2021 VIRTUAL CELEBRATE RESEARCH DAY

POSTERS

RESIDENT AND FELLOW POSTER COMPETITION CATEGORY
VIRTUAL CELEBRATE PEDIATRIC RESEARCH DAY  
UBC DEPARTMENT OF PEDIATRICS

Friday, April 9th, 2021  
Via ZOOM – link provided separately

DEPARTMENT OF PEDIATRICS VIRTUAL GRAND ROUNDS

12:00 – 1:00pm  
Welcome to Celebrate Research Day 2021 & Introduction by Dr. Ran Goldman to Grand Rounds  
special keynote speaker Dr. Srinivas Murthy, Clinical Associate Professor, Department of Pediatrics,  
Faculty of Medicine, University of British Columbia.

VIRTUAL CELEBRATE RESEARCH DAY COMPETITION STARTS

1:00 – 1:05pm  
Introduction to competition and to judges & moderators  
Dr. Ran Goldman, MD, Director, Resident Research Program and Professor, UBC Department of Pediatrics,  
BC Children’s Hospital introducing Dr. Danya Fox, Dr. Kyla Hildebrand, and Dr. Jonathan Rayment.

PLEASE NOTE:  
With the ongoing success and outstanding projects, Celebrate Research Day and the competition is  
taking place in two simultaneous Zoom breakout rooms, one for the resident competition category,  
and the other for fellow competition category. Audience members are able to switch between and  
choose the room they would like to join.

Each oral presenter will have 8min to present & 2min for questions and speaker change over. Judges  
select a Best Resident Research Paper and a Best Fellow Research Paper. This year, only the winner  
of the resident oral competition category goes on to compete at the national level. Two runner-up  
winners are selected in each competition category, along with three poster competition winners  
(poster competition information on page 4).
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<tr>
<td>1:05–1:15p</td>
<td>Dr. Barbara Lelj Garolla Di Bard</td>
<td>Use Of A Neoprene Binding To Reduce Giant Omphaloceles Followed By Delayed Primary Closure, And A Qualitative Analysis Of Parents' Satisfaction</td>
</tr>
<tr>
<td>1:15–1:25p</td>
<td>Dr. Brittany Boorman</td>
<td>PEWS In The Emergency Department (ED) Provider’s Prospective Study</td>
</tr>
<tr>
<td>1:25–1:35p</td>
<td>Dr. Christopher Harper</td>
<td>Comparing The External Validity Of Clinical Prediction Tools Incorporating Serum Procalcitonin To Identify Febrile Infants (0-90 Days) At Low Risk For Serious Bacterial Infection: A Retrospective Analysis</td>
</tr>
<tr>
<td>1:35–1:45p</td>
<td>Dr. Derek Chan</td>
<td>Emergency Department Quality Of Care For Sickle Cell Disease In Ontario, Canada: A Population-Based Matched Cohort Study</td>
</tr>
<tr>
<td>1:45–1:55p</td>
<td>Dr. Katrina Assen</td>
<td>Evaluation Of The Effectiveness Of The Antimicrobial Stewardship Program Within The B.C. Women’s Hospital Neonatal Intensive Care Unit</td>
</tr>
<tr>
<td>1:55–2:00p</td>
<td>5-MIN BREAK</td>
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<tr>
<td>2:00–2:10p</td>
<td>Dr. Mitchell Canes</td>
<td>Availability Of Pediatric Home IV Therapy Across British Columbia: A Brief Environmental Scan</td>
</tr>
<tr>
<td>2:10–2:20p</td>
<td>Dr. Sabine Lague</td>
<td>Patterns Of Early Coronary Artery Changes In Pediatric Heart Transplant Recipients Detected Using Optical Coherence Tomography</td>
</tr>
<tr>
<td>2:20–2:30p</td>
<td>Dr. Taneille Johnson</td>
<td>Evaluating Sepsis Screening In The BCCH Emergency Department</td>
</tr>
<tr>
<td>2:30–2:40p</td>
<td>Dr. Tanjot Singh</td>
<td>Neighbourhood Socioeconomic Deprivation And Assault Injuries In Urban Youth</td>
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ZOOM BREAKOUT ROOM 2 – FELLOW ORAL COMPETITION CATEGORY

<table>
<thead>
<tr>
<th>Time</th>
<th>Presenter</th>
<th>Division</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:05 – 1:15pm</td>
<td>Dr. Adi Ein-Dor</td>
<td>Division of Gastroenterology</td>
<td>Ten Years Follow Up Of Early Onset Inflammatory Bowel Disease Patients- A Single Center Retrospective Cohort Study</td>
</tr>
<tr>
<td>1:15 – 1:25pm</td>
<td>Dr. Carolina Silva</td>
<td>Division of Endocrinology</td>
<td>Usability Of Virtual Visits For The Routine Clinical Care Of Transgender Youth During The COVID-19 Pandemic</td>
</tr>
<tr>
<td>1:25 – 1:35pm</td>
<td>Dr. Gurpreet K. Grewal</td>
<td>Division of Neonatology</td>
<td>Clinical Features And Echocardiographic Parameters Of Relative Adrenal Insufficiency (RAI) Among Preterm Infants: A Five-Year Review</td>
</tr>
<tr>
<td>1:35 – 1:45pm</td>
<td>Dr. James Wang</td>
<td>Division of Adolescent Medicine</td>
<td>Health Care Needs And Missed Care Among Youth In Care In British Columbia: A Population Study</td>
</tr>
<tr>
<td>1:45 – 1:55pm</td>
<td>Dr. Kate Maki</td>
<td>Division of Pediatrics Emergency Medicine</td>
<td>A Pilot Study Of Intranasal Lidocaine In Acute Management Of Pediatric Migraine And Migraine-Like Headache: A Randomized Controlled Trial</td>
</tr>
</tbody>
</table>

1:55 – 2:00pm 5-MIN BREAK

2:00 – 2:10pm  | Dr. Krishan Yadav       | Division of Neonatology                       | Impact Of Early Versus Late Medical Treatment Of A Hemodynamically Significant Patent Ductus Arteriosus On Time To Reach Full Feeds In Preterm Neonates |

2:10 – 2:20pm  | Dr. Kristen Favel       | Division of Nephrology                        | Chronic Kidney Disease Prevalence And Glomerular Filtration Rate Trends In Children With Type 1 Diabetes |

2:20 – 2:30pm  | Dr. Nikoo Niknafs       | Division of Neonatology                       | Fluid Overload In Newborns Undergoing Abdominal Surgery |

2:30 – 2:40pm  | Dr. Omolabake Akinseye  | Division of Neonatology                       | Automated Detection Of Respiratory Rate In Infants Using Video Images: A Feasibility Study |

2:40 – 2:50pm  | Dr. Rebecca Ronsley     | Division of Hematology/Oncology               | Effect Of Time To Diagnosis In Children With Malignant Central Nervous System Tumors On Survival Outcomes And Long-Term Morbidity: An Institutional Cohort Study |

2:50 – 3:00pm  | Dr. Saketh Saravu       | Division of Cardiology                        | 3D MedEd - Do 3D Models Improve Understanding Of Congenital Heart Disease? |

EVERYONE TO JOIN ZOOM BREAKOUT ROOM 1 – WINNER ANNOUNCEMENTS!!!

3:00-3:15pm    | Judging and Deliberation | (15-min audience & presenter break)          |
3:15 - 3:30pm  | Competition Awards & Wrap-Up | (oral and poster winners announced!)       |
This year, to showcase everyone’s fascinating research projects in the wider BCCH and UBC research community, all Celebrate Research Day presenters, including those selected for oral presentations above, were asked to create virtual posters. While only the ones selected for the poster presentation category below will be judged (3 top winners), everyone’s virtual posters are being showcased online on the UBC Department of Pediatrics website starting April 1st, for a 30-day period. To view all posters, go to the ‘Highlights’ section on the main department webpage: https://pediatrics.med.ubc.ca/

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<tr>
<th>Poster #</th>
<th>Name</th>
<th>Project Title</th>
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<tr>
<td>#1</td>
<td>Dr. Alyssa De Luca</td>
<td>Evaluating the Quality of Virtual Visits in a Tertiary Pediatric Endocrinology Clinic during the COVID-19 Pandemic</td>
</tr>
<tr>
<td>#2</td>
<td>Dr. Andrea Wallace</td>
<td>Taking YACtion: Adolescents’ future-based projects within a hospital-based youth advisory committee</td>
</tr>
<tr>
<td>#3</td>
<td>Dr. Ariane L’Ecuyer</td>
<td>Evaluating relationship between febrile temperatures and clinical outcomes in pediatric patients with severe falciparum malaria</td>
</tr>
<tr>
<td>#4</td>
<td>Dr. Basil Kadoura</td>
<td>Assessing Comfort in Caring for Transgender and Gender-Diverse Youth among Pediatric Physicians in British Columbia: A Cross-Sectional Survey</td>
</tr>
<tr>
<td>#5</td>
<td>Dr. Cielle Wachnian</td>
<td>Childhood leukemia long-read transcriptomics based point of care diagnosis: First phase – Retrospective point of care validation on biobanked samples. Second phase -Institutional prospective validation in low and high income countries. Third phase – Prospective use in low income countries.</td>
</tr>
<tr>
<td>#6</td>
<td>Dr. Derek Chan</td>
<td>Single cell profiling of hematopoietic stem and progenitor cells in pediatric aplastic anemia</td>
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<tr>
<td>#7</td>
<td>Dr. Kaie Rosborough</td>
<td>Clinical And Biochemical Efficacy Are Not Affected By Switch From Infliximab Originator To Renflexis In Pediatric Inflammatory Bowel Disease Patients</td>
</tr>
<tr>
<td>#8</td>
<td>Dr. Maksim Parfyonov</td>
<td>Leveraging The Gut Microbiota In Pediatric Refractory Epilepsy: Safety And Feasibility Of Oligofructose-Enriched Inulin Supplementation For Dysbiosis And Seizure Control</td>
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<tr>
<td>#9</td>
<td>Dr. Mor Cohen-Eilig</td>
<td>Developing screen time guidelines for children and youth with autism</td>
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*Poster #1, #2, #3, #4, #5, #6, #7, #8, #9 are in alphabetical order.*
**Poster #10**  
Dr. Safia Ladha  
*Resident, Division of General Pediatrics, Division of Hematology/Oncology*  
Characterizing inflammatory profiles in relapsed pediatric tumours

**Poster #11**  
Dr. Sarah Silverberg  
*Resident, Division of General Pediatrics*  
Transmission of SARS-CoV-2 by Children and Adolescents: A Systematic Review

**Poster #12**  
Dr. Maya Rosenkrantz  
*Resident, Division of General Pediatrics, Victoria*  
A Scoping Review Of Social Medicine Curricula In The Child And Youth Health Context Across Health Disciplines

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THANK YOU FOR VIRTUALLY CELEBRATING OUR PEDIATRIC RESEARCH IN 2021!

AND MANY THANKS TO OUR COMPETITION JUDGES!

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Dr. Kyla Hildebrand  
Dr. Jonathan Rayment  
Dr. Danya Fox

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For inquiries, contact:  
Maja Klempner, Research & Scholarly Activities Program Assistant, UBC Department of Pediatrics  
Email: pediatrics.research@ubc.ca  
Tel: 778-322-5534
Evaluating the Quality of Virtual Visits in a Tertiary Pediatric Endocrinology Clinic during the COVID-19 Pandemic

Alyssa De Luca, MD¹; Danya Fox, MD, FRCPC, MPH¹,²; Carol Lam, MD, FRCPC, MSc¹,²

¹University of British Columbia, Department of Pediatrics; ²Division of Endocrinology, BC Children’s Hospital

The Division of Endocrinology at the BC Children’s Hospital adapted by providing new patient consultations both virtually and in person. This project assessed the appropriateness of virtual outpatient consultations in pediatric endocrinology. The ultimate goal was to inform quality improvement (QI) initiatives to enhance the overall quality of patient care.

### Background/Objective

In light of the COVID-19 pandemic, the College of Physicians and Surgeons of British Columbia (BC) mandated that providers minimize direct contact with patients. The Division of Endocrinology at the BC Children’s Hospital adapted by providing new patient consultations both virtually and in person.

### How we did it

- A 4 question post-encounter survey was introduced for physicians to rate the level of appropriateness of a virtual visit for each new patient consultation:
  1. A virtual visit was/would be able to address this consultation as adequately as an in-person visit
  2. If I could choose freely outside the constraints of COVID-19, this consultation was/would be suitable for a virtual visit
  3. A physical examination was absolutely needed for clinical care of this patient
  4. I would have made the same management plan for this patient regardless of whether this was a virtual or in-person visit

### What we found

- 258 surveys were completed and analyzed from April 2020 to November 2020.
- Referral for short stature (n=47) was the most commonly seen consultation, with 81% initially seen virtually.

### Conclusions/Next Steps

- The most common referral to pediatric endocrinologists may not be optimal for virtual visits in the current model.
- Next step is implementation of a QI initiative targeted at enhancing virtual visits for newly referred short stature patients.
- Based on preliminary discussions with key stakeholders and analysis by an affinity diagram, 3 target areas have been identified:
  1. A virtual visit was/would be able to address this consultation as adequately as an in-person visit
  2. If I could choose freely outside the constraints of COVID-19, this consultation was/would be suitable for a virtual visit
  3. A physical examination was absolutely needed for clinical care of this patient

Graph 1: New patient consultations from April to November 2020, categorized by reason for referral (1 = short stature, 2 = tall stature, 3 = early puberty, 4 = hypothyroidism, 5 = congenital hypothyroidism, 6 = menses, 7 = bone health, 8 = delayed puberty, 9 = hypoglycemia, 10 = obesity, 11 = micropenis, 12 = other)

Post-encounter survey results – short stature

1. Physicians disagreed (mean score 3.3)
2. Physicians disagreed (mean score 2.8)
3. Physicians agreed (mean score 4.4)
4. Physicians disagreed (mean score 3.9)

Instituting stricter referral requirements
Obtaining accurate anthropometric measurements prior to the virtual visit
Provision of clearer expectations to patients and families prior to the virtual visit
Implementation of short stature triage form
Amendment of pre-existing parent information sheet

QI aim: improve mean survey scores to >4.5 (slightly agree) for question 1 and <3.5 (slightly disagree) for question 3 in 80% of patients newly referred for short stature within a 4-month period.
INTRODUCTION
For healthcare providers who care for adolescents with chronic health conditions, it is important to understand the perspectives of adolescents in order to provide care that will promote positive youth development (PYD), especially as adolescents navigate the transition to adult care. One increasingly popular approach to engage youth in the healthcare setting and promote PYD is for hospitals to implement Youth Advisory Committees (YACs).

There is a paucity of research on youth engagement in healthcare, and particularly with respect to YACs. It is important that we understand and support youth’s engagement with the healthcare system in order to support their transition from paediatric to adult care and promote positive youth development.

OBJECTIVES
To document how adolescents engage with the YAC at BC Children’s Hospital, and the meaning that they assign to their experiences with the YAC.

Research questions:
(a) How do adolescents construct, articulate, and act on goals and strategies related to their involvement in the YAC?
(b) What meaning do the goal-directed actions of adolescents involved in the YAC have for the adolescents?

THEORETICAL BASIS
The Action-Project Method (Young et al., 2001) will be used to collect and analyze the data. The method is guided by Contextual Action Theory (Young, Valach, & Collin, 2002). Contextual Action Theory (CAT) views development as the product of goal-directed actions and joint actions between individuals and the social context in which they occur, and how actions unfold over time.

Conceptually, we are using CAT to understand how youth engage with the YAC and how their actions in the YAC contribute to PYD. The links between CAT and PYD are highlighted in Table 1.

### Table 1: Comparing Contextual Action Theory and Positive Youth Development

<table>
<thead>
<tr>
<th>Contextual Action Theory (Young, Valach, &amp; Collin, 2002)</th>
<th>Positive Youth Development (Lerner et al., 2005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Joint actions occur within cultural context, and contribute to the construction of culture</td>
<td>• Youth development is conceptualized as a product of bidirectional relationships between the individual and their environment</td>
</tr>
<tr>
<td>• Conceptualizes action in terms of three components: manifest behaviour, internal processes, and social meaning</td>
<td>• Conceptualizes strengths of youth including behaviours such as school engagement, and internal processes such as intentional self-regulation and hopeful future expectations</td>
</tr>
<tr>
<td>• Youth development and transition to adulthood are constructed by the joint actions of youth and those around them, within the cultural context</td>
<td>• Transition to adulthood is a developmental process in which youth are influenced by interactions between individual internal factors and external cultural/environmental factors</td>
</tr>
<tr>
<td>• Over time, the process of constructing projects and the relationships youth establish with others engaged in their projects are key factors that support youths’ successful transition to adulthood</td>
<td>• When youth’s internal strengths are aligned with external resources to support positive growth, this optimizes their opportunities for healthy development and successful transition to adulthood</td>
</tr>
</tbody>
</table>

METHODS
Sample: 5-10 adolescents between the ages of 12-18 who are current members of the YAC.

Interviews: Adolescents will participate in a series of interviews as depicted in Fig. 1:
- Interview 1: A conversation with a researcher about their engagement with the YAC
- Interview 2: A video-mediated recall interview, which will allow youth to reflect on their responses.
- Narrative feedback interview: After analyzing the data, the researcher will write a narrative summary for the youth. The researcher and youth meet to discuss the narrative and its congruence with the youth’s views.

Data Analysis: The data analysis will focus on adolescents’ actions as they engage with the YAC. Within and cross-case comparison will be used to identify unique and common themes.

### Fig. 1: Steps in Research Protocol

1. Meeting 1: Youth Interview (recorded)
2. Meeting 2: Video recall Interview
3. Meeting 3: Narrative feedback

NEXT STEPS
The study is currently in progress.
We hope that the results of this study will increase our limited understanding of youth’s engagement in YACs and how their engagement may foster positive development and support their transition to adulthood.
Evaluating relationships between febrile temperatures and clinical outcomes in children with severe falciparum malaria.

Ariane L’Ecuyer MD FRCPc1, Laura Sauve MD FRCPc1, Arjen M. Donorop MD PhD2,3, Katherine Pliewes MSC, MD, DPhil FRCPc2,3,4
1Division of General Pediatrics, Department of Pediatrics, British Columbia Children’s Hospital, University of British Columbia, Vancouver, British Columbia, Canada.
2Malaria Department, Mahidol Oxford Research Unit, Faculty of Tropical Medicine, Bangkok, Thailand.
3Centre for Tropical Medicine and Global Health, Rufford Department of Clinical Medicine, University of Oxford, Oxford, United Kingdom
4Division of Infectious Disease, Department of Medicine, University of British Columbia, Vancouver, British Columbia, Canada.

Introduction

- Fluctuating fever is an intrinsic feature of malaria infection that coincides with schizont rupture of infected red blood cells (RBGs).
- Febrile temperatures inducing increased cytoadherence of parasitized RBGs in vitro suggests that temperature reduction may prevent sequestration in the microvascularity, consequently preventing end-organ dysfunction in vivo.1
- Acetaminophen is routinely administered to reduce fever in patients with malaria, as recommended by the World Health Organization (WHO).2
- Antipyretics in adults and children with malaria report conflicting effects on fever and whether antipyretics have a beneficial impact on the clinical course.1
- While fever at enrollment in patients with severe malaria has been associated with lower mortality, the relationship of longitudinal febrile temperatures with mortality and end-organ dysfunction is unknown.

Methods

- This study was an analysis of a subset of patients enrolled into three clinical trials assessing Acute Kidney Injury (AKI) was defined using the Kidney Disease Improving Global Outcomes (KDOQI).
- Lactate (μmol/L)
- HCO3 (μmol/L)
- White cell count (x10^9/L)
- Heart rate/minute
- Respiratory rate/minute

A total of 71 patients were included (Table 1). Mortality amongst this cohort was 27%. 61% were males, n (%) 71 (100%). Age (years) 38 (73%) 38 (73%) 50 (100%)

- Acute Kidney Injury (AKI) was defined using the Kidney Disease Improving Global Outcomes (KDOQI) criteria: creatinine ≥ 2.5 μmol/L or ≥ 1.5 times rise in creatinine from baseline, or requirement of renal replacement therapy (RRT) and using WHO criteria for AKI in severe malaria: urea > 56 mg/dL.4 Baseline serum creatinine was calculated by the validated Hoste(age) equation using age-based estimated glomerular filtration rate (eGFR) normative values (2 years old) and an eGFR of 120 ml/min per 1.73 m² (≥2 years old).5
- Coma recovery time was defined as hours until Glasgow Coma Score (GCS) recovered to greater than 11.

Results

- A total of 71 patients were included (Table 1). Mortality amongst this cohort was 27%: 16% patients had AKI during hospitalization, of whom 17% required RRT during admission.
- The Tmax and AOC-T° were similar among those that died compared to survivors (p=0.242 and 0.263, respectively). (Table 1)
- There were no significant differences in AOC-T° or Tmax (dichotomized by the medians) among those that died compared to survivors (p=0.540 and p=0.423). Time to death and length of hospital stay did not differ in patients with higher AOC-T° or Tmax (p=0.884 and p=0.447; p=0.483 and p=0.903) (Table 1).
- Higher Tmax and AOC-T° were associated with AKI at enrollment (p=0.004 and 0.017) and during hospitalization (p=0.001 and 0.001) (Table 3). However, among those with AKI at enrollment who subsequently received RRT compared to those who did not receive RRT, there was a trend towards lower, Tmax (38.7°C (38.3 to 39.3°C) versus 39.3°C (38.9 to 40.1°C) p=0.097) and AOC-T° (6.0°C (2.1 to 0.15°C) versus 2.0°C (15.1 to 27.8°C); p=0.036).
- In univariate logistic regression analysis, a higher creatinine at enrollment was associated with increased odds for mortality (Odds Ratio (OR) 1.74, 95%CI 1.22-2.49; p=0.002) whereas Tmax and AOC-T° were not associated with mortality (p=0.124 and p=0.682, respectively).

