SRTP - Project Description Form #235

PART I:

Name of Schulich faculty member who will supervise the project	Roberta Berard
Supervisor's Schulich, Western, Hospital or Lawson Email	roberta.berard@lhsc.on.ca
Schulich Department	Paediatrics

PART II - Project Description

Title of Project	Sarcopenia in children with Chron's disease

Background

Crohn's disease (CD) is a chronic inflammatory condition associated with growth failure and impaired nutritional status in 65-85% of children. Children with CD risk for malnutrition due to reduced caloric intake, malabsorption, micronutrient deficiencies, decreased physical activity, glucocorticoid therapy, and increased production of inflammatory cytokines. These factors contribute to the unintentional loss of skeletal muscle mass which is known as sarcopenia.

In adults with inflammatory bowel disease (IBD), sarcopenia is associated with poor disease outcomes and decreased quality of life. Whether similar outcomes exist for children with CD has not been extensively studied.

Assessing sarcopenia in a clinical setting can be done using cross-sectional abdominal CT by taking measurement of total psoas muscle area (tPMA). Using the intervertebral lumbar area, total psoas muscle area is easily measured, reproducible, and gives a reliable representation of total body muscle mass.

To the best of our knowledge, there are no studies investigating if children with CD have sarcopenia using CT imaging of tPMA. There has been evidence of sarcopenia in children with Inflammatory bowel disease (IBD) using MR imaging, but this data lacks normative reference ranges, making it difficult to interpret.

Recently, the Hospital for Sick Children (SickKids) has developed normative, age and sex-specific reference ranges of tPMA for children aged 1-16. This provides an opportunity to evaluate the prevalence of sarcopenia in children compared to standardized tPMA growth curves.

Therefore, this study aims to investigate the prevalence of sarcopenia in children with CD by using CT imaging of tPMA compared to normative pediatric tPMA growth curves. Additionally, this study will evaluate the clinical outcomes for children with Crohn's disease who are sarcopenic. Further understanding of sarcopenia in pediatric CD could introduce improved predictive measures of poor outcomes and subsequently allow for interventions such as nutritional and physical rehabilitation.

Hypothesis

Our primary objective will be to determine if children with Crohn's disease have sarcopenia compared to normative reference ranges by measuring total psoas muscle surface area. Our secondary objective will be to determine if the presence of sarcopenia in children with Crohn's disease will impact their outcomes at diagnosis, time of CT, 6 months and 1 year follow-up.

We hypothesize that the clinical course for children with Crohn's disease who have sarcopenia, will be associated with more negative outcomes such as the need for surgery and failure of therapy.

Proposed Methodology

This study is a retrospective, single-center study conducted at the Children's Hospital of Western Ontario (CHWO) in London, Ontario. Patient data from 2013-2023 will be collected through the hospital electronic medical record for analysis of sarcopenia and clinical outcomes. A waiver of consent will be requested for this access to patient data. Variables gathered from patients will include patient factors, laboratory data and clinical parameters (wPCDAI). Total psoas muscle surface area will be measured on patients with Crohn's disease who have had a clinically indicated abdominal CT. All tPMA measurements will be measured by a radiologist.

Disease severity and response to therapy will be measured using the Weighted Pediatric Crohn's Disease Activity Index (wPCDAI) and the change in score will be compared over the two follow-up time points. Follow up will be recorded from 6 month and 1-year appointments. Treatment course over time will be evaluated including changes to therapy and complications such as the need for surgery, abscess formation, the presence of strictures and fistulas, and number of disease flares will be recorded.

The target sample size of this study is 30 pediatric patients with Crohn's disease. Study participants must be between 1-16 years of age, meet diagnostic criteria for Crohn's disease and have had a CT scan that includes views of the psoas muscle. Participants must not have any comorbid neuromuscular diagnosis that affects muscle mass.

Data will be analyzed using descriptive analysis, with mean, medians, and data ranges reported. All statistical analyses will be performed using SPSS. A $p < 0.05$ will indicate a statistically significant difference.

Expected Outcomes

Over the course of the summer, it is expected that the student will retrieve, organize and analyze data retrieved from the hospital medical record, according to the criteria outlined above. This data analysis will provide exploration into the approach of CT imaging of tPMA in the clinical management of Crohn's disease. It also aims to provide further support for the use of sarcopenia as a biomarker for poor clinical outcomes in pediatric Crohn's disease. It is expected that this analysis will help to support pediatric gastroenterologists when considering how to identify children at risk of poor outcomes. Ultimately, this will serve to benefit pediatric patients with Crohn's disease because early identification of poor outcomes will allow for proactive nutritional and physical rehabilitation interventions.

Research Environment – Description of the number of research personnel, primary location of research, size of lab, etc

This research should be conducted by one student, with the supervisory assistance from Dr. Berard and the individuals listed below. The primary location of this research will be virtual by VPN from power chart, however they may be some instances when the student will have to extract data from physical records which will occur onsite at LHSC London.

Names and titles of other individuals who will be involved with the research project?

Dr. M Miller, Statistician, LHSC London
Sarah Wells, Research Coordinator, LHSC London
Dr. Ian Ross, radiology, LHSC
Dr. Eileen Crowley, Pediatric GI, LHSC
Dr. Jessica Woolfson, Pediatric GI, LHSC

Can this project be done remotely?	Yes
Duration of Project	One Summer

Expected Objectives/Accomplishments for Student?

The student will achieve content knowledge of the relevance of sacropenia in pediatric chronic disease, in particular in Pediatric Crohn's disease. The student will learn about the processes required to achieve ethics approval for a retrospective study. The student will learn skills in development of a case report form, database development and management. The student will perform data collection, develop a data analysis plan, and will review data output and provide preliminary data interpretation. The student will write the first draft of the manuscript and will present this work at peds GI / rheum national meetings. The student will have regular meetings, guidance, and mentorship from supervisors until the project has been completed, and the manuscript published.

PART III - Certifications

If the project will require any certification approvals from one or more of the following offices, please check the appropriate box below.	- Human Ethics
Human Ethics: If you have the protocol information, please enter it below (or enter the status of the approval).	Pending - REB will be submitted and approved before summer 2024

Note: certification approval should be obtained prior to the start of the summer. Projects without this approval will not be a priority for funding.