

ASPIRE

Celebrating Change in the JGH Surgical Mission Célébration du changement dans la mission chirurgicale du JGH

Challenges & Opportunities

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The Surgical Profession: Then and now

This past May the JGH hosted an unusual cross-disciplinary meeting of the minds that gathered to discuss the history and relationship between technology and the surgical profession. In addition to the scheduled speakers representatives from general and orthopaedic surgery, experts from the departments of radiology, medical research, history, oncology, engineering, obstetrics, gynaecology and social studies were present. The result was a dynamic exchange of knowledge and thoughtful questions about the history of medicine along with discussions about the realities and challenges the surgical profession has faced over time. Topics included how surgery has always been tied directly to technology, how its status as an actual profession was not automatic but was originally frowned upon, that women were some of the very first surgeons, understanding the various milestones achieved in procedures and instruments, examining those in use today to see if they really have improved patient care.



The question is how to train surgical residents so they are best prepared to meet the needs of their future patients. Simply being trained in applying the latest techniques and how to use state-of-the-art equipment is not enough, it is important that surgical residents and students learn that it is not always appropriate or necessary to do some attractive or available surgical procedure simply because it can be done. *GB* Making the right decisions about which treatment option is best for the patient is critical - should the patient receive a joint or bone replacement instead of a resurfacing or fusion, is knee arthroscopy a responsible operation if post-op findings show the exact same results for both? *RC*



Edwin Smith Papyrus

Apart from deciding the best treatment for the patient, there is also the question in some cases of who should actually do a procedure? The lines defining surgeon from technician are blurring. Should the seasoned experienced surgeon do it or a trained technician who knows how to use a sophisticated machine but may not have an extensive knowledge of human anatomy, biology or biochemistry? *ML* It may be time to shift from training to become solely a highly specialized professional towards the concept of a broader rounding of abilities, a cross-disciplining of skills, leading towards whole patient care because some alternatives to surgery may offer the best outcomes for the patient. Applied radiology started in the early 1950s as an alternative to gynecological surgery and today radiation technology is playing a significant role by collaborating on many important urological cases, a good example of where the boundaries are wide open. *GW, GB, FB*

cont'd on page 3

LEADERSHIP

Kudos to an Inspirational Trail-blazer & Mentor.

by Carol-Ann Vasilevsky

In April 29 & 30, the Division of Colon and Rectal Surgery at the JGH hosted a 2-day symposium entitled: "Innovations & Controversies: Celebrating Forty Years of Colorectal Surgery in Canada" which was held at the Centre Mont-Royal in Montreal.

We had a very robust program replete with local, national & international speakers who paid tribute to Dr. Philip H. Gordon, the former director of our division, who is the founding president of the Canadian Society of Colorectal Surgeons, and the first fully trained colorectal surgeon at the JGH, McGill and in Canada.

Many local, general and colorectal surgeons, as well as specialists from Europe, the US and South America as well as from across Canada attended the meeting which was deemed by all as a very successful educational event. The world-class symposium explored many new innovations in technology and management of common colorectal problems including the associated controversies which have arisen over the past forty years since the inception of colorectal surgery in Canada.

All of us who are presently on staff in the division owe our career choices as colon and rectal surgeons to Dr. Gordon who served as an inspirational teacher and mentor to us during our residencies in General Surgery and helped guide us to Colorectal Surgery as our final career goal. As a result, we presently have a flourishing division of 5 additional members and boast the largest division of colorectal surgery across Canada.

Dr Gordon's contribution to the McGill Department of Surgery was honoured by the establishment of academic half day in colorectal surgery for the residents beginning next year with a lecture in his name to be given on an annual basis by a notable expert in Colorectal Surgery.



<http://www.montrealcolorectalsymposium.com/>

SLMVs for Training Anywhere & Anytime!

Inspired by the transformation of the surgical resident CTU to an on-line paperless training manual, Dr. Shannon Fraser & Educational Technologist Barbara Reney have continued over the past few months their initiatives to provide updated

surgical training materials. The latest endeavor is the creation of several bilingual, short, learning video modules. Each segment covers a basic but critical OR procedure such as pre-surgical scrubbing, defining and protecting sterile perimeters and what to do when they are breached, proper gowning and gloving techniques, executing the Surgical Safety Checklist and safe patient transferring. Official SOPs were provided by JGH IPAC Consultant Fernanda Cordeiro and were demonstrated by Sylvie Laferrière and Julie DiManno of the OR department.

The motivation for producing these tools are the short, yet content-packed durations of each resident rotation, combined with the limited staff resources. The clear, concise training vignettes are intended to help prepare the in-coming students and residents in advance, before they arrive at their rotation, giving them the tools to make the most of their rotation from day one. Since the videos will be available on-line they will be accessible from anywhere and at anytime - meaning around the clock access on or off the JGH site.

As pre-surgery learning tools, these videos also enable the OR nurse educator more time to observe each resident in performing the skills so as to better evaluate their abilities and identify any specific issues to be corrected immediately. This support material will help expedite the regular teaching process and allows more time for direct, one-one interaction. The better prepared the learners are, the more likely they will be able to participate within the team to provide the best health care possible for the patients.

These materials will be released soon so please stay tuned....



CHANGE DIARY

cont'd from pg 1

The Impact of Technological Change on the Surgical Profession:



2015 Workshop

PAST, PRESENT, FUTURE



Invited Speakers

David Jones, MD, PhD, Harvard University
 Peter Kernahan, MD, PhD, University of Minnesota
 Roger Kneebone, MD, PhD, Imperial College
 Rachel Prentice, PhD, Cornell University
 Lawrence Rosenberg, MD, PhD, McGill University
 Thomas Schlich, MD, PhD, McGill University
 Léo Mignot, PhD, University of Bordeaux
 Cynthia Tang, McGill University
 Nicholas Whitfield, PhD, McGill University

Chairs

Gerald Batist, Segal Cancer Centre, JGH, McGill University
 Richard Margolese, Surgical Oncology, McGill University
 George Weisz, PhD, History of Medicine, McGill University

Jewish General Hospital - Board Room - B-124

May 6th 2015, 9:30 am - 5:30 pm
 May 7th, 2015, 9:30 am - 3:30 pm

From crude forceps and simple saws, to minimally invasive techniques and nano medicine, the surgical craft has always been a technically oriented discipline. New instruments, techniques and procedures have all shaped the identity of the surgical profession. This evolutionary process is on-going and due for a fundamental reconsideration of the definition of the surgical professional domains and jurisdictions. This workshop brings together an international group of recognized practitioners, historians, and social scientists to explore these changes and challenges. Discussions will touch on how technology has shaped surgical practices, training and the roles of surgical practitioners in the past, how it is changing the field in the present and will inevitably continue to do so in the future.



This event is organized by the McGill University Department Social Studies of Medicine, the Jewish general Hospital Department of Surgery and the Jewish General Hospital Foundation

See program details at: <http://www.docdroid.net/11h54/montreal-052015-itcsp-workshop-program.pdf.html>

surgery. What about manufactured implants (artificial hearts, joint, breast implants) costly, infallible devices that break-down, leak, malfunction post-surgery? 3D printed replacement body parts like pelvises for cancer patients or customized vertebra for spinal surgery are more convenient and stronger, the bones can grow into the spongy metal pores increasing the implant strength and decreasing rejection, they are a better fit and can decrease pressure on the surrounding bone. Now the 4D flexible biomedical implant that is designed to change shape over time may eventually help patients with disorders involving the heart, bones, muscles or gut as well as respiratory ailments. As with any medical procedure new technology needs to be used judiciously as the long-term consequences are unknown. Therefore "Would-be innovators must be aware of the fragility of the knowledge on which innovations are based" DJ.

Surgery as we know it would not have existed without technology and today patients have more access to information on which they form their own opinions about disease and injuries, they are more aware of various treatment options, the potential outcomes, success rates and the possible quality of their lives after the treatments. They may not be the scientific or medical experts but involving patients in their own care leads to better outcomes. At the same time, this also means acknowledging the patients' choice to not participate in any treatment option offered.

Surgical skills and patient out-comes have come a long way from the days of the ancient surgical cases dating back to around 3000-2500 B.C. as described in the Edwin Smith Papyrus (see image pg1 bottom left; translation at: <https://ceb.nlm.nih.gov/proj/flash/smith/smith.html>). Of the few things we can count, we can be certain that both will continue their evolutionary process as long as the need for this type of medical solution exists.....

*(The following link leads to an article discussing this issue - <http://www.thelancet.com/pdfs/journals/lanpsy/PIIS2215-0366%2815%2900188-1.pdf>)

Key: GB-Gerald Batist, FB-Frank Bladou, RC-Ruth Chaytor, SF-Shannon Fraser, DJ-David Jones, ML-Mark Levental, TS-Thomas Schlich, GW-George Weisz.



Nano-Scopic Robots for Eye Surgery

CHANGE DIARY

Post ITCSP Reflections From Speakers and Attendees

One of the most important contributions to emerge in the Workshop was the problematization of the notion of disease, as it often oscillated and changed from a medical to a surgical domain. This in turn causes professional and epistemological turf conflicts further exacerbated by the specialized nature of current surgical practices. In this context the boundaries of operational perimeters of a “technician” and a surgeon have been mentioned as a cause of additional conflict. What remains to be fully explored are those trajectories that eventually lead to the acceptance or the refusal of specific surgical procedures. The importance of History and historical practices as hermeneutical tools in order to discern conflicts and debates around what constitute surgical practices remains crucial.

During the Workshop the patients were often referred to in numerous surgical contexts (from radiological interventionists to robotic surgery including orthopedic, oncological and cardiological surgery), however, their agency in the decision-making process (going through a surgical procedure or not) remains to be fully analyzed. It would be very beneficial to focus on the relationships between patients, surgeons and physicians during the decision-making process, so as to further understand the narrative, visual or other strategies used by surgeons or/and physician in order to explain surgical or therapeutic approaches. Similarly, what roles do patients play in establishing and spreading of a particular surgical procedure?



Relationships between surgeons, tool makers and the proponents of new surgical technological apparatuses constitute a very complex network. It would be very beneficial to further analyze the dynamics involved in the creation of surgical tools and the specific contributions of all actors involved. Considering the highly competitive marketplace, one question is particularly relevant: why does a surgical tool or a surgical apparatus become widely used while others “don’t make it big”?

The place of Medical and Surgical History in the current Medical School Curriculum has been referred to several times during the Workshop. However, rather than merely providing an historical chronology, historical practices should be considered as extremely useful in approaching medical and surgical problems. In this context the pedagogical importance of visuality should never be underestimated. Further research should be carried out regarding surgical textbooks (relationship between text and images) and the visual aspects of surgical training needs to be further problematized. In particular more attention is needed on the circulation of surgical knowledge through images. It is also very important to consider the role that medical translation plays in the dissemination of surgical knowledge.

While the Workshop was aimed to better understand the impact of technology on surgical procedures, it became clear since the beginning that paradoxically (although not surprisingly to me), a more reflective surgical humanity approach was needed. Indeed, many comments were made regarding the role of the surgeon in her/his numerous capacities in and

out of the surgical theater. The technology must be clearly located in larger social, cultural and historical perimeters in order to better understand the collectiveness of the Surgical Act. For instance, nurses and anesthesiologists should be part of future discussions and their roles should be located in a larger historical context. As I remarked several times during our sessions, we were similar to Janus simultaneously looking in the past and in the future. I believe this approach should be strengthened.

The Workshop certainly initiated a discussion about surgical practices within an institutional setting such as a teaching Hospital, however, it is worth recalling that surgery as a discipline extends its practices to forensic and to humanitarian domains as well (just to cite two examples). It is my hope that a second Workshop will be take place so as to further historically scrutinize the large body of literature on Surgery, and thus better understand our position in front of it. Ultimately, the patients will benefit.

Cosimo Calabrò, PhD

Department of History and Classical Studies, McGill University



Victorian Era Surgical tools

cont'd

CHANGE DIARY

ITCSP reflections cont'd from pg 4

This interdisciplinary workshop brought together medical and surgical practitioners, social scientists, anthropologists and historians from McGill, Harvard, Minnesota, Cornell, Imperial College, and the University of Bordeaux and provided a unique opportunity to discuss current issues in surgery with a view on the long perspective. This event was initiated by Dr. Lawrence Rosenberg and Dr. Thomas Schlich who are working on a CIHR-funded research project "Disrupting Surgical Practice: The Rise of Minimally Invasive Surgery, 1980–2000". The vent logistics were handled by Barbara Reney MEDTech.