Objectives

1. To assess the relationship between febrile temperatures and mortality in hospitalized pediatric patients with severe falciparum malaria.
2. To assess the relationship between febrile temperatures and clinical outcomes reflecting end-organ dysfunction including renal outcomes and coma recovery time.

Table 1. Baseline demographics and clinical and laboratory characteristics of children with severe falciparum malaria by mortality status

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total</th>
<th>Survivors</th>
<th>Fatal cases</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>71</td>
<td>52</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>66 (92%)</td>
<td>50 (96%)</td>
<td>16 (84%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>5 (7%)</td>
<td>2 (4%)</td>
<td>3 (16%)</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>38 (73%)</td>
<td>38 (73%)</td>
<td>50 (100%)</td>
<td></td>
</tr>
<tr>
<td>Baseline serum creatinine (μmol/L)</td>
<td>70 (99%)</td>
<td>66 (99%)</td>
<td>4 (21%)</td>
<td></td>
</tr>
<tr>
<td>AOC-T° (°C)</td>
<td>39.1 (38.4-39.7)</td>
<td>39.1 (38.4-39.7)</td>
<td>39.2 (38.4-39.6)</td>
<td>0.821</td>
</tr>
<tr>
<td>Tmax (°C)</td>
<td>38.7 (38.3-39.3)</td>
<td>39.3 (38.9-40.1)</td>
<td>38.7 (38.3-39.3)</td>
<td>0.262</td>
</tr>
<tr>
<td>AKI</td>
<td>16 (23%)</td>
<td>12 (23%)</td>
<td>4 (21%)</td>
<td>0.444</td>
</tr>
<tr>
<td>Severe falciparum malaria</td>
<td>28 (39%)</td>
<td>18 (35%)</td>
<td>10 (53%)</td>
<td>0.129</td>
</tr>
</tbody>
</table>

Table 2. Severe malaria criteria on admission by febrile status

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total</th>
<th>Survivors</th>
<th>Fatal cases</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>71</td>
<td>52</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>AKI</td>
<td>16 (23%)</td>
<td>12 (23%)</td>
<td>4 (21%)</td>
<td>0.444</td>
</tr>
<tr>
<td>Admission temperature ≤ 39.0°C</td>
<td>66 (92%)</td>
<td>52 (96%)</td>
<td>16 (84%)</td>
<td></td>
</tr>
<tr>
<td>Admission temperature ≤ 39.4°C</td>
<td>51 (72%)</td>
<td>39 (75%)</td>
<td>12 (63%)</td>
<td>0.129</td>
</tr>
</tbody>
</table>

Table 3. Clinical outcomes by febrile status

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total</th>
<th>Survivors</th>
<th>Fatal cases</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>71</td>
<td>52</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Coma recovery time (hours)</td>
<td>24 (21-33)</td>
<td>26 (21-33)</td>
<td>18 (21-30)</td>
<td></td>
</tr>
<tr>
<td>AOC-T° (°C)</td>
<td>39.1 (38.4-39.7)</td>
<td>39.1 (38.4-39.7)</td>
<td>39.2 (38.4-39.6)</td>
<td></td>
</tr>
<tr>
<td>Tmax (°C)</td>
<td>38.7 (38.3-39.3)</td>
<td>39.3 (38.9-40.1)</td>
<td>38.7 (38.3-39.3)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Kaplan-Meier comparing coma recovery time by dichotomized Tmax

Figure 2. Kaplan-Meier comparing coma recovery time by dichotomized AOC-T°

Conclusion

- Febrile temperatures at enrollment and during the first 24 hours of admission were not associated with survival and may be associated with a prolonged coma recovery time.
- Lower temperatures during hospitalization were associated with but not predictive of RRT requirement in children with severe falciparum malaria.
- This analysis suggests that acetaminophen would not be detrimental and may be beneficial in the management of fever in severe malaria; analysis of a larger cohort would facilitate further delineating potential relationships of febrile temperatures and clinical outcomes in pediatric severe falciparum malaria.

References

4. Hoste age equation using age-based estimated glomerular filtration rate (eGFR) normative values (2 years old) and an eGFR of 120 ml/min per 1.73 m² (≥2 years old). Hoste equation using age-based estimated glomerular filtration rate (eGFR) normative values (2 years old) and an eGFR of 120 ml/min per 1.73 m² (≥2 years old).
ASSESSING COMFORT IN CARING FOR TRANSGENDER AND GENDER-DIVERSE YOUTH AMONG PEDIATRIC PHYSICIANS IN BRITISH COLUMBIA: A CROSS-SECTIONAL STUDY

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1. Division of Pediatrics, British Columbia Children’s Hospital, The University of British Columbia. 2. Clinical Research Support Unit, BC Children’s Hospital Research Institute. 3. Division of Adolescent Medicine, Department of Pediatrics, British Columbia Children’s Hospital, The University of British Columbia

METHODS

• Cross-sectional mixed-methods survey design created through REDCap and sent to all BC pediatric physicians, including resident physicians, through the BC Pediatric Society.
• Quantitative data was collected with an 18-question survey answered in a 4-point Likert scale. Each respondent was given a “Knowledge Score” and “Comfort Score” based on 4 questions (4-16) for each score.
• Quantitative data was analyzed using SAS version 9. Knowledge and Comfort Scores were compared using linear regression and individual questions were assessed using chi-squared test.
• Qualitative data was analyzed by two investigators using thematic analysis

RESULTS

• Narrative survey questions aimed to identify gaps in training and barriers in practice to using gender-affirming language when providing care for TGD youth. Similar themes arose with both questions, and were organized using an ecological model.

DISCUSSION

• The overall knowledge score (10/16) for all participants was 2 points below the comfort score (12/16). This was echoed in our narrative comments, that pediatric physicians in BC know they are lacking in knowledge to fully support this population and are eager to learn more.
• We theorize that the gap in training/knowledge is so significant that it becomes a barrier to using gender-affirming practices.
• Limitations: assessing personal comfort is a subjective measure and we cannot predict competence or ability. While we have a distribution of BC physicians across region, practice length and practice type, our smaller sample size makes it difficult to generalize our results to all BC pediatric physicians.

CONCLUSION

• Gaps in training may contribute to physician discomfort when discussing gender identity with patients.
• Integration of a creative educational opportunities about gender-diversity in medical school, such as role play and normalizing discussion about gender, may help improve future care of TGD youth.
• We must continue to advocate for ongoing decolonization of healthcare, including more inclusive EMRs and hospital identification systems.

ACKNOWLEDGEMENTS

We would like to thank all participants who engaged with our survey, Dr. Daniel Metzger and Dr. Sheila Marshall for their support on this project, and the Clinical Research Support Unit of BCCHR, most importantly Boris Kuzeljovic who unfortunately passed away prior to our project completion. Finally, thank you to the Department of Pediatrics for supporting this study with a Resident Research Mini-Grant.
Background
Genomic testing is standard of care for diagnosis, risk stratification & treatment of childhood leukemia. Low-income countries (LIC) often do not have access to diagnostic testing and cannot comprehensively diagnose leukemia, risk stratify patients, or provide treatment with appropriate chemotherapies/targeted therapies.

Objectives
To test the use of transcriptomics as a tool for point of care diagnosis of B-cell childhood acute lymphoblastic leukemia (ALL).

Hypothesis
RNA long read sequencing (LRS) can provide a fast, low-cost, and accurate point of care method of detecting genomic rearrangements and specific expression changes to allow for comprehensive diagnosis and care in LIC.

Methods
RNA extraction was performed from biobanked cells. After magnetic bead DNA and RNA extraction, DNA is removed with DNaseI. After ribosomal RNA depletion, cDNA is synthesized. LRS is performed using the Oxford Nanopore Technology (ONT) Promethion®. The ONT MinKNOW and MinKNOW Core, Guppy and other software were used to generate FAST5 and FASTQ files.

Results
• 41 biobanked samples identified
• One t(9;22) pilot sample ran
• RNA extracted from 13 samples with variable yield ranging from 187 ng to 1343 ng.

Pilot sample:
One t(9;22) sample was chosen to test ONT whole transcriptome sequencing. Aim - to test the ability of detecting both gene fusion & the specific expression pattern characterizing Ph and Ph-like leukemia with sequencing on one Promethion flow cell, yielding 73 M reads (80.51 Gb) over 72h.

Results –
• Fusion detection: 142 reads (molecules) map to BCR – ABL1 fusion. (vs 4,446 BCR and 1,796 ABL1).
• Expression pattern: A total of 27,114 isoforms were expressed with at least 2 RNA molecules (95th percentile: 51, 99th percentile: 164). In this sample, overexpressed genes include clinically relevant genes, such as: BTG1 (134), IKZF1 (159), EBFI (609), RUNX1 (132), ERG (173). CRLF2 is under expressed (2 molecules).
• Expression of 415 isoforms from 408 genes showed very high expression level
• 122 of these genes are involved in leukemia or cancer pathways (Kegg).

Discussion
Current diagnostic techniques include karyotyping, FISH, chromosome microarray & RNA sequencing. These techniques allow detection of critical genomic variants for stratification, including gene fusion and copy number variants. RNA-expression based categorization is now possible using RNA-microarray or RNA-sequencing, defining new prognostic and therapeutic groups. Classical (short-read) sequencing cannot reliably define the expressed isoforms or detect gene fusion or other variants.

RNA LRS allows for full length sequencing of all expressed gene isoforms. The ONT Minion is a LRS portable device usable for gene sequencing in remote areas. This device could be used as point of care (POC) in LIC. In this study, we are studying properties of ONT LRS to define the appropriate parameters for use at POC.

Sequencing of one BCR-ABL1 sample detected overexpression of the fusion transcript. In addition, a broad expression pattern may allow us to define prognostic/therapeutic subgroups, including Ph-like leukemia. Point mutations and indels may also be accessible with this technique.

Our preliminary data show that RNA extraction yield may be a limiting factor for this application.

Conclusions:
Preliminary data has shown that RNA LRS can identify gene fusion and characterize RNA expression in bone marrow samples from patients with B-cell ALL, thus allowing stratification of most cases. RNA LRS is a promising method to provide a fast, low-cost, and accurate point of care method of detecting genomic rearrangements and specific expression changes.

Future Directions
- Deep sequencing of one sample for each B-cell ALL group (1 sample / flow cell)
- CDNA bar-coding to decrease cost (6 samples per flow cell).
- CNV and mutation detection.

Second phase - Institutional prospective validation in low and high income countries.
Third phase – Prospective use in low income countries

Completion of phase 1 will allow for phase 2, a prospective study to validate point of care approach by performing LRS in patients with leukemia diagnosed at Red Cross War Memorial Hospital and BC Children’s Hospital and phase 3 point of care testing in unequivoked units in LIC.

References
Single cell profiling of hematopoietic stem and progenitor cells in pediatric aplastic anemia

Derek Chan,1,2,3 Wyeth Wasserman,3,4 Aly Karsan,5,6 Suzanne Vercauteren1,3,6

1 BC Children’s Hospital, Vancouver, BC; 2 Department of Pediatrics, Faculty of Medicine, University of British Columbia, Vancouver, BC; 3 Department of Medical Genetics, Faculty of Medicine, University of British Columbia, Vancouver, BC; 4 BC Cancer Research Institute, Vancouver, BC; 5 Department of Pathology and Laboratory Medicine, Faculty of Medicine, University of British Columbia, Vancouver, BC

Background and Rationale

- Aplastic anemia (AA) is a bone marrow failure disorder characterized by a paucity of blood cells that significantly predisposes affected individuals to life threatening infections and/or bleeding outcomes with a high mortality rate, risk of treatment relapse and/or evolution of clonal disease.

- Current therapy options include blood stem cell transplantation using a matched sibling donor or use of immunosuppressive agents, the latter of which supports an underlying immune-mediated process in AA; however, the use of improved agents for immunosuppression have not translated into meaningful improvements in clinical trial outcomes based on this fundamental principle.

- While adult-centric AA research has led to the recent identification of Eltrombopag as a novel therapy option, clinical trials in pediatric AA have shown no parallel benefit (Groarke et al., 2021), underscoring a widening knowledge and clinical translation gap for diagnosed children.

Hypothesis

We anticipate our approach of using single cell methods to profile hematopoietic stem and progenitor cells (HSPCs) in AA will allow for an unbiased identification of aberrant pathways that may be therapeutically targeted to rescue hematopoiesis with markedly improved confidence based on recent successes shown in other BMF disorders such as Shwachman-Diamond syndrome (Joyce et al., 2019).

We propose to use a stem-cell focused, discovery-based approach for the following aims:

Aim 1 – Elucidate the hematopoietic structure and transcriptional expression landscapes in pediatric AA.

Aim 2 – Characterize the genomic landscapes among primitive HSPCs within pediatric AA.

Aim 3 – Globally integrate HSPC proteomic profiling with transcriptomes in pediatric AA.

Research Approach and Methods:

Figure 1: Single cell transcriptional profiling of HSPCs in pediatric AA.

1) Primary pediatric bone marrow samples from healthy controls and/or patients with aplastic anemia (n=3 each) are processed and flow sorted to isolate viable Lin- CD34+ HSPCs and stained with DNA conjugated antibodies targeted to primitive cell surface markers.

2) CITE-seq: Labelled cells are partitioned and paired with oligonucleotide barcoded beads and enzymes required for library preparation by phase-based microfluidics at single cell resolution (Gel Bead-in EMulsion, “GEM”); cDNA libraries are prepared and sequenced, followed by bioinformatic analyses integrating cell surface marker data with transcriptomics to construct the hematopoietic hierarchy at single cell resolution;

3) Orthogonal data validation experiments for gene expression by quantitative PCR, functional HSPC colony output and flow based cell population analysis.

Funding supports provided by:
2021 BCCHR Childhood Diseases Seed Grant
Clinical and biochemical efficacy are not affected by switch from infliximab originator to Renflexis in pediatric inflammatory bowel disease patients

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Background
In British Columbia, Pharmacare’s 2019 biosimilar initiative mandated that all pediatric inflammatory bowel disease (IBD) patients on the infliximab (IFX) originator Remicade be switch to the biosimilar Renflexis by May 15, 2020.

The safety, clinical efficacy, and cost-effectiveness of biosimilar infliximab in adult inflammatory bowel disease have now been extensively shown. However, limited data have been collected in the pediatric IBD setting.

To date, there is pediatric IBD data demonstrating that switching from the IFX originator Remicade to the IFX biosimilar, CT-P13, does not affect efficacy, safety or immunogenicity, but there is no data on switching to Renflexis.

Aims
Primary aim
To determine the proportion of patients remaining on biosimilar IFX (Renflexis) at 24 weeks after switch from originator IFX (Remicade).

Secondary aim
To explore the proportion of patients remaining in clinical and biochemical remission at 24 weeks after switch from Renflexis to Remicade.

Methods
- Prospective, longitudinal, observational, single-center study at BC Children’s Hospital.
- All children with IBD receiving maintenance Remicade were followed prospectively 24 weeks prior to the switch and 24 weeks after the switch.
- Baseline demographics, anthropometrics, concomitant medication, clinical disease indices (wPCDAI, PUCAI), bloodwork (complete blood count, C reactive protein, albumin), fecal calprotectin, and IFX drug levels were collected at baseline and 3 monthly after the switch.
- All data are presented as median and interquartile range.

Results
Table 1: Baseline patient demographics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (n=139)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (%)</td>
<td>61 [85]</td>
</tr>
<tr>
<td>Median age (years)</td>
<td>16.2 [3.7]</td>
</tr>
<tr>
<td>IBD Subtype (%)</td>
<td></td>
</tr>
<tr>
<td>Crohn’s</td>
<td>79 [110]</td>
</tr>
<tr>
<td>Ulcerative colitis</td>
<td>18 [25]</td>
</tr>
<tr>
<td>Unclassified</td>
<td>3 [4]</td>
</tr>
<tr>
<td>Extraintestinal manifestations</td>
<td>20 [28]</td>
</tr>
<tr>
<td>Perianal disease (%)</td>
<td>33 [46]</td>
</tr>
<tr>
<td>Median Remicade duration (mo)</td>
<td>42.7 [35.1]</td>
</tr>
<tr>
<td>Concomitant medication (%)</td>
<td></td>
</tr>
<tr>
<td>Steroids</td>
<td>0 [0]</td>
</tr>
<tr>
<td>Azathioprine</td>
<td>22 [30]</td>
</tr>
<tr>
<td>Methotrexate</td>
<td>40 [56]</td>
</tr>
<tr>
<td>Previous surgery (%)</td>
<td>9 [13]</td>
</tr>
</tbody>
</table>

- At 24 weeks post-switch, 99% (137/139) of patients remained on Renflexis.

Table 2: Baseline patient demographics

<table>
<thead>
<tr>
<th></th>
<th>Baseline pre switch</th>
<th>24 weeks post switch</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median wPCDAI / PUCAI</td>
<td>0</td>
<td>0</td>
<td>0.18</td>
</tr>
<tr>
<td>Median CRP</td>
<td>&lt;5 mg/L</td>
<td>&lt;5 mg/L</td>
<td>0.26</td>
</tr>
<tr>
<td>Median fecal calprotectin</td>
<td>72.5 ug/g</td>
<td>65.5 ug/g</td>
<td>0.87</td>
</tr>
</tbody>
</table>

- There was no change in proportion of patients with clinical and biochemical indices in the normal range at the time of switch (baseline) and 24 weeks post switch.

Figure 1: There was no change in proportion of patients with clinical and biochemical indices in the normal range at the time of switch (baseline) and 24 weeks post switch.

Figure 2: Median IFX trough levels at baseline and 24 week post switch from Remicade to Renflexis.

Conclusions
Pediatric IBD patients on maintenance IFX can be successfully switched from IFX originator to the biosimilar Renflexis without affecting efficacy, immunogenicity or safety in the short term.

Prospective long-term outcomes for Renflexis are still warranted.
LEVERAGING THE GUT MICROBIOTA IN PEDIATRIC REFRACTORY EPILEPSY:
SAFETY AND FEASIBILITY OF OLIGOFRUCTOSE-ENRICHED INULIN
SUPPLEMENTATION FOR DYSBIOSIS AND SEIZURE CONTROL

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¹BC Children’s Hospital, ²University of British Columbia, ³BC Children’s Hospital Research Institute, ⁴Alberta Children’s Hospital, ⁵University of Calgary

BACKGROUND

The ketogenic diet (KD) is a highly effective therapy for treatment-resistant epilepsy (RE)¹,². Growing interest in the diet has generated a variety of hypotheses to explain the anticonvulsant effects of the KD, however the exact mechanisms remain poorly understood³. The KD is associated with significant adverse effects, and is difficult to maintain⁴. Therefore, biomarkers of KD response are needed to pursue novel therapeutic strategies.

Recent animal studies have implicated the gut microbiota (GM) as a possible mediator of the anticonvulsant effects of the KD. In mouse models of epilepsy, the anti-seizure effects of the KD are abolished in mice reared in a germ-free environment or those given antibiotics⁵. Replacing the intestinal flora with KD-type species restores the seizure protective effects. Importantly, enriching for these species in mice fed a conventional diet also provides anti-seizure effects suggesting a potential therapeutic target.

Limited data on the effects of KD on human GM with inconsistent results. At baseline, the GM of children with RE is less diverse and dysbiotic relative to healthy controls. During KD, diversity of the GM decreases further. Of note, these studies were conducted in Asia and Europe. Given the marked variability of the GM across populations, it is important to investigate whether similar shifts in the GM occur after the KD in North American children.

Prebiotics, defined as a ‘substrate that is selectively utilized by host microorganisms conferring a health benefit’⁶, are an attractive tool for altering the GM. The prebiotic effects of inulin-type fructans (ITF) are well documented in human trials. We aim to elucidate whether ITF prebiotics can prevent the undesired changes in the GM associated with the KD, and be used to manipulate the GM of children with refractory epilepsy to outcompete epileptogenic taxa thereby reducing seizures.

DESIGN

The current study is divided into two arms (see Figure). Children with refractory epilepsy, aged 2-18, will enter arm (A) if they are candidates for KD initiation. Otherwise they will enter arm (B). An additional cohort of healthy controls will be recruited for comparison. Primary endpoints include between- and within-patient variability in GM composition and metabolomics profile before and after starting on inulin. Secondary outcomes include seizure frequency, tolerability and feasibility of inulin supplementation in this unique population.

RESULTS

Due to the COVID19 pandemic, our recruitment is temporarily paused. We are anticipating results by the end of 2021.

REFERENCES

Developing Screen Time Guidelines for Children and Youth with Autism: Using the Knowledge to Action Framework

Cohen-Eilig Mor, MD; Mayer Yael, PhD; Chan Janice; Di-Spirito Nicole; Goldberg Tessa; Kuzyk Natasha; Glodjo Armanda, MD; Jarus Tal, PhD

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Faculty of Medicine
The University of British Columbia
Sunny Hill Health Centre

Background: Children with Autism spectrum disorder (ASD) are more susceptible to the potential detrimental effects of screens on health and development. Currently there are no screen time guidelines that address the specific needs of children and youth with ASD.

