Comprehensive Research Experience for Medical Students
Summer Research Program 2020

Supervisor/Project Information Form
Due February 6, 2020 by email to crems.programs@utoronto.ca

Supervisor Name: Dr Sebastian Hobson

Project Title: Development of a novel diagnostic imaging score to predict placenta accreta spectrum disorders: Combining ultrasound and MRI

Hospital/Research Institution: Mount Sinai Hospital

Email: Sebastian.Hobson@sinaihealth.ca

Field of Research (2 keywords): Obstetrics, Radiology

Department: Maternal Fetal Medicine, OB/GYN

School of Graduate Studies Appointment (IMS, LMP, IHPME etc)? Yes/No: No
If YES, please name: N/A

Brief Project Description (<300 words):
BACKGROUND: Placenta accreta spectrum (PAS) disorders are rapidly evolving into the most significant iatrogenic pregnancy condition of the 21st century. Due to rising rates of pregnancy following cesarean deliveries, the incidence of this condition is around 1 in every 403 births. If subsequent placentation occurs at the location of an acquired cesarean scar with placenta previa, the risk of placental “invasion” leads to significant risk of major postpartum hemorrhage, massive blood transfusion, hysterectomy and damage to adjacent organs and major vessels. The key to adequate preparation and reducing complications lies in accurate antenatal diagnosis with ultrasound and MRI, both of which remain understudied.

OBJECTIVE: Our study (REB 17-0162-E) aims to develop a novel scoring system based on ultrasound and MRI findings to accurately diagnose and stratify the severity of PAS disorders.

METHODOLOGY: Retrospective cohort study from 2008-2019. Cases include 135 identified pregnant women with diagnosed PAS disorder who underwent ultrasound and MRI. Controls include 102 identified pregnant women with isolated placenta previa who underwent ultrasound and MRI.
OUTCOMES: Patient demographics, ultrasound characteristics (placental shape, lacunae, vascularity, ectopy, myometrial integrity and thinning), MRI characteristics (dark bands, texture, lobulation, ectopy and myometrial loss), surgical outcomes and postoperative outcomes including histopathological diagnosis. Ultrasound characteristic scores will be independently determined by two MFM physicians, and MRI scores by two specialist radiologists.

STATISTICAL ANALYSIS: Bayesian cluster analysis will be used to estimate the probability of PAS disorder presence and severity for any given combined ultrasound/MRI score. Diagnostic testing parameters will be calculated with statistical significance $p<0.05$. Statistical support/training are provided.

OPPORTUNITY: This project will enable the medical student to develop clinical research skills in obstetrics, radiology, REDCap database entry (currently 50% completed), statistical analysis, research presentation and manuscript preparation (including publication authorship). They will also have an enriched clinical experience within a cohesive specialized team.