Topics presented and discussed ranged from the definition of surgery in antiquity through to current issues on the division of labor between surgeons and non- and non-surgical physicians. With its diverse range of participants, the workshop provided inspired lively interaction between theoreticians and clinicians to quite an unusual degree, resulting in a remarkable process of mutual learning.

As the presentations demonstrated, the field of surgery is ever evolving; the relatively stable twentieth century was an exception, a period of stability in the field characterized by "classic" open surgery, performed by often highly specialized surgical practitioners. Surgeons were able to rely on a stable market of elective "bread and butter" operations, such as gall bladder removal and appendectomy. At the same time, surgery celebrated spectacular achievements of highly specialized, elite fields, such as organ transplant and cardiac surgery. The basic recipe for success was "more of the same". This stability vanished towards the end of the century as new technologies such as minimally invasive surgery appeared requiring a completely new skill-set, different from those used for open surgery and which could be performed by practitioners other than surgeons.

In the aftermath, the traditional division of medical care into surgical and non-surgical fields has become fundamentally unsettled, and it is by no means clear how the surgical profession should react to this new situation: Maybe versatility – as discussed in one of the presentations – will be the key qualification of surgical training in the future? Perhaps surgeons will become like other highly trained specialists in the new, fluid and volatile labor market of the 21st century?

Will they more closely resemble IT technicians than traditional surgeons?

On the other hand, history also shows that there is one permanent factor in surgery, that being the key responsibility of looking after the patient as a person, a human being, whose suffering cannot be reduced to the organic lesions – an emphasis that might be worth focusing on, not just for reasons of professional survival of the specialty.

Thomas Schlich, MD, PhD



Very Happy ITCSP Event Chairs & Speakers

I found the program was well planned and included some excellent speakers who were able to provide a variety of interesting perspectives and an excellent stimulus for discussion. As a clinician, it was a great opportunity to interact with non-clinical professionals, particularly those with a background in the history of medicine. I develop a sense of humility when I realize that the advances of today may well become part of the history of medicine of tomorrow. Thank you for inviting me. Harvey Sigman, MD, CM
Department of Surgery, JGH

The workshop was extremely useful for several reasons. For the historians and sociologists there, it was a chance to hear first hand how surgeons thought about recent innovations and their effect. I was surprised by how worried several surgeons were about the future of the field. For the surgeons there, I saw appreciation for the context that historians were able to provide. I think we were able to clear up some common misconceptions. George Weisz, PhD

A brief note to say how much I enjoyed the Workshop and how useful I found it. To me this was a tremendous (and highly unusual) opportunity to engage with a diverse group of clinicians, historians, social scientists and others around the impact of technological change. This is an issue that affects us all, but discussions often take place within disciplinary groups rather than across them.

The quality of the presentations and discussion was extremely high, and I was most impressed by the commitment and thoughtfulness of all who took part. The discussions were thought-provoking and challenging and have opened up new areas in my own thinking. I was pleased to be able to contribute my own work around simulation-based re-enactment of surgical procedures from the recent past, and to have the group's feedback and challenge about the ideas I have been working on.

The organization and hospitality of the workshop was outstanding, and it was a pleasure to take part.

Roger Kneebone, MD, PhD

cont'd

CHANGE DIARY

ITCSP reflections cont'd from pg 5

I found the workshop extremely interesting for many reasons. First of all because it concerns a topic which is relevant to the practice of Radiology and it's intersection with the department of Surgery. I did not appreciate prior to this workshop the extent of concern and introspection going on in Surgery regarding the perceived uncertain future (as seen from their perspective) of their profession.

I must honestly say that while we also have experienced many challenges including other specialties encroaching on bread and butter activities, we do not view it the same way. We tend to be more forward looking and optimistic about what the future will bring. I suspect it may have to do with ours being a younger specialty compared to surgery. Viewed from the outside, I believe the pessimism is unwarranted and there are many opportunities for Surgery to reinvent itself in the modern context.

I was quite surprised and impressed by the contribution made by medical historians and social scientists to the debate. Given their long term view of previous centuries, they framed the discussion in terms of continuing evolution of a specialty. I was also surprised at the lack of discussion within surgery regarding the patient and personnel safety of adopting technologies from another profession without proper grounding in terms of the risks.

I would reiterate what I mentioned at the workshop and that is that all decisions regarding who is best placed to provide services to patients should be viewed from the point of view of the best interests of the patient. Mark Levental, MD, Chief, JGH, Dept. of Radiology

I thought this was a great event, an unusual opportunity for historians to spend a serious amount of time with a group of very thoughtful surgeons and other physicians, to talk seriously about the challenges facing medicine, the perspectives that history and the social sciences can offer, possible opportunities for reform, and the constraints that make it difficult to change medical practice and health care systems. David Jones, MD, PhD

This workshop was a great opportunity to better understand the challenges the surgical profession must face. It was also an important and enlightening opportunity to initiate dialogue between social scientists and medical professionals; unfortunately such cross-disciplinary events are too rare. Thank you to the organizers for making this initial workshop possible.

With the increase in the number of surgical specialties that are using techniques such as minimally invasive procedures, medical training and what defines a surgical specialist - an actual trained surgeon or a technologist - is now moving beyond traditional disciplinary boundaries, which is and will be a real challenge. One way to achieve this is to initiate more frequent and open dialogue between the specialties that are now engaged in newer surgical and associated domains techniques and with newer instruments.

Léo Mignot, PhD

I found the major benefit was the opportunity to listen to medical professionals discussing the various issues raised; the discussions were helped by the size of the workshop, large enough for dynamic and varied conversations, small enough to remain intimate and inclusive, such lively discussions would not have been possible with a larger crowd. I liked the two-day format, the mixture of disciplines and the way the schedule was organized.

Nicholas Whitfield, PhD

CONGRATULATIONS!!

To the winners of the 2015 Fraser Gurd Day

Quick Shot:

Sara Najmeh: "Neutrophil Extracellular Traps (NETs) Sequester Circulating Tumor Cells via Beta-1 Integrin-Mediated Interactions". Supervised by: Dr Lorenzo Ferri

Presentations:

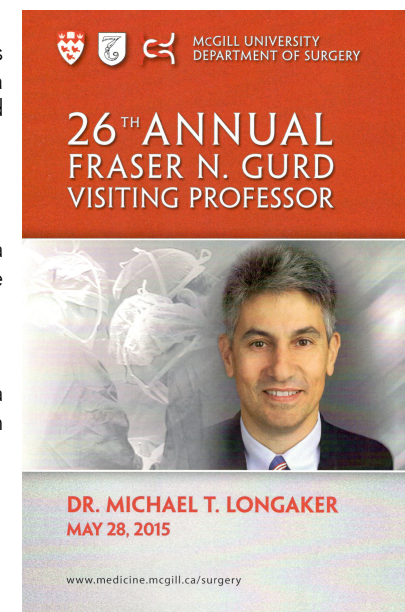
1st place: Priyanka Sehgal
"CD109 As a Regulator of Squamous Carcinoma Cell Migration and Invasion". Supervised by: Anie Philip

2nd place: Stephen Hanley
"Pre-Operative Prediction of Spinal Cord Ischemia in Complex Endovascular Aortic Aneurysm Repair".
Supervised by: Dr Cherrie Abraham

Contributors:

Cosimo Calabrò, Shannon Fraser, Jean-Marc Frayret, Stephen Hanley, David Jones, Roger Kneebone, Mark Levental, Leo Mignot, JGH MedPhoto, Karam Mustapha, Thomas Schlich, Harvey Sigman, Tarifin Sikder, Carol-Ann Vasilevsky, George Weisz

Editor & Message Design: Barbara Reney



RESEARCH

Variables Impacting Post-Surgical Outcomes in Elderly Patients.

Elderly patients account for approximately 50% of the surgical load today. Knowing this, it is imperative that we understand their recovery process. Two recent studies being conducted by our research team focused on the impact that malnutrition and postoperative complications have on post-surgical recovery in elderly patients.

Our findings for the impact of malnutrition suggests that individuals who are malnourished have a lower functioning capacity compared to well nourished patients and therefore optimizing patient nutrition prior to surgery may have a moderate to long-term impact on postoperative recovery.

Additionally, when we examined the impact of postoperative complications and surgical recovery, we found that the greater the number and severity of complications after elective abdominal surgery significantly delays recovery in elderly patients. The overall complication rates in the elderly population can be better managed through the adherence to quality indicators.



Mehdi Tahiri, MD

September.

Publication in the journal Surgical Endoscopy is pending for the manuscript penned by the same team and titled: *Quantifying the impact of complications on patient's recovery after abdominal surgery: A prospective clinical trial.* (Mehdi Tahiri, 1st author; Tarifin Sekder, 2nd author)



Tarifin Sikder, MSc



A Prospective Study Assessing the Effect of Preoperative Nutrition on the Surgical Recovery of Elderly Patients

Tarifin Sikder BSc, Mehdi Tahiri MD, Geva Maimon PhD, Debby Teasdale RN, Nadia Sourial MSc, Sebastian Demyttenaere MD MSc, Shannon Fraser MD MSc, and Simon Bergman MD MSc

Department of Surgery, Jewish General Hospital, St. Mary's Hospital Center, McGill University, Montreal, Canada
Lady Davis Institute for Medical Research, Jewish General Hospital, Montreal, Canada

INTRODUCTION

Background: 15-20% of patients are malnourished before surgery. However, the impact of nutritional status on surgical recovery has not yet been determined.

Aim: To understand the effect of nutritional status on the postop recovery of elderly patients.

METHODS

Study Design: Prospective cohort study

Patient Population: Patients aged 70 years and older undergoing elective general surgery between July 2012 and July 2014.

Primary Predictor: Nutritional status was measured with the Subjective Global Assessment (SGA), a validated tool.

Primary Outcome: Functional status was measured with hand grip strength.

Measurements: Patients were evaluated at preop and at 1-week, 4 weeks, 12 weeks, and 24 weeks after surgery.

Statistical Analysis: Repeated measures analysis was used to test whether nutritional status affects the rate of recovery of grip strength. The statistical model was adjusted for **gender, age, Charlson Comorbidity Index (CCI), body mass index (BMI), laparoscopic or open surgery, wound class, cancer, postoperative complications, and preoperative grip strength.**

DISCLOSURES

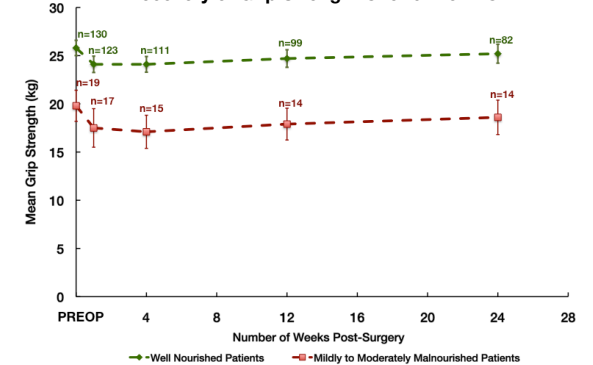
Funded by the Canadian Institute for Health Research (CIHR) and St. Mary's Hospital Research Center. Dr. Bergman is a consultant for Baxter and Covidien. There are no other conflicts of interest or financial relationships to disclose.

RESULTS

Study Demographics

Patient Characteristics	Total Sample (n=149)	SGA Nutritional Status	
		Well Nourished (n=130)	Mildly to Moderately Malnourished (n=19)
Age, mean (SD)	77.7 (4.9)	77.3 (4.7)	80.4 (5.3)
Male, n (%)	79 (53.0)	71 (54.6)	8 (42.1)
BMI, mean (SD)	27.2 (5.5)	27.9 (5.4)	22.5 (3.3)
CCI, median (Q1-Q3)	3 (2-6)	3 (2-6)	2 (2-6)
Preoperative Grip Strength, mean (SD)	25.0 (8.0)	25.8 (9.0)	19.8 (7.1)
Cancer Status, n (%)	98 (65.8)	84 (64.6)	14 (73.7)
Wound Class 1, n (%)	34 (22.8)	32 (24.6)	2 (10.5)
Laparoscopic Surgery, n (%)	41 (27.5)	37 (28.5)	4 (21.1)
Complications, n (%)	53 (35.6)	47 (36.2)	6 (31.6)

Recovery of Grip Strength Over 6-months



Repeated Measures Analysis

Predictor Variables	Estimate	95% CI	p-value <0.05
Age	-0.04	(-0.15, 0.08)	0.54
Gender	-2.07	(-3.30, -0.84)	0.001*
BMI	-0.004	(-0.10, 0.09)	0.94
CCI	-0.04	(-0.24, 0.15)	0.66
Preoperative Grip Strength	0.83	(0.76, 0.91)	<.0001*
Nutritional (SGA) Status	2.01	(0.39, 3.63)	0.02*
Cancer Status	0.32	(-1.02, 1.67)	0.64
Wound Class 1 vs. 2 and 3	-0.82	(-2.28, 0.64)	0.27
Open vs. Laparoscopic Surgery	-0.45	(-1.63, 0.73)	0.45
Postoperative Complications	-1.30	(-0.20, 2.40)	0.02*
Effect of time	0.01	(0.001, 0.01)	0.02*
Effect of SGA status and time	0.00	(-0.02, 0.02)	0.92

Summary

An increase in grip strength was observed for all SGA groups over time. Gender, preoperative grip strength, nutritional status and postoperative complications were predictors of postoperative grip strength. The rate of recovery for grip strength was similar between SGA groups.

CONCLUSION

Patients with superior preop nutritional status benefit from greater upper body function during recovery. Therefore, optimizing patient nutrition prior to surgery may have an impact on postoperative recovery.

RESEARCH

Patient Trajectory Simulation Tool to Improve Treatments and Outcomes

Treatment pathways of long-term illnesses, such as colorectal cancer, involve the complex interactions and decisions of wide variety of actors in the health care environment. From the moment of diagnosis until the end of their illness, patients undergo many visits, exams, and treatments in the hospital such as surgery, chemotherapy and, or, radiation.

Understanding the factors that improve the chance of remission is a fundamental mission of the hospital. In particular, understanding how the organization of these exams and treatments with the available hospital resources affects the quality of life and remission of the patients is an important part of this endeavor. A myriad of hospital staff from surgeons to oncologists, nursing and administrative departments were interviewed to gather real-time data on all the aspects of the patient treatment trajectory from their first visits through to their discharge.

A team of researchers from the General Jewish Hospital and the École Polytechnique de Montréal, led by Dr. Rosenberg and Professor Frayret, are working together to develop a simulation tool that will allow them to assess the impact on remission, quality of life and resource utilization of new management policies and, eventually, new organization protocols of medical treatments for specific illnesses. The simulation tool implementation team is led by Karam Mustapha, post-doctoral fellow at École Polytechnique de Montréal.

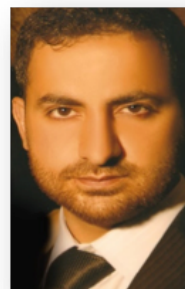
This ambitious project involves a multidisciplinary team of researchers in industrial engineering, computer science and the field of health sciences. A first prototype already provides interesting insights into the potential of such a decision support tool.



Jean-Marc Frayret, PhD

Colorectal cancer is a diagnosis of particular concern for older Canadians and is the second cancer diagnosis in terms of rate of incidence and mortality among Canadians after lung cancer. Deciding what are the best approach for each patient is a complex process. Treatments may involve surgery and either pre- or post-operative radiation or chemotherapy. The rigorous requirements of each treatment regimen as well as the uncomfortable side effects has a significant impact on the quality of life of patients.

This study is the first step of an existing project aiming at the development of an agent-based simulation of the whole trajectory - from start to finish - of a patient diagnosed with colorectal cancer. Firstly, we modeled the tumour and metastasis growth in patients for mentioned protocols of surgery, radiotherapy and chemotherapy treatments by extending the Gompertzian formula of tumor growth. We also used a model developed by Iwata the growth and metastases of the main tumor described by a set of mathematical equations. These models are entered into the simulation to capture the physiological state of the patients cancer.



Karam Mustapha, PhD

Secondly, the co-morbidities of patients which could impact the care-pathway, and his or her treatment protocol, are identified through reviewing the literature and consulting with oncologists at JGH. These were entered into the simulation as Charlson Comorbidity Index (CCI), for example, hypertension, diabetes, etc.

Thirdly, the factors such as fatigue, depression, sleep disturbance, financial stability, emotional support, etc. were identified to impact the psycho-social state of the patient. Each of these factors impact the treatments (radiotherapy and chemotherapy), in so far as whether the treatment dosage is to be changed or stopped assessed by the severity of each factor, in this study we are based in toxicity scale (CTC-NCIC Criteria)