STAGE 1: Mapping needs and barriers for screen time use among children and youth with ASD

Objective: To map the current needs and barriers for screen time guidelines

Methods: 15 Clinicians

Interviews and focus groups

Summative analysis

Results - Main themes:
- Lack of knowledge and awareness for the need to monitor screen time use among families and clinicians of children with ASD.
- Individual, environmental and behavioral factors are contributing to increasing levels of screen use.
- The need for behavioral strategies to support screen use management.
- Existing gaps in the current screen time recommendations for children with ASD.
- An urgent need exists in developing adapted screen time guidelines specific for children with ASD.

STAGE 2 (work in progress): Developing screen time guidelines for children with ASD

Objectives: To develop useful educational screen time guidelines for children with ASD that are agreed upon by experts and stakeholders.

Methods:
Based on the results of stage 1 and extensive literature review a survey was created.

DELPHI METHOD

Goal - 75% agreement on the guidelines

The panel was asked about these areas:
- Risk for screen time overuse.
- Attitudes and knowledge about ASD and screen time.
- General screen time guidelines and their applicability to children with ASD.
- Behavioral strategies for parents and clinicians to monitor and regulate screen time use.
- Effective educational resources for managing screen time.

Conclusions:
- This project will provide guidance and education for parents and clinicians regarding the use of screen time with children and youth with ASD.
- The guidelines will include the best ways to use screen time, benefits and limitations of screen time, and strategies on how to mediate screen time conflicts.
- The agreed upon guidelines could be the steppingstones for clinical interventions for screen time use of children and youth with ASD.
CHARACTERIZING INFLAMMATORY PROFILES IN RELAPSED PEDIATRIC TUMOURS

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ABSTRACT

While the treatment of pediatric cancer has progressed considerably over the past half century, there remains a proportion of pediatric patients who will relapse and ultimately not be cured of their cancer. With the evolution of personalized medicine in which therapies are specifically targeted to each individual, there is an opportunity to utilize this therapeutic approach in relapsed pediatric cancer in which conventional chemotherapy approaches are unsuccessful. In order to take advantage of this approach, it is first necessary to characterize these relapsed tumours in order to identify the unique molecular signatures contained within, with the ultimate goal of tailoring therapies to those specific molecular changes.

To this end, we plan to re-analyse whole genome and RNA sequencing results from children and adolescents in BC with relapsed, refractory or hard to treat cancers who were previously enrolled on a precision medicine study, Peds POG (Personalized Oncogenomics). We have identified several Peds POG patients who have had extreme outlier expression of IL-6 and who presented with highly inflammatory states with tumor-induced fevers, weight loss and elevated inflammatory biomarkers such as CRP. In two such cases, patients were treated with immunomodulators targeting IL-6 and had dramatic clinical responses. This raises the hypothesis that whole transcriptome sequencing can identify a subgroup of patients with relapsed tumours who may benefit from a quality-of-life point of view with targeted anti-inflammatory measures. We therefore will aim to specifically assess RNA sequence data to determine expression of various inflammatory markers including cytokines such as IL-6 when compared within the tumour itself, to other similar tumours and to normal expression comparators. Patients with evidence of outlier IL-6 or other similar cytokine expression will be characterized. Among this retrospective cohort, response and outcome data for any patients receiving anti-IL6 targeted therapy will be described. With this information, it will be possible to ascertain the inflammatory profiles of relapsed tumours and subsequently guide treatment decisions including the possibility of initiating cytokine-specific targeted therapies.

BACKGROUND

Pediatric cancer and PedsPOG

- Significant differences in tumour composition/heterogeneity between pediatric and adult cancers
- Carcinogenesis is a complex process with a dynamic tumour microenvironment that differs among sites within a single patient, evolves over time with treatment and progression of disease
- Large proportion of pediatric cancers do not respond to initial treatment
- Second line treatment is less evidence-based, often associated with lower response rate, increased toxicity and high impact on quality of life
- Need for more bioinformatic data characterizing pediatric tumours in order to develop individualized/targeted therapies that offer a higher response rate with possibly less toxicity
- PedsPOG is a pediatric extension of the Personalized Oncogenomics (POG) initiative which utilizes genome sequencing to identify patient-specific molecular aberrations in order to inform systemic therapies and clinical decision-making

DNA/RNA sequencing in pediatric cancer

- Identification of underlying genetic changes in pediatric tumours can reveal druggable therapeutic targets and pathways
- Decreased cost and increased availability of bioinformatic tools such as DNA/RNA sequencing enables molecular profiling of tumours in a clinically relevant timeframe
- DNA sequencing has led to the identification of underlying genetic mutations that drive and maintain tumourigenesis
- Some studies have shown more utility with RNA-seq gene expression information whereby actionable RNA-seq identified gene expression changes were not identified by DNA analysis

Inflammation and cytokine expression in pediatric cancers

- Increased inflammatory cytokine (e.g. IL-6) expression and activity has been linked to the onset and progression of some pediatric cancers
- Overactivity of inflammatory cytokines contributes to the presentation of paraneoplastic syndromes
- Therapies targeting individual cytokines or upstream regulators has been shown to be effective in slowing disease progression
- RNA sequencing of inflammatory cytokines and their upstream regulatory pathways can identify tumours with abnormally high cytokine expression and may enable specific cytokine inhibitors to be used therapeutically

OBJECTIVE

The objective is to analyze whole genome and RNA sequencing results from children and adolescents in BC with relapsed, refractory or hard to treat cancers who are or were previously enrolled in the PedsPOG precision medicine study. Specifically, the data will be interrogated for DNA and RNA expression of inflammatory cytokines with the intent on generating possible therapeutic targets in a clinically relevant timeframe.

METHODS

- Samples will be obtained from participants enrolled in the PedsPOG study with relapsed, refractory cancers or cancers with very poor prognosis
- Tumour biopsies will undergo initial genomic analysis with a targeted panel
- Samples will subsequently undergo rapid RNA and DNA sequencing followed by bioinformatic analysis to identify unique drivers of that cancer
- Bioinformatic analysis would ideally highlight aberrantly expressed genes or pathways that can be targeted with available therapies
- Results will be discussed at tumour board meetings, with clinical care team and study participant and family to determine best therapeutic option

RESULTS

- Figure 1. POG workflow
- Figure 2. Utility of RNA sequencing analysis

SUMMARY

Despite the advancements in pediatric cancer treatment in the past decades, there remains a large portion of patients who do not respond to initial therapy and second-line treatment is often toxic with limited benefit, highlighting a need for the identification of more effective treatments. Personalized medicine using molecular profiling of such tumours can identify genetic aberrations and altered expression of genes and pathways leading to the identification of therapeutic targets and ultimately guide individualized clinical decision making.

Acknowledgements

We thank the patients and families who have enrolled in the PedsPOG study and donated samples to be analyzed as part of this study. We thank the UBC Department of Pediatrics Resident Research Grant for funding this work.

REFERENCES

4 Personalized Oncogenomics Group. Tped POG (POG) initiative which utilizes genome sequencing to identify patient-specific molecular aberrations in order to inform systemic therapies and clinical decision-making.

Figure 1. POG workflow

Figure 2. Utility of RNA sequencing analysis

Figure 3. Mesothelioma patient plasma cytokine profile.
Introduction

Children represent a minority of COVID-19 cases. Historically children have played an important role in disease transmission.

There has been debate as to the safety of opening schools and childcare settings. There is a significant need to better understand the role children play in the spread of COVID-19.

This systematic review identified evidence of pediatric index cases and confirmed transmission to children as well as to adults.

Methods

A search of OVID Medline, EMBASE, CINAHL, and Web of Science databases were searched for English language publications on December 1, 2020.

We included articles with confirmed child-to-child or child-to-adult transmission. Articles that did not include confirmed pediatric transmission, or that only demonstrated adult-to-child transmission, were excluded.

Articles that reported antibody response rather than PCR were excluded. Articles with in-hospital transmission were excluded.

We calculated the secondary attack rate in articles with sufficient information, as well as the number of infected contacts per child.

Narrowing of Inclusion Criteria

- Initially planned to correlate findings with population-wide studies that provided insight into pediatric evidence
- We excluded articles that simply demonstrated pediatric COVID-19 cases without any evidence of transmission or confirmed lack of transmission through contact tracing and testing due to a high volume of studies

Definition of Pediatric Transmission

Transmission Characteristics

Total of 9 studies from the United States, with 2 each from China and Germany, and 1 article each from Australia, Brunei, Greece, Hong Kong, Poland, South Korea, and Switzerland.

We seek to further evaluate transmission dynamics by age of the index case and age of the secondary cases.

Planned Analysis

- Calculation of partial secondary attack rates (i.e. each child, on average, led to a certain number of pediatric and adult secondary cases)
- Calculation of formal secondary attack rate
- Evaluation of attack rates by transmission setting, age, and other demographic factors

Reference / Bibliography

Social Medicine Curricula in the Child & Youth Health Context Across Health Disciplines: A SCOPING REVIEW

BACKGROUND

- Social determinants of health (SDOH) = conditions in which people are born, grow, live, work & age - determinative of health inequities.
- It is unclear which methods are most effective for teaching SDOH in child & youth health.
- This study aims to describe educational interventions used to teach SDOH in the child and youth health context in various health training programs and assess their possible role in a potential social pediatrics curriculum for pediatrics postgraduate training.

METHODS

- Literature search using Ovid MEDLINE & MedEd PORTAL + studies from references of relevant articles.
- Search supported by an information specialist.

INCLUSION CRITERIA:

- Educational interventions
- Social determinants of health
- Health professions
- Child & youth health

PRELIMINARY RESULTS

442 articles
- 1 screen

91 articles
- 2 screen from references

28 articles + 10 articles

38 articles

CONCLUSION

Ideally, social pediatrics curricula should incorporate a combination of educational strategies, provide learners with virtual resources, expose them to interdisciplinary learning, and bring them into the community to facilitate experience-based learning.

