

Operating in Hot Poison: HIPEC for Peritoneal Mesothelioma

Dr. Andrea McCart
Surgical Oncology, Mount Sinai Hospital
Associate Professor of Surgery, University of Toronto
Scientist, Lunenfeld-Tanenbaum Research Institute
Director, Ontario Peritoneal Surface Malignancy Program



Objectives

1. Understand the role of cytoreductive surgery and HIPEC for malignant peritoneal mesothelioma in 2019
2. Review the recent outcomes of the Ontario Peritoneal Malignancy Program
3. Learn about ongoing research for MPM

Peritoneal Mesothelioma

- M=F, peak age 55-60 y
- Rare malignancy: ