

Musculoskeletal Oncology

Leadership



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Orthopaedic oncology research faces several challenges, including insufficient patient volume at individual sites, so high-quality research to guide clinical practice has lagged behind other surgical subspecialties. However, the rigorous design, organization and execution of the first multi-centre randomized controlled trial in orthopaedic oncology (PARITY), led by CEO, has set a new standard for clinical research in the field. Capitalizing on the international momentum of PARITY and the advanced trial infrastructure of CEO, our goal is to expand our research program of high-quality international trials in the field to generate research findings that enhance clinical practice.

Juravinski Hospital and Cancer Centre – Clinical Program in Musculoskeletal Oncology

The Musculoskeletal Oncology Clinical Research Team, situated at the Juravinski Hospital and Cancer Centre (JHCC) site of Hamilton Health Sciences, is participating as a recruiting centre for the clinical studies being led by CEO researchers, as well as a number of prospective multi-centre musculoskeletal oncology studies being led by other research teams, including Canadian Orthopaedic Oncology Society (CANOOS).



Current Studies – CEO Methods Centre



<http://PARITYtrial.com>

The Prophylactic Antibiotic Regimens In Tumor Surgery (**PARITY**) trial is an ongoing international, multi-centre, double-blinded randomized controlled trial evaluating the effect of short versus long-duration postoperative prophylactic antibiotic regimens on the incidence of surgical site infection following surgical excision and endoprosthetic reconstruction of lower-extremity bone tumors in 600 patients.

To our knowledge, this is the first multi-centre randomized controlled trial in orthopaedic oncology and has led to newly forged collaborations with surgeons at 55 sites across Canada, the United States, Argentina, Australia, South Africa, Brazil, Spain, the Netherlands, and India.

Principal Investigators: Dr. Michelle Ghert and Dr. Mohit Bhandari

SAFETY Protocol Development Study

Approximately 50% of sarcoma patients will develop a local or distant recurrence (metastasis). Once advanced metastases are detected, the median length of survival is 15 months, so long-term post-operative surveillance is widely considered an essential aspect of sarcoma management. However, adverse effects of intensive surveillance practices are also noteworthy, including the financial and emotional burden on patients, and concerns over unnecessary exposure to radiation. Our recent research program planning initiative identified post-operative surveillance as the highest-ranking research priority in orthopaedic oncology. Therefore, a robust clinical trial is warranted but will require widespread patient support. The aim of the Surveillance AFTER Extremity Tumor surgery (SAFETY) Protocol Development Study is to engage sarcoma patients to demonstrate patient willingness to participate in such a study, and develop a feasible, clinically relevant and patient-centered study protocol.

Principal Investigator: Dr. Michelle Ghert



SAFETY Trial

<http://SAFETYrct.com>

Following treatment for a primary extremity soft-tissue sarcoma (STS), patients remain at risk for the development of local and systemic disease recurrence. Metastasis (disease recurrence) to the lung is the most frequent single location of disease recurrence in STS patients, occurring in almost half of all patients. Therefore, careful post-operative surveillance is an integral element of patient care. However, the detection of metastases does not necessarily affect long-term survival and may negatively impact quality of life.

The overall objective of the Surveillance AFTER Extremity Tumor surgery (SAFETY) International Randomized Controlled Trial is to

determine the effect of surveillance strategy on 5-year patient survival after surgery for a STS of the extremity by comparing the effectiveness of: A) a surveillance frequency of every 3 vs. every 6 months; and B) chest CT scans vs. chest radiographs (CXR). Eight hundred and thirty patients will be randomized to one of four possible treatment arms (clinical assessment + chest CT scan every 3 months for 2 years; clinical assessment + chest CT scan every 6 months for 2 years; clinical assessment + CXR every 3 months for 2 years; or clinical assessment + CXR every 6 months for 2 years). Patients will continue to be followed for another 3 years for a total of 5 years. Recruitment is expected to begin in Fall 2019.

Principal Investigator: Dr. Michelle Ghert

A Convolutional Neural Network for Predicting Fracture Risk in Metastatic Bone Disease of the Proximal Femur

Advances in cancer treatment have prolonged patient survival and now over 60% of all breast, prostate, lung and thyroid cancers will metastasize to bone. Therefore, more patients than ever before are living with metastatic bone disease (MBD). The proximal femur is the most common long bone involved in MBD and pathologic fractures of the femur are associated with significant morbidity, mortality and loss of quality of life (QoL). Prophylactic surgery for an impending fracture of the proximal femur has been shown in the literature to confer substantial benefit in terms of morbidity and mortality. However, a tool that can guide treatment by accurately predicting fracture risk remains elusive. Our study aims to use novel machine learning techniques to develop and validate a tool that accurately predicts high vs. low pathologic fracture risk in MBD patients so as to minimize their disease burden and maximize their QoL.

Principal Investigator: Dr. Anthony Bozzo

Supervising Principal Investigator: Dr. Michelle Ghert

Orthopaedic Resident Education in Oncology Study

Resident education is essential to the future of healthcare delivery across Canada. Once they enter independent practice, orthopaedic surgeons must have a fundamental understanding of orthopaedic oncology in order to provide appropriate care and timely referral of patients with musculoskeletal tumors. Their knowledge is assessed as part of the Royal

College of Physicians and Surgeons of Canada (RCPSC) certification examination, which is written by all graduating orthopaedic surgery residents in Canada. There has been a recent increase in orthopaedic resident education research as well as a better understanding of effective teaching methods in general. Despite this, residency programs vary with regards to the amount of resident exposure to orthopaedic oncology and teaching methods employed. With the RCPSC moving towards a competency-based educational model, a better understanding of the effect of the program structure on oncologic education will help inform the requirements for a competency-based curriculum. Our objective is to assess the characteristics of orthopaedic residency programs with respect to the structure of oncology teaching and the scores of program residents on the orthopaedic oncology section of the RCPSC certification examination.

Principal Investigator: Dr. David Wilson

Current Studies – JHCC Clinical Program

The Effect of Incisional Negative Pressure Wound Therapy on Wound Complications and Clinical Outcomes Following Lower Extremity Sarcoma Surgery in Patients Treated with Preoperative Radiation Therapy (VAC Study): A Multicenter Randomized Controlled Trial

The combination of extensive surgery and radiation therapy in lower extremity soft-tissue sarcomas results in high wound complication rates, which often necessitates further intervention, prolonged hospitalization and significant patient morbidity. Incisional Negative Pressure Wound Therapy (INPWT) is a novel wound management system used in sarcoma care that may prevent major wound complications, simplify wound management and facilitate shorter hospital stays, decreased hospital re-admission rates and increased patient satisfaction. The objective of this study is to determine the clinical effectiveness of INPWT in preventing major wound complications compared to standard dressings in lower extremity soft-tissue sarcoma patients undergoing surgery following neoadjuvant radiation therapy.

Local Principal Investigator: Dr. David Wilson

Completed Studies

Moving Forward Through Consensus

Primary Paper

Schneider P, Evaniew N, McKay P, Ghert M. Moving Forward Through Consensus – A Modified Delphi Approach to Determine the Top Research Priorities in Orthopaedic Oncology. *Clin Orthop Relat Res* 2017 Dec: 475(12): 3044-55 [Epub ahead of print].

Protocol Paper

Schneider P, Evaniew N, Rendon JS, McKay P, Randall RL, Turcotte R, Vélez R, Bhandari M, Ghert M. Moving forward through consensus: Protocol for a modified Delphi approach to determine the top research priorities in the field of orthopaedic oncology. *BMJ Open* 2016; 6(5): e011780.

Current Ontario Surveillance Strategies Following Extremity Sarcoma Surgery

Primary Paper

Bozzo A, Seow H, Pond G and Ghert M. Changes in soft-tissue sarcoma treatment patterns over time: A population-based study in a country with universal and centralized healthcare. *Sarcoma* 2019; 8409406.