Using concepts of self-directed learning & reflection is fundamental in consolidating learning in social pediatrics.
2021 VIRTUAL CELEBRATE RESEARCH DAY

POSTERS

RESIDENT AND FELLOW ORAL COMPETITION CATEGORY
Usability of virtual visits for the routine clinical care of transgender youth during the COVID-19 pandemic

Background:
• Trans youth experience many barriers accessing gender-related care, and the COVID-19 pandemic has posed further challenges
• Since March 2020, our Gender Clinic experienced an unprecedented shift from in-person to virtual visits

Objective → to evaluate virtual visits for the routine gender care of trans youth

Usability: extent to which a product can be used by specific users, to achieve specific goals, in a specific context

Methods:
• Survey emailed to families who participated in a virtual gender visit between March and August 2020
• Developed by a multidisciplinary gender team, piloted on trans youth and families
• Included the Telehealth Usability Questionnaire (Paramanto, 2016) and questions about future preferences

Results: n=87 (39% response rate)

<table>
<thead>
<tr>
<th>Age (years), median (IQR)</th>
<th>15.6 (13.7, 17.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of follow-up (months), median (IQR)</td>
<td>19.5 (4.5, 34.5)</td>
</tr>
<tr>
<td>First clinic visit was virtual, %</td>
<td>15</td>
</tr>
<tr>
<td>Sex assigned at birth, female, n (%)</td>
<td>52 (60)</td>
</tr>
<tr>
<td>Current endocrine therapy, %</td>
<td>52</td>
</tr>
<tr>
<td>Hormone therapy</td>
<td>24</td>
</tr>
<tr>
<td>Puberty blockers only</td>
<td>24</td>
</tr>
<tr>
<td>No medications</td>
<td>75</td>
</tr>
<tr>
<td>Attended the visit, %</td>
<td>22</td>
</tr>
<tr>
<td>Only patient</td>
<td>3</td>
</tr>
<tr>
<td>Patient AND parent</td>
<td>75</td>
</tr>
<tr>
<td>Only parent</td>
<td>5</td>
</tr>
<tr>
<td>Health care provider (in addition to MD), %</td>
<td>23</td>
</tr>
<tr>
<td>Trainee</td>
<td>10</td>
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<tr>
<td>Nurse</td>
<td>1</td>
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<td>Social worker</td>
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<tr>
<td>Distance from hospital, %</td>
<td>75</td>
</tr>
<tr>
<td>&lt;100 km</td>
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<tr>
<td>&gt;200 km</td>
<td>5</td>
</tr>
<tr>
<td>Perceived safety of virtual visits, %</td>
<td>60</td>
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<tr>
<td>Safer than in-person</td>
<td>40</td>
</tr>
<tr>
<td>As safe as in-person</td>
<td>10</td>
</tr>
<tr>
<td>Less safe than in-person</td>
<td>0</td>
</tr>
<tr>
<td>Barriers to virtual visits</td>
<td>69</td>
</tr>
<tr>
<td>Not difficult</td>
<td>30</td>
</tr>
<tr>
<td>Hard to build a relationship</td>
<td>13</td>
</tr>
<tr>
<td>Trouble focusing</td>
<td>6</td>
</tr>
<tr>
<td>Would like to continue virtual visits, %</td>
<td>94</td>
</tr>
<tr>
<td>Desired number of visits per year, median</td>
<td>2</td>
</tr>
<tr>
<td>Virtual</td>
<td>1</td>
</tr>
</tbody>
</table>

Discussion:
• Virtual gender visits have very good usability
• Virtual care is as safe/safer than in-person for trans youth
• Trans youth and families would like to continue virtual care after this pandemic

During this time of extraordinary change, continuous assessment and changes are essential to ensure high-quality care. With this feedback from families, our clinic’s delivery of care will continue to be transformed.
Clinical features and echocardiographic parameters of relative adrenal insufficiency among preterm infants: a five-year review

Gurpreet K. Grewal; Mimi T.Y. Kuan; Krishan Yadav; Carol K. Lam; Joseph Y. Ting
Department of Pediatrics, University of British Columbia, Vancouver BC, Canada

INTRODUCTION

• Infants born at low gestational age (GA) may not exhibit adequate cortisol levels at time of stress, also known as relative adrenal insufficiency which is postulated to further compromise compensatory mechanisms and circulatory collapse

OBJECTIVE

To review clinical features and echocardiographic parameters of RAI in preterm infants and their correlation with adrenocorticotropic hormone (ACTH) stimulation tests

METHODS

• Single center (British Columbia Women’s Hospital NICU, Vancouver) 5-years retrospective study (Jan 2015 – Jun 2019)

Inclusion Criteria

• GA <32 weeks
• Presented with a shock-like clinical picture at physicians’ discretion
• cortisol level of <250nmol/L at this time of stress

Exclusion Criteria

• Received corticosteroid prior to cortisol collection

Definitions:

• Oxygenation failure: defined as an absolute increase of at least 20% in the mean arterial pressure or FiO2 requirement within 24 hours of spot cortisol sample drawn
• Ventilation failure: defined as the need for rescue HFOV/HFJV because of inability of conventional settings to maintain adequate ventilation support or a 20% increase in amplitude within 24 hours of spot cortisol drawn
• Systemic hypotension: defined as a blood pressure (systolic, diastolic, or mean) below the third percentile (as expected for the gestational age) that persisted for at least 1 hour before the cortisol sample was drawn

REFERENCES


RESULTS

• 45 eligible infants (5.6% of NICU admissions) (Figure 1)
• Only 19 infants (42.2%) received hydrocortisone for presumed RAI, with a median [range] treatment duration of 2 days [1 – 8]
• Lower cortisol level was associated with lower GA at the presentation of RAI (p-value= 0.049)

Figure 1: Study Eligibility Flow Chart

Table 1: Sample Demographics and Clinical Characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>n (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic Hypotension</td>
<td>33 (73.3)</td>
<td></td>
</tr>
<tr>
<td>Fluid boluses</td>
<td>29 (64.4)</td>
<td></td>
</tr>
<tr>
<td>Inotropic support</td>
<td>31 (68.9)</td>
<td></td>
</tr>
<tr>
<td>Respiratory instability</td>
<td>33 (73.3)</td>
<td></td>
</tr>
<tr>
<td>Oxygenation failure</td>
<td>29 (64.4)</td>
<td></td>
</tr>
<tr>
<td>Ventilation failure</td>
<td>23 (51.1)</td>
<td></td>
</tr>
<tr>
<td>Hyponatremia</td>
<td>37 (82.2)</td>
<td></td>
</tr>
<tr>
<td>Oliguria ≤15µmol/L</td>
<td>10 (22.2)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Clinical Features of Infants with RAI

<table>
<thead>
<tr>
<th>ACTH - Abnormal (n=4)</th>
<th>ACTH - Normal (n=41)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA weeks, median [IQR]</td>
<td>24 [23-27]</td>
<td>25 [22-30]</td>
</tr>
<tr>
<td>BW grams, median [IQR]</td>
<td>840 [660-1000]</td>
<td>625 [500-1427]</td>
</tr>
<tr>
<td>Age of onset in weeks, median [IQR]</td>
<td>10 [5-26]</td>
<td>13 [2-47]</td>
</tr>
<tr>
<td>Hypotension, n (%)</td>
<td>2 (67)</td>
<td>14 (82)</td>
</tr>
<tr>
<td>Respiratory instability, n (%)</td>
<td>3 (100)</td>
<td>31 (65)</td>
</tr>
<tr>
<td>Use of hydrocortisones, n (%)</td>
<td>3 (100)</td>
<td>16 (94)</td>
</tr>
</tbody>
</table>

Table 3: Clinical Features among Infants with ACTH Stimulation Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>n (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROC analysis demonstrated that low cortisol level was not predictive of adverse clinical (hypotension, respiratory instability, hyponatremia, or oliguria) and laboratory outcomes (abnormal ACTH test)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 infants (28.9%) had echocardiogram performed at time of cardiopulmonary deterioration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All had normal left ventricular (LV) fractional shortening (median [IQR]: 42% [38 – 49])</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LV output (median [IQR]: 242ml/kg/min [155 – 330])</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSIONS

• 5% of NICU admission with RAI (cut-off of cortisol <250nmol/L at the time of shock-like presentation)
• Lower cortisol level was associated with lower GA at the presentation of RAI (p-value= 0.049)
• Further prospective study with well-defined protocol is needed to understand the use of cortisol and its clinical implications

gurpreet.grewal@cw.bc.ca
Health care needs and missed care among youth in care in British Columbia: a population study

James X. Wang, MD\textsuperscript{a}, Sheila K. Marshall, PhD\textsuperscript{a,b}, Colleen S. Poon, PhD\textsuperscript{c}

Background
- Youth in care (YIC)
  - Definition: Youth living in foster care, kinship care, group homes, or youth agreements within the past year.
  - Vulnerable population with many risk factors leading to high prevalence of mental and physical health needs\textsuperscript{1,2}.
  - Recommended to have more frequent health care encounters than general adolescent population\textsuperscript{1,2}.
- It is unknown how Canadian YIC perceive whether their health care needs are sufficiently met.

Objective
To assess YIC’s perception of their health status and frequency of missed care in comparison to the non-YIC group.

Method
- 2018 BC Adolescent Health Survey\textsuperscript{3}
  - Comprehensive questionnaire administered by the McCreary Centre Society every 5 years.
  - Unweighted sample size: 38,015 respondents.
  - Representative sample of the population of 255,000 public school students in Grades 7-12 in BC.
- Measures
  - Questionnaire items on demographics, mental and physical health (poor, fair, good, excellent), and health care access in the past year.
- Statistical analysis
  - IBM SPSS\textsuperscript{®} Complex Samples module software.
  - Weighted frequency and cross-tabulation analyses.

Results

Table 1. Demographics.

<table>
<thead>
<tr>
<th>% of weighted sample</th>
<th>YIC</th>
<th>Non-YIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>14.76 y</td>
<td>14.91 y</td>
</tr>
<tr>
<td>Gender identity</td>
<td>Female</td>
<td>50.9%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>42.9%</td>
</tr>
<tr>
<td></td>
<td>Non-binary</td>
<td>6.2%</td>
</tr>
</tbody>
</table>

** = p < 0.01; N.S. = not significant

- YIC had more than twice as high odds to report poor/fair mental health (OR 2.28 [99% CI 1.83-2.83]) and physical health (OR 2.42 [99% CI 1.93-3.04]) compared to non-YIC.

Table 2. Rates of “poor” or “fair” self-rating of mental and physical health among YIC and non-YIC.

<table>
<thead>
<tr>
<th></th>
<th>Mental health</th>
<th>Physical health</th>
</tr>
</thead>
<tbody>
<tr>
<td>YIC</td>
<td>46.5% **</td>
<td>36.4% **</td>
</tr>
<tr>
<td>non-YIC</td>
<td>27.6%</td>
<td>19.1%</td>
</tr>
</tbody>
</table>

** = p < 0.01, as compared to non-YIC

- Female YIC were more likely than male YIC to report poor/fair mental health (63.4% vs. 25.6%) and physical health (43.8% vs. 25.0%) (p < 0.01).

Table 3. Self-reported reason for missed mental health care in the past year.

<table>
<thead>
<tr>
<th>Prior negative experience</th>
<th>YIC</th>
<th>Non-YIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent/guardian would not take me</td>
<td>22.3%</td>
<td>11.0% **</td>
</tr>
<tr>
<td>No transportation</td>
<td>19.8%</td>
<td>10.0% **</td>
</tr>
<tr>
<td>Couldn’t go when it was open</td>
<td>11.5%</td>
<td>4.8% **</td>
</tr>
<tr>
<td>On a waiting list</td>
<td>9.1%</td>
<td>4.6% **</td>
</tr>
</tbody>
</table>

Note: Other response options not shown. ** = p < 0.01

Discussion
- YIC reported worse mental and physical health and higher rates of missed care than non-YIC.
  - Poor self-perceived health status is a product of environmental, population (i.e. YIC as a group), and personal barriers to receiving needed health care\textsuperscript{4}.
  - Gender disparity: female YIC reported worse health and higher rates of missed care than male YIC.
  - Possible explanations: baseline gender differences in health needs, gendered socialization of health perception, or sampling limitations (e.g. more males not attending school or in alternative schools).
- Study limitations
  - Public school-based surveys would not capture youth who are enrolled in independent schools, homeschooled, or not attending school.
  - Cross-sectional study design unable to examine causal relationships.

Conclusions
- Further attention is needed in addressing systemic and individual barriers to health care in this vulnerable population.

References
Chronic kidney disease prevalence and glomerular filtration rate trends in children with type 1 diabetes

Kristen Favel1,2,4, Cherry Mammen1,2, Constadina Panagiotopoulos1,3
University of British Columbia Department of Pediatrics1, Division of Nephrology2, Division of Endocrinology3, Clinician Investigator Program4

Objectives
To describe the prevalence of CKD and abnormalities in estimated glomerular filtration rate (eGFR) in children with T1D
To explore the relationship between patient characteristics and trends in eGFR

Methods
Ambispective cohort study (2016-2019)
Single pediatric tertiary center in Vancouver, Canada
Paper and electronic record review
Sex, age, history of DKA, height, weight, blood pressure, A1C, and outpatient serum creatinine

Cohort
420 children under 18 years of age with T1D followed in the Diabetes clinic

Definitions
Modified Schwartz eGFR formula
CKD: < 60 ml/min/1.73 m²
At risk for CKD: 60-<90 ml/min/1.73 m²
Normal: >90-140 ml/min/1.73 m²
Hyperfiltration: >140 ml/min/1.73 m²

Analysis
Linear regression modelling of eGFR as a function of duration of T1D, adjusting for patient characteristics

Results
54% males
Age at diagnosis: 6.1 years
Duration of T1D: 4.8 years
44% had a history of DKA
21% developed AKI with DKA
43% use insulin pump

A1C: 7.8%
eGFR: 114 ml/min/1.73 m²
BMI: 73rd percentile
Systolic BP: 65th percentile
Diastolic BP: 51st percentile

No participants had overt CKD
76% had normal renal function
12% had were in the “at risk” category
12% demonstrated hyperfiltration

When eGFR was analyzed as function of duration of T1D, there was a linear decline in eGFR of 1.4 ml/min/1.73 m² per year (-1.95, -0.87; p<0.001)

Adjusting for patient characteristics, there were steeper declines in eGFR with duration of T1D in females vs males, and with higher A1C values and BMI and DBP percentiles

Conclusions
In a large cohort of children with T1D, 24% were considered at risk for CKD based on a mildly decreased GFR and/or hyperfiltration, and there was a linear decline in eGFR of 1.4 ml/min/1.73 m² with each year. Change in eGFR with time has not been characterized in children with T1D. This is concerning as children with T1D are at risk for CKD over their lifetimes. Further study is needed to characterize their renal function trajectories.

Acknowledgements to the Canucks for Kids Fund, as well as Mike Irvine, Ricky Thandi, Kimberley Chang, and Rebecca Ronsley. This study was supported through the fellowship training of K.F. (UBC Clinician Investigator Program). The funding source had no role in the design and conduct of the study.
Impact of early versus late medical treatment of a hemodynamically significant patent ductus arteriosus on time to reach full feeds in preterm neonates

Krishan Yadav*, Mimi Kuan†, Gurpreet K Grewal‡, Michael Castaldo§, Joseph Ting∥

Department of Pediatrics, University of British Columbia, Vancouver BC, Canada

Background

• Prolonged exposure to a hemodynamically significant patent ductus arteriosus (hsPDA) in preterm infants has been associated with an increase in neonatal morbidities.
• There is limited evidence, based on small and heterogeneous trials, that early closure of hs-PDA may improve tolerance to enteral feeds.

Objective

• To examine the effect of timing of medical treatment (within first 7 days of life versus after 7 days of life) for a hsPDA on the duration to achieve full feeds in infants born at >30 weeks of gestation.

Design/Methods

• This was a retrospective cohort study in our quaternary neonatal intensive care unit (NICU) with a dedicated targeted neonatal echocardiography service.
• Demographic and cardiorespiratory characteristics of infants admitted between July 2015 - June 2019 who received medical treatment for a hsPDA were analyzed after being grouped based on those who received first medical therapy within 7 days of life (early treatment) and after 7 days of life (late treatment).
• A hsPDA was defined using both clinical (worsening ventilation, pulmonary hemorrhage/edema, or hypotension required inotrope or hydrocortisone) and echocardiographic findings (LA/Ao ratio>1.4; LVO>350mL/kg/min, PDA>1.4mm, p=0.013). Other echocardiographic parameters for hsPDA were similar in both groups.
• Infants in early treatment group reached full feeds earlier than those in late treatment group (day of life 19 [IQR 14.8,33.8] vs. 30 [IQR 21,48], p=0.042).

Results

• A total of 46 babies (24 in early treatment group and 22 in late treatment group) were included in study.
• There were no differences in baseline demographic characteristics between two groups except in median birth weight (802 vs 1016g, p=0.022) [Table 1].
• Median left ventricular output was lesser in early treatment group(286 ml/kg/min[264,350] vs 369 [299-423] p=0.013). Other echocardiographic parameters for hsPDA were similar in both groups.

Table 1: Clinical characteristics and neonatal outcome data of infants in early and late treatment groups.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Early Treatment group (n=24)</th>
<th>Late treatment group (n=22)</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age (weeks), median IQR</td>
<td>25.5 [24 – 27]</td>
<td>25.5 [24.2 – 27]</td>
<td>ns</td>
</tr>
<tr>
<td>Birth Weight (grams), median IQR</td>
<td>802 [649 – 887]</td>
<td>1016 [859 – 1161]</td>
<td>0.022</td>
</tr>
<tr>
<td>Proportion of SGA, n (%)</td>
<td>5 (10.9)</td>
<td>2 (4.3)</td>
<td>ns</td>
</tr>
<tr>
<td>Apgar Score &lt; 7 at 5-minute, n (%)</td>
<td>15 (32.6)</td>
<td>14 (30.4)</td>
<td>ns</td>
</tr>
<tr>
<td>Drug for initial medical therapy</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Indomethacin, n (%)</td>
<td>10 (41.7)</td>
<td>5 (22.7)</td>
<td>ns</td>
</tr>
<tr>
<td>Ibuprofen, n (%)</td>
<td>12 (50)</td>
<td>13 (59.1)</td>
<td>ns</td>
</tr>
<tr>
<td>Acetaminophen, n (%)</td>
<td>2 (8.3)</td>
<td>4 (18.2)</td>
<td>ns</td>
</tr>
<tr>
<td>Two or more courses of medical treatment, n (%)</td>
<td>16 (66.7)</td>
<td>8 (36.4)</td>
<td>ns</td>
</tr>
<tr>
<td>Need for surgical ligation, n (%)</td>
<td>4 (16.7)</td>
<td>3 (13.6)</td>
<td>ns</td>
</tr>
<tr>
<td>NEC Stage 2 or above, n (%)</td>
<td>2 (4.3)</td>
<td>6 (13)</td>
<td>ns</td>
</tr>
<tr>
<td>In-hospital Mortality, n (%)</td>
<td>4 (16.7)</td>
<td>2 (9.1)</td>
<td>ns</td>
</tr>
<tr>
<td>Started feeds (DoL), median IQR</td>
<td>3 [2 – 4]</td>
<td>3 [2 – 4]</td>
<td>ns</td>
</tr>
<tr>
<td>Reached full feeds (DoL), median IQR</td>
<td>18.5 [14.8 – 33.8]</td>
<td>30 [21 – 48]</td>
<td>0.042</td>
</tr>
<tr>
<td>Duration to reach full feeds (days), median IQR</td>
<td>15 [11.8 – 24.5]</td>
<td>27.5 [16.2 – 44]</td>
<td>0.028</td>
</tr>
</tbody>
</table>

Results

Table 2: Echocardiographic parameters of infants with hemodynamically significant PDA in each treatment group.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Early Treatment group (n=24)</th>
<th>Late treatment group (n=22)</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVO (mL/kg/min), median IQR</td>
<td>286 [264 – 350]</td>
<td>369 [299 – 423]</td>
<td>0.013</td>
</tr>
<tr>
<td>RVO (mL/kg/min), median IQR</td>
<td>218 [183 – 287]</td>
<td>281 [250 – 317]</td>
<td>ns</td>
</tr>
<tr>
<td>PDA diameter (millimeters), median IQR</td>
<td>1.8 [1.37 – 2.22]</td>
<td>1.95 [1.52 – 2.2]</td>
<td>ns</td>
</tr>
<tr>
<td>LA/Ao ratio, median IQR</td>
<td>0.83 [0.77 – 0.875]</td>
<td>0.815 [0.79 – 0.87]</td>
<td>ns</td>
</tr>
<tr>
<td>LA/Ao ratio, median IQR</td>
<td>1.6 [1.4 – 1.95]</td>
<td>1.68 [1.52 – 1.87]</td>
<td>ns</td>
</tr>
<tr>
<td>IVRT (milliseconds), median IQR</td>
<td>35.5 [32.3 – 42.4]</td>
<td>37.5 [32.4 – 41.8]</td>
<td>ns</td>
</tr>
<tr>
<td>TAPSE (millimeters), median IQR</td>
<td>6 [6 – 7]</td>
<td>8 [7 – 8]</td>
<td>0.002</td>
</tr>
<tr>
<td>LV FS (%), median IQR</td>
<td>40 [38.5 – 43]</td>
<td>41 [36.5 – 44]</td>
<td>ns</td>
</tr>
<tr>
<td>LV EF (%), median IQR</td>
<td>75 [73 – 78]</td>
<td>76 [72.2 – 78]</td>
<td>ns</td>
</tr>
</tbody>
</table>

LVO: Left Ventricular Output; RVO: Right Ventricular Output; PDA: Patent Ductus Arteriosus; LA/Ao ratio: the ratio of peak velocity blood flow from left ventricular relaxation in early diastole (the E wave) to peak velocity flow in late diastole caused by atrial contraction (the A wave) at the left atrial valve; LA/Ao ratio: ratio of Left atrium and Aortic diameter; IVRT: Isovolumetric Relaxation Time; TAPSE: Triplane Apical Annular Plane Systolic Excursion; LV FS: Left Ventricular Fractional Shortening; LV EF: Left Ventricular Ejection Fraction

Conclusion

• Early medical treatment of hsPDA was associated with shorter duration to reach full feeds in our cohort of preterm infants.
• Larger scale study is needed to understand the association between the timing of medical therapy and prolonged exposure of splanchic circulation to hs PDA.

Key references


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Infants undergoing abdominal surgery, particularly those born preterm, are at risk of postoperative fluid overload and acute kidney injury (AKI) due to immature cardiac and renal functions, which could contribute to increased morbidity and mortality.

**OBJECTIVES**

To evaluate the burden of fluid overload among newborns undergoing abdominal surgery and its association with adverse neonatal outcomes.

**METHODS**

**Inclusion criteria:**
- Newborns who had undergone laparotomy from
- Admitted to a tertiary level NICU Jan 2017 – Jun 2019

**Exclusion criteria:**
- Diagnosed with congenital malformation or syndrome, TORCH infection, ultrasound evidence of large parenchymal hemorrhagic infarction (>2cm, Grade 4 IVH)
- Acute kidney injury – defined as an increase in serum creatinine >1.5 times of baseline or >26mmol/L, or urine output less than 0.5mL/kg/hr over 24-hour

**Fluid overload** – maximum percentage change in body weight and difference between actual and prescribed fluid intake post-operatively

**Statistical analysis:**
- Mann-Whitney U test used to compare actual and prescribed fluid intake
- Association was assessed with univariate and multivariate linear regression models

**RESULTS**

- Eligible patients (n=60) demographic and clinical characteristics can be found in Table 1

**Table 1. Patient demographic and clinical characteristics**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Median [IQR] or n/N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestation age (GA), weeks</td>
<td>29 [25 – 36]</td>
</tr>
<tr>
<td>Birth weight (BW), grams</td>
<td>1240 [721 – 2871]</td>
</tr>
<tr>
<td>Indicators for laparotomy</td>
<td></td>
</tr>
<tr>
<td>Small bowel obstruction</td>
<td>27/60 (45.0)</td>
</tr>
<tr>
<td>Necrotizing enterocolitis</td>
<td>14/60 (23.0)</td>
</tr>
<tr>
<td>Large bowel obstruction</td>
<td>7/60 (11.7)</td>
</tr>
<tr>
<td>In the first 3 post-op days</td>
<td></td>
</tr>
<tr>
<td>Required inotropes</td>
<td>24/60 (40.0)</td>
</tr>
<tr>
<td>Hypotremia (&lt;130mmol/L)</td>
<td>5/9/ (8.5)</td>
</tr>
<tr>
<td>Hypoalbuminemia (&lt;20g/L)</td>
<td>15/31 (48.4)</td>
</tr>
<tr>
<td>Serum creatinine measured</td>
<td>52/60 (86.7)</td>
</tr>
<tr>
<td>Fulfilled our AKI criteria</td>
<td>4/60 (6.7)</td>
</tr>
<tr>
<td>Max % change of BW</td>
<td></td>
</tr>
<tr>
<td>Within first 3-days post-op</td>
<td>6 [3 – 13]</td>
</tr>
<tr>
<td>Within first 7-days post-op</td>
<td>11 [5 – 17]</td>
</tr>
</tbody>
</table>

- Median actual fluid intake was significantly higher than prescribed fluid intake in the first 7 post-operative days (p<0.01) [Figure 1]

- Every 1% increase in weight gain within the first 3 days post-operation was associated with an increase in 0.6 day of invasive ventilator support (p=0.012) [Figure 2].

- Such correlation still exists after adjusting for GA (p=0.033).

**CONCLUSIONS**

- Weight gain within the first 3 post-op days was positively associated with the duration of invasive ventilator support
- Actual fluid intake was significantly higher than prescribed fluid – potential target of future QI projects
- Careful monitoring of intra- and early postoperative fluid balance may play an important role in optimizing outcomes of newborns undergoing abdominal surgery

**REFERENCES**

Automated detection of respiratory rate in infants using video images: A feasibility study

Omolabake Akinseye1, Nikoo Niknafs1, Liisa Holli2, Pascal M. Lavoie1,2, Guy A. Dumont1,2, Soodeh Ahani1,2
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INTRODUCTION

- Children face the highest risk of death in their first month. Sepsis is a leading cause of mortality
- Early signs of sepsis can be subtle. Respiratory rate (RR) is important in clinical assessment
- Contact-based monitors such as electrocardiograms and pulse oximeter involve high maintenance costs for supplies1
- WHO Danger Signs help frontline health workers in developing countries identify ill babies in need for prompt referral and interventions. Could some of these DS be captured automatically using simple video-based monitoring devices?

OBJECTIVE

- To create an algorithm that can automatically measure RR and identify breathing abnormalities in babies using conventional Red Green Blue (RGB) video images.

METHODS

- Videos were captured from 13 stable neonates admitted to a tertiary care NICU (Vancouver, Canada), with a resolution of 1620x1236 pixels, with 8 bits per pixel, and at 20 frames/second using a high-resolution Buxco RGB camera mounted on a tripod stand 1 m away from the infant (figure 2).
- Each video frame was split into candidate overlapped Regions of Interest (ROI) and grouped into motionless and moving regions. The moving regions were selected as the ROI. The motion magnification algorithm2 was used to magnify the breathing motion and estimate the breath pulse from the videos. This was compared to RR visually counted by a medical expert looking at the video sequence.

RESULTS

<table>
<thead>
<tr>
<th>DEMOGRAPHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of babies</td>
</tr>
<tr>
<td>Gestational age at birth, mean (SD), weeks</td>
</tr>
<tr>
<td>Gender, no (%)</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Birth weight, mean (SD), gm</td>
</tr>
<tr>
<td>Age median (IQR), days</td>
</tr>
<tr>
<td>Respiratory support</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

| RR detection by a new algorithm (Fig 1) |

| BREATH PULSE ESTIMATED FROM THE VIDEO |

<table>
<thead>
<tr>
<th>Time (seconds)</th>
<th>0</th>
<th>0.015</th>
<th>0.03</th>
<th>0.045</th>
<th>0.06</th>
<th>0.075</th>
<th>0.09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiration</td>
<td>28.0</td>
<td>28.5</td>
<td>29.0</td>
<td>29.5</td>
<td>30.0</td>
<td>30.5</td>
<td>31.0</td>
</tr>
</tbody>
</table>

| Study Set Up (Fig 2) |

| Manually detected respiratory rate |
|---|---|---|
| 45 | 50 | 55 |
| 50 | 57 | 57 |
| 55 | 55 | 55 |
| 60 | 60 | 60 |
| 65 | 65 | 65 |
| 70 | 70 | 70 |

| Correlation (Fig 3) |

| Pearson r = 0.88 | p = 0.046 |

CONCLUSION

- We developed an algorithm that can measure RR and identify apneic events using RGB video images in young infants (Fig 1). Further studies, using large datasets and including infants with vital sign abnormalities, are needed to establish its effectiveness in the clinical setting, e.g., telemedicine, remote clinic visit and critical care.

REFERENCES


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Effect of time to diagnosis in children with malignant central nervous system tumors on survival outcomes and long-term morbidity: an institutional cohort study

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Background

- Delayed diagnosis of pediatric CNS tumors is common in several types of tumors in the United States, the United Kingdom and Canada.
- Central nervous system (CNS) tumors account for approximately one quarter of new cancer diagnoses in children and are the largest group of solid neoplasms.
- Average overall survival of 72% for children with malignant CNS tumors and are the largest group of solid tumors in the United States, the United Kingdom and Canada.
- Central nervous system (CNS) tumors account for approximately one quarter of new cancer diagnoses in children.
- Morbidity remains high and includes vision and hearing loss, cognitive impairment and endocrinopathies, all of which might impair function and quality of life.
- Experience with anecdotal and small series have demonstrated that timely diagnosis is crucial in minimizing associated morbidity and early mortality.
- Currently, the impact of time to diagnosis on long-term morbidity and mortality in patients with CNS tumors is unknown.

Objective

- To determine the impact of time to diagnosis (TTD) on morbidity and mortality and to identify factors associated with overall survival in pediatric patients with malignant CNS tumors.

Methods

- This is a retrospective review of all malignant CNS tumors presenting to BC Children’s Hospital (BCCH) from 2000-2019
- Inclusion criteria: malignant CNS tumors presenting to and treated at BCCH
- Exclusion criteria: low grade gliomas and those not treated at BCCH
- Data collection: past medical history, tumor type and presence of metastatic disease, treatment protocol, treatment outcome, disease and treatment-related morbidities (vision loss, hearing loss, panhypopituitarism, cognitive impairment, learning disability)
- Analyses:
  - Time to diagnosis (TTD) defined as time of first symptom to time of oncology consultation
  - TTD and overall survival (OS) as well as morbidity; stratified by tumor, age and presence of metastatic disease
- Survival was estimated using the Kaplan-Meier method. A cox proportional hazards model was used to evaluate the relationship between mortality and long-term morbidity (vision loss, hearing loss and cognitive impairment)

Results

- A total of 116/191 childhood tumors were identified as a malignant CNS tumor and included
- Medial TTD was 63 days (IQR 26.5-237.5 days) with a range of 23 (IQR 6.5-237.5 days) to 197.5 (IQR 61.8-418.8 days)
- Three-year PFS was 57% and 5-year OS was 78.4%
- 64% of patients were alive with no evidence of disease at median follow up from treatment completion of 4.31 years (IQR 1.77-6.15 years)
- Time to diagnosis is crucial in minimizing associated morbidity and early mortality.

Inclusion criteria:

- Central nervous system (CNS) tumors account for approximately one quarter of new cancer diagnoses in children.
- Morbidity remains high and includes vision and hearing loss, cognitive impairment and endocrinopathies, all of which might impair function and quality of life.
- Experience with anecdotal and small series have demonstrated that timely diagnosis is crucial in minimizing associated morbidity and early mortality.
- Currently, the impact of time to diagnosis on long-term morbidity and mortality in patients with CNS tumors is unknown.

Morbidity Analysis by Tumor Group Using Cox Proportional Hazards Model

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>N (%)</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
<th>Lower 95% CI</th>
<th>Upper 95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medulloblastoma</td>
<td>81 (42.8)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.610</td>
<td>0.000</td>
<td>1.000</td>
<td>0.420</td>
</tr>
<tr>
<td>Ependymoma</td>
<td>3 (15.4)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.686</td>
<td>0.000</td>
<td>1.000</td>
<td>0.255</td>
</tr>
<tr>
<td>High-grade glioma</td>
<td>23 (68.4%)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.665</td>
<td>0.000</td>
<td>1.000</td>
<td>0.070</td>
</tr>
</tbody>
</table>

Conclusions

- This is the first study to evaluate the impact of TTD on overall survival and morbidity in pediatric CNS tumors.
- Median TTD is associated with overall survival and long-term morbidity in pediatric patients treated for malignant CNS tumors.
- Additional larger-scale studies will aid clinicians’ understanding of contributing factors to long term morbidity and mortality.

Future Directions

- Knowledge translation to parents and healthcare professionals should be a priority to promote prompt medical care aiming to mitigate morbidity and mortality.