term male infant was born via emergency caesarian section to a healthy 30-year-old woman with an unremarkable pregnancy in view of abnormal fetal heart rate. His physical examination was significant for marked hepatomegaly causing severe abdominal distention. He required intubation for rapidly progressing respiratory distress and hemodynamic instability. CT abdomen revealed a large intra-hepatic mass. He had persistent severe metabolic acidosis, and rapidly developed disseminated intravascular coagulation unresponsive to multiple blood product transfusions. CH was suspected, however, his rapid clinical deterioration and multiorgan failure made surgical exploration impossible. In view of anticipated poor outcome, a decision to withdraw care was done at 24 hours of age. Autopsy confirmed the diagnosis of CH.

Case 2 - A term SGA male infant boy was born to a healthy 36-year-old mother by vaginal delivery. He was admitted to NICU for hypothermia and suspected sepsis, received antibiotics, and was doing well. At 4 days old, he suddenly deteriorated with hemodynamic instability and progressing abdominal distension. Diagnostic laparotomy releveled a ruptured bleeding mass arising from the liver. The tumor was resected and a diagnosis of CH was confirmed by histopathology. After consultation with Oncology, chemotherapy was initiated which he tolerated well.

Discussion: Congenital hepatoblastoma accounts for 10% of all pediatric hepatoblastomas in infants up to three months of age with a 25% survival rate and 100% mortality rate for stage 4 hepatoblastoma [1,2]. During labour, tumor compression can lead to rupture and intraabdominal hemorrhage. Postnatally, low birth weight and prematurity are risk factors and clinical presentation ranges from abdominal distention and/or a palpable abdominal mass to multiorgan dysfunction and death [2]. Laboratory findings include anemia, platelet abnormalities, and an elevated alpha fetoprotein, all of which our patients had [2]. Furthermore, a histological diagnosis is needed for confirmation [3]. Management includes surgical resection and chemotherapy.

Conclusion: These cases highlight the rapid clinical deterioration secondary to complications of congenital hepatoblastoma. Therefore, it is crucial to consider malignancy in diagnosing and managing a sick newborn.

A Case of Infantile Hypoinsulinemic Hypoketotic Hypoglycemia

S. Ames, M. Inman, M. Chard, D. Yau, M. A. Nour

Background: Pediatric hypoglycemia is a common clinical entity, yet hypoketotic, hypoinsulemic hypoglycemia without evidence of a disorder of fatty oxidation is rare. Current literature reports only five cases of a novel AKT2 mutation resulting in this rare, but important diagnosis.

Case: A 6-month-old female presented to our center with a history of recurrent, undefined seizures and was found to have severe hypoglycemia (blood glucose of 1.8 mmol/L). Her history was significant for macrosomia, coarse facial features, hypotonia and dysmorphology at birth (including coarse facial features, proptosis, and facial asymmetry with left-sided facial hemihypertrophy) that was undergoing evaluation. Mild, uncomplicated, 'transient' hypoglycemia was noted postnatally but resolved with establishment of feeds by day 3 of life. 'Critical sample' laboratory evaluation at 6 months of age demonstrated hypoketoic hypoglycemia with undetectable insulin levels, appropriate fatty acid elevation, normal liver enzymes, and normal metabolic testing (including acylcarnitine profile and urine organic acids). Glucagon stimulation test resulted in blood glucose rise of 2.2 mmol/L. Recurrent asymptomatic hypoglycemia occurred despite high glucose infusion rates (> 15 mg/kg/min). Treatment with both high dose diazoxide (>15 mg/kg/day) and octreotide were unsuccessful. Genetic testing sent upon clinical suspicion revealed a pathogenic heterozygous mutation in AKT2, c.49G>A, p.(Glu17Lys).

Discussion: This AKT2 gain-of-function mutation has been reported in three previous papers totaling to five reported cases worldwide. This mutation leads to an activation of insulin mediated glucose uptake (via the SLC2A4/GLUT4 transporter), stimulation of glucose storage as glycogen, cell proliferation, and protein synthesis. This has promoted recurrent, severe, fasting as well as non-fasting hypoglycemia and has been associated with dysmorphisms and overgrowth with mainly left-sided hemihypertrophy. Responses to conventional treatments is poor, often necessitating frequent bolus or continuous feeds. While never reported, there also may be a theoretic role for therapy using mTOR inhibitors.

Conclusion: We present the sixth reported case of hypoketotic, hypoinsulinemic hypoglycemia due to an AKT2 mutation in the world. Due to the downstream nature of this defect, treatment options are limited. In the event of hypoketotic hypoinsulinemic hypoglycemia, especially with associated dysmorphisms and overgrowth, an AKT2 gain-of-function mutation should be considered.

Transition to adult diabetes care: Perspectives from adolescents with type 1 diabetes and their caregivers

Sustainable Development Goal: Good health and well-being

Katherine Backman, Mark Inman, Rhonda Bryce, Rayzel Shulman

The transition from pediatric to adult care for adolescents with type 1 diabetes mellitus (T1DM) is a particularly challenging and vulnerable period, leaving adolescents at high risk for deterioration of their physical and mental health. Transition programs have been shown to support adolescents, improve their quality of care, and minimize negative health consequences related to transition. Currently, no formalized transition support program exists in Saskatchewan for adolescents with T1DM. This survey-based exploratory study examined perspectives, anticipated challenges, and transition needs of adolescents with T1DM and their caregivers followed in the LiveWell Pediatric Diabetes Program in Saskatoon, Saskatchewan. Respondents identified the need for supports to facilitate increasing adolescent independence and negotiation of responsibility for diabetes-related tasks between adolescents and their caregivers. They also identified gaps in current adolescent education, especially diabetes financial considerations. Adolescents and their caregivers conveyed the desire for specific information about their future adult diabetes care providers, pre-transition introductions to their adult care team, and a preference for in-person individual meetings rather than group-based transition workshops for transition education. These findings, which better our understanding of transition challenges and needs, will be instrumental in guiding further transition care initiatives to minimize gaps in care, reduce patient and family anxiety related to transition, and improve adolescent health and independence.

QI Project: Use of antibiotics for community acquired pneumonia inpatient pediatric ward

Nicole Bechard, Ayisha Kurji

Community acquired bacterial pneumonia remains a relatively common pathology that can result in admission to an inpatient ward. The Canadian Pediatric Society guidelines on uncomplicated community acquired pneumonia in previously healthy children recommend empiric therapy with amoxicillin or ampicillin for seven to ten days. This provides appropriate coverage for the most common pathogen (streptococcus pneumoniae) and is good practice for antimicrobial stewardship.

This project is an in progress quality improvement project which was initiated in order (i) to determine if the antibiotic selection in the inpatient pediatric context is following the Canadian Pediatric Society guidelines on choosing narrow spectrum oral antibiotics where possible and (ii) to decrease the use of IV broad spectrum antibiotics. The first PDSA cycle involved data collection from September 2017 to April 2018. Children aged 2 months to 17 years with a diagnosis of community acquired pneumonia were included in the data set. Results of 159 records showed that the four most common antibiotics used in these cases were amoxicillin (34.6%), ceftriaxone (34%), azithromycin (23.3%) and ampicillin (8.2%). This demonstrates a high use of broad spectrum antibiotics (i.e. ceftriaxone) and suggests that there is room for further improvement in antibiotic selection for community acquired pneumonia. It also demonstrated a secondary finding of a high rate of azithromycin use, which is not a first line treatment for community acquired pneumonia. As a result of this project a guideline flow chart and PPO were developed to be used in the next PDSA of the QI project as tools to encourage antibiotic choices that are narrow spectrum as per the CPS guidelines. This will be implemented over the next respiratory season (September-April 2020) and data on antibiotic use will be compared. Additional data may be collected from September-April 2018 and 2019.

Prevalence of passive exposure to vaping and active vaping in pediatric cystic fibrosis patients

Sustainable Development Goal: Good health and well-being

Supraja Rengan, Martha McKinney

The objective of this study is to evaluate the prevalence of exposure to passive vaping and active vaping in the pediatric cystic fibrosis population. Recently, there has been a trend towards e-cigarette use/vaping in the general population. Current Canadian data shows that prevalence of e-cigarette use is higher in individuals under the age of 25. Vaping associated lung injury is a newly emerging disease entity with rising morbidity and mortality in the general pediatric population. It is known that passive exposure to smoking results in increased hospitalizations and lower lung function in pediatric cystic fibrosis patients. A previous study in Quebec has shown that there is a high prevalence of passive exposure to cigarette exposure in patients with cystic fibrosis that is greater than the prevalence in the general population. This study aims to assess the prevalence of vaping in caregivers of pediatric cystic fibrosis patients as well as vaping practices of older patients seen in the pediatric cystic fibrosis clinic in Saskatoon. Data will be collected using a self-designed survey to assess smoking and e-cigarrette/vaping practices of pediatric patients and their caregivers. Surveys will be distributed as either a paper survey or online survey to individuals attending pediatric cystic fibrosis clinics. Consent will be obtained prior to administering the survey. In the future, we hope that this survey can be expanded to other clinical care settings to assess prevalence of e-cigarette use and exposure in the pediatric population.

Oral PRESENTATIONS

PhD Category

12:20-12:30

The Evolving Smoking Behavior of Canadian Youth in the Context of Changing Legislation

Tracey-Ann Stitchell, Nazeem Muhajarine

Background: Electronic cigarettes entered the market in 2006 and, with more than 460 brands and 7,700 flavorings, have amassed great popularity. Current research shows that countries, including the USA and Korea, are showing a dramatic increase in interest and use of electronic cigarettes by youth. Electronic cigarette related illnesses, such as EVALI, have emerged recently and are affecting thousands of patients. As of March 3, 2020, eighteen cases of vaping-associated lung illness have been reported to the Public Health Agency of Canada. Consequently, provincial bylaws pertaining to e-cigarette use and sale, as well as that of cannabis are changing nationally. These changes will potentially affect access to and use of these products by youth. Hence, in light of the expanding electronic cigarette market and changing cannabis legislation, research examining how the smoking behavior of Canadian youth is evolving is warranted and timely.

Purpose: The aim of this research is to identify the impact of cannabis legalization on youth, describe the trends in cannabis and e-cigarette use and to examine the perceptions of Saskatchewan's youth on cannabis and e-cigarette smoking.
Method: A nested mixed-method study will be conducted along with a systematic review of literature. A systematic review will be completed that examines the consequences of cannabis legalization in youth behavior and on outcomes such as attitudes, perceived risks and cannabis-related health care encounters. Two secondary data sources will be accessed for the study namely, the Canadian Student Tobacco, Alcohol and Drug Survey - CSTADS (2014-2019) and the Thriving Youth, Thriving Communities Survey (2019). These surveys will provide valuable information regarding the use of these products by youth as well as other risky health behaviors such as alcohol and drug use. A nested qualitative component will comprise focus group discussions examining youth perception of the risks and benefits associated with the use of cannabis and e-cigarettes. Additionally, any insights related to the understanding of terminologies pertaining to these smoking products from the quantitative component will be discussed. The study is guided by social behavioral theories (such as the Protection Motivation Theory) which postulates that youth might weigh the rewards (such as increased popularity) against threats (such as smoking related diseases) when making decisions regarding risky health behaviors such as smoking.
NB- If invited to do an oral presentation, i would present: a summary of changes in legislative context and pattern of use of tobacco, cannabis and now (smoking, vaping/e-cig), methodology and expected implications.

12:30pm-12:40pm

Bone health in children and youth with autism spectrum disorder: A systemic review and meta-analysis

Rostami Haji Abadi Mahdi, Saija Kontulainen

Sustainable Development Goal: Good health and well-being

Context: Higher risk of fracture reported in individuals with autism spectrum disorder (ASD) might be linked to poor bone development in childhood and suboptimal peak bone mass.
Objectives: To systematically review studies comparing imaged bone outcomes between children with ASD and typically developing children (TDC) or reference data, and perform a meta-analysis to compare those commonly reported bone outcomes.
Data Sources: We searched articles published between January 1991 and December 2018 from PubMed, Cochrane Library, Web of Science, EMBASE and Scopus databases.
Study selection: We included studies comparing areal bone mineral density (aBMD) between children with ASD and TDC in the meta-analysis, and evaluated other imaged bone outcomes qualitatively.
Results: Seven publications were identified for the systematic review, and four studies were included in the meta-analysis. The meta-analysis indicated that aBMD at the total body (effect size = -0.77; 95% CI, -1.26 to -0.28), lumbar spine (-0.69; -1.00 to -0.39), total hip (-1.00; -1.82 to -0.17) and femoral neck (-1.07; -1.54 to -0.60) were lower in children with ASD compared to TDC. Based on our qualitative review, limited evidence suggested lower total body bone mineral content and 10-20% lower cortical area (at distal radius and tibia), cortical and trabecular thickness (at distal radius) and bone strength (at distal radius and tibia) in children with ASD.
Conclusions: Children with ASD had lower aBMD at the total body, lumbar spine, hip and proximal femur compared to TDC. Limited evidence also suggested deficits in bone mineral content, micro-architecture and strength in children with ASD.

12:40pm-12:50pm

Lower bone area, content and strength in children and youth with type 1 diabetes

Yuwen Zhang, M. Kehrig, M. Nour, S. Kontulainen

Introduction: Greater fracture risk in children and youth with type 1 diabetes (DM1) may relate to weaker bones, however evidence is limited. The study objective was to compare bone properties and estimated bone strength between children with and without DM1.
Methods: We compared bone properties between 49 children and youth with DM1 and 170 typically developing peers (aged 6-15yrs). We used peripheral quantitative computed tomography to measure bone outcomes (area, content, density, and estimated bone strength) at distal and shaft sites of the radius and tibia, and muscle cross-sectional area at the forearm and lower leg. Prospective mixed-methods sequential explanatory study. conducted by We compared bone outcomes between children with DM1 and their peers using MANCOVA followed by pairwise comparisons. We adjusted radius comparison for sex, maturity, forearm muscle area and body mass and tibia comparison for sex, maturity and body mass. Significance was set at $p<.05$.
Results: Adjusted bone outcomes differed between children and youth with DM1 and their peers at the radius and tibia (Pillai's trace = 0.181 and 0.253, $p<.01$, respectively). At the radial shaft, children and youth with DM1 had a 7% lower total bone area, 8% lower cortical bone area, and 8% higher cortical bone density ($p<.05$). At the tibial shaft, children and youth with DM1 had an 7% lower total bone area, 9% lower cortical bone area, 5% lower cortical bone content, and 6% lower bone strength, and a 4% higher cortical bone density ($p<.05$). Conclusion: Children and youth with DM1 had deficits in bone area, content and strength, but a higher cortical bone density compared to their peers without DM1. Further study is warranted to determine underlying mechanisms and inform future potential interventions.

Oral PRESENTATIONS

Undergraduate Category

12:55-1:05pm

Comparing aortic growth rates in children with bicuspid aortic valve and conotruncal congenital heart defects

Chloe Johnson, Erin Barbour-Tuck, Gitanjali Mansukhani, Scott Pharis, Charissa Pockett, Tim Bradley

ABSTRACT:
BACKGROUND: Bicuspid aortic valve (BAV) is common and associated with progressive dilation of the ascending aorta (AAO). Conotruncal congenital heart defect (ctCHD), such as tetralogy of Fallot and transposition of the great arteries, are less common and associated with progressive dilation of the sinus of Valsalva (SOV). Related pediatric complications are rare and aortic surveillance guidelines in childhood are not well established. The aim of this study was to measure and compare aortic growth rates in children with BAV and ctCHD as annual rate of change in sinuses of Valsava or ascending aortic diameter and z-scores normalized to body surface area.

METHODS: Data were abstracted on CHD diagnoses, dates and types of cardiac surgeries and interventions, sex, and age, height and weight and other echocardiographic features recoded at the time of each study measured. Measurements were made on previously obtained serial transthoracic 2D echocardiograms at the level of the SOV and AAO and z-scores were calculated.

RESULTS: Thirty-one BAV (number of echocardiograms 11±5 [mean±SD]; age at last follow-up 13.8±2.6 years; duration of follow-up 8.1±3.1 years 28 males) and 16 conotruncal CHDs (number of echocardiograms 6±2; age at last follow-up 11.7±5.7 years; duration of follow-up 8.8±4.1 years; 8 males) were included. Of the BAV group, 21 had right/left cusp fusion (3 were post balloon valvuloplasty including 1 each with surgical valvotomy, aortic coarctation/ventricular septal defect repair, or atrial and ventricular septal defect repair), 8 had right/non cusp fusion and 1 had left/non cusp fusion (all with no prior interventions) and 1 had indeterminate cusp fusion (with prior balloon valvuloplasty and surgical valvotomy). Of the conotruncal CHD group, 3 had transposition of the great arteries (all post arterial switch operation), 7 had tetralogy of Fallot with pulmonary stenosis (5 post transannular patch and 2 post valve sparing repair), and 6 had tetralogy of Fallot with pulmonary atresia (all post conduit-type repair). In BAV, AAO growth rate was 1.1±0.5 mm/year and -0.01±0.22 Z-score/year. In ctCHD, SOV growth rate was 1.7±1.3 mm/year and 0.15±0.31 Z-score/year.

CONCLUSIONS: Absolute growth rates of the AAO in BAV and the SOV in ctCHD are consistent with somatic growth, as when normalized to body surface area Z-scores they remain similar with age. Generating aortic growth curves and using multi-level modelling, will be important to determine the independent clinical and echocardiographic predictors of AAO growth in BAV and SOV in ctCHD absolute growth rate and developing evidence-based aortic surveillance guidelines.

1:05-1:15pm

Effects of congenital heart disease sub-type on growth trajectories in early childhood

Megan Gallagher, Erin Barbour-Tuck, Gitanjali Mansukhani, Scott Pharis, Charissa Pockett, Tim Bradley

BACKGROUND: Children with congenital heart disease (CHD) tend to be shorter and weigh less than their healthy peers, but after surgical correction experience a rapid period of catch-up growth. This rapid catch-up growth in early childhood, in addition to exposure to a higher caloric diet and a more sedentary lifestyle than their healthy peers, may predispose children with CHD to obesity and cardiovascular disease. The aim of this study was to compare the growth trajectories for height, weight and body mass index (BMI) for different CHD subtypes through early childhood (birth to 7 years).

METHODS: Data were abstracted on sex, birth weight, birth height, CHD diagnoses, dates and types of cardiac surgeries and interventions, all available serial weights and heights; and BMI were calculated. Exclusion criteria were prematurity < 32 weeks, or any genetic, chromosomal syndromes or other multisystem disease known to affect growth trajectory.

RESULTS: The 7 CHD subtype groups included 11 coarctation of the aorta (median age at repair 2.2 [range 0.4 to 15.7] months), 5 transposition of the great arteries (median age at repair 0.8 [range 0.3 to 1.3] months); 8 tetralogy of Fallot (median age at repair 2.6 [range 0.7 to 7.8] months), 6 complex CHD with biventricular repair (median age at repair 2.4 [range 1.6 to 62.4] months), 14 complex CHD with single ventricular palliation (median age at Fontan completion 32.1 [range 25.8 to 49.1] months), 19 ventricular septal defects repaired (median age at repair 9.2 [range 3.5 to 136.2] months) and 21 ventricular septal defects not repaired. The mean number of visits was 11±7 with a mean duration of follow-up for all 84 CHD subtypes of 5.4±1.6 years. The mean growth trajectory of all CHD subtypes for weight was 3.1±1.5 kg per year, for height was 10.6±4.1 cm per year, and for BMI was 0.6±1.4 kg/m2 per year. The growth trajectories for weight, height, and BMI over the duration of follow-up were similar for each of the other CHD subtypes compared with ventricular septal defects not repaired.

CONCLUSIONS: Growth trajectories for weight, height, and BMI over early childhood for children with CHD were similar for complex compared with simple CHD subtypes. Generating growth curves for each CHD subtype using multi-level modelling and long-term follow-up, will be important to determine the effect of rapid catch-up growth for more complex CHD subtypes on future risk of obesity and cardiovascular disease.

Oral PRESENTATIONS

Knowledge Translation Category

1:20-1:30pm

The TREKK Saskatchewan Roadshow: A novel approach to disseminating pediatric emergency medicine treatment tools in rural, regional, and remote Saskatchewan

Seyara Shwetz, Vicki Cattell, Robert Carey, Gloria Yoo, Maple Liu, James Stempien

Introduction: 85% of children requiring emergency care do not present to a specialized children's hospital. Therefore, their care is delivered by generalized physicians practicing in remote, rural, or general emergency departments. By developing numerous comprehensive, user-friendly resources summarizing the latest evidence and best practices in pediatric emergency medicine, Translating Emergency Knowledge for Kids (TREKK) (www.trekk.ca) aims to ensure every child receives the highest standard of care regardless of where the care is provided. To enhance distribution, implementation, and utilization of these resources, the Saskatchewan TREKK Roadshow delivers medical education sessions to remote, rural, and regional centres across the province. The TREKK Roadshow implements multi-disciplinary teaching to deliver didactic lecture, procedural rounds, and simulated cases during the day-long session.

Methods: The TREKK Roadshow is a collaboration co-led by the University of Saskatchewan's Children's Emergency Services Division of the Department of Pediatrics and the Department of Emergency Medicine. Facilitators and participants are multi-disciplinary, including physicians, nurses, paramedics, residents, and respiratory therapists. Following the Roadshow, a paper evaluation is completed by participants, and the feedback drives content enhancement and development.

Results: Since 2018, the TREKK Roadshow has traveled to seven regional cities in Saskatchewan. Current feedback strongly suggests the event is a relevant, high-yield learning experience for participants. Feedback suggests the combination of simulation and didactic teaching results in early adaptation of new treatment regimes. Delivery of the content through a multi-disciplinary team is well-received by the participants; recognizing the strengths of different healthcare practitioners promotes safe distribution of tasks during simulated cases and improves critical resource management.

Discussion: The Saskatchewan TREKK Roadshow has shown to be a positive experience for remote, rural, and regional health care practitioners, including nurses, paramedics, respiratory therapists, and physicians. Roadshows have the potential to enhance the evidence-based, standardized care provided to children in the province's emergency departments by utilizing the tools developed by TREKK's pediatric emergency medicine specialists and researchers.
cardiovascular disease.

Oral PRESENTATIONS

Resident Category

1:30-1:40pm

Pediatric ED management of severe traumatic brain injury

Maple Liu, Gregory Hansen

Introduction: Traumatic brain injury (TBI) is the leading cause of residual disability and injury-related mortality in North American Children. As the majority of TBI injuries are received and managed in the ED, the ED trauma center is a vital part in optimizing management. Although guidelines for TBI management in adults has been well studied, pediatric management is largely facilitated by recent guidelines published in 2019.
Objective: Evaluating ED management of TBI in Saskatchewan will not only outline how pediatric TBI is managed in our center but may elucidate areas of improvement in our management.

Methods: This is a retrospective chart review that was conducted solely at Royal University Hospital (RUH) in Saskatoon, Saskatchewan. A total of 57 patients with severe TBI were studied, identified through medical records at RUH and its pediatric intensive care unit registry. Data collection included parameters around patient identifiers, transport to trauma center, injury severity, indicators for raised intracranial pressure, airway and breathing management, circulation management, disability/central nervous system management, complications, and outcome measures. Statistical analyses were done using SPSS software. Discrete variables were reported as percentages, and continuous variables were reported as median and interquartile ranges.

Results: Mean age was 14.3yrs with a majority being male (76.8%). Mechanism of injury was primarily due to motor vehicle accidents (44.6%). Only 3 patients demonstrated hypoxia on arrival, and of those, 2 were adequately treated. The majority of patients (66.1%) received end-tidal CO2 monitoring, however of the 37 patients, only 11 received interventions to correct CO2. Most patients had documented vitals associated with disability (pupils, GCS, C-spine precautions, temperature) promptly on arrival. However the position of bed was only appropriately set to 30 degrees for 2 out of 56 patients. Although the majority of patients (94.6%) received bloodwork, timing of first blood gas had a large variability (mean 31.5min). Among the 8 patients who died in hospital, 5 died on day 1 of hospital stay. Median GOS score on discharge was 3 (3 to 4.5).

Conclusion: In addition to comparing our ED management of pediatric severe TBI to current guidelines, novel parameters shown to affect TBI outcome were also included in this study. Although there are many areas of good adherence to current recommendations, there are definite areas of improvement that can provide guidance in optimizing survival for future pediatric patients.

1:40-1:50pm

Case Report of Intrauterine-acquired Congenital HSV Infection

Kaitlyn Lopushinsky, Andrei Harabor, Jaya Bodani

Introduction- Congenital infection due to intrauterine exposure to herpes simplex virus (HSV) is exceedingly rare, but when found is often associated with life-threatening complications and a significant mortality rate.

Case Description- A preterm male infant was born with diffuse erosions in various stages of healing suggestive of denuded bullae. The mother had a few atypical vesicles on one hand a few weeks prior to delivery and was not treated. Prenatal ultrasound showed fetal cerebral ventriculomegaly, suspected Dandy-Walker malformation, and oligohydramnios. Neonatal skin swabs were positive for HSV-2 by polymerase chain reaction (PCR) and the patient was treated with intravenous acyclovir. MRI findings showed severe progressive ex-vacuo ventricular dilatation consistent with congenital herpes simplex infection. Due to those findings and comorbid cardiac pathology with worsening function, care was redirected to a palliative path and the child expired at 21 days of age.

Discussion- Although confirmed congenital HSV infections are very rare, the potentially devastating prognosis and complications as evidenced by our case show that awareness of congenital HSV is critical for pediatricians as well as physicians involved in antenatal care period in order to provide optimal care.

Conclusion- In order to adequately counsel pregnant women, more work must be done to elucidate the prevalence of intrauterine HSV leading to congenital infection as well as diagnostic means and potential antenatal treatment.

1:50-2:00pm

CT Practice Standards for Pediatric TBI

Gloria Yoo, A. Leach, R. Woods, T. Holt, G. Hansen

Gloria Yoo, A. Leach, R. Woods, T. Holt, G. Hansen

Introduction: Acute medical management of traumatic brain injury (TBI) can be challenging outside of the resuscitation bay, specifically during transport to and from radiology and while obtaining a computed tomography (CT) scan of the brain. We sought out to determine the management practices of Canadian traumatologists for pediatric patients with severe TBI requiring CT in the emergency department (ED).

Methods: In 2019, surveys were sent to 20 adult and pediatric trauma directors in hospitals across Canada. The novel survey utilized a comprehensive “Who, What, When, Where, and Why” approach to ascertain clinical practices around CT scanning in the ED.

Results: Of the 9 traumatologists who replied (response rate = 45%), the majority (75%) managed up to 20 severe TBI patients a year. Most (89%) managed pediatric patients only and practiced in a Level I Pediatric Trauma Center (78%). Team members present in the CT scan included physicians (89%), registered nurses (100%), and respiratory therapists (38%). The average time to and from the CT scanner was one-hour. Over half of respondents (56%) had experienced an adverse event in CT with variable access (11-56%) to necessary resuscitation equipment and medications. Significant hypotension (44%) was the most common adverse event experienced. With the exception of an end tidal CO_2 monitoring (56%), heart rate, rhythm, respiratory rate, saturation, and blood pressure were always monitored during a CT scan. Head of bed elevation had an approximately equal distribution of flat (44%) versus elevated (56%).

Conclusion: The practice variability of Canadian traumatologists may reflect a lack of evidence to guide patient management during CT scanning in severe pediatric TBI, The current lack of standardized practice may potentially contribute to morbidity and mortality in this population. These findings may provide insight to guide future research and the creation of quality improvement initiatives or standardized protocols to manage these patients in the ED.

Thank you

Our Presenters

Our Judges

The Department of Pediatrics, Research Office

The College of Medicine, University of Saskatchewan

The Jim Pattison Children's Hospital Foundation of Saskatchewan

SPRING (Saskatchewan Pediatric Research and Innovation Group)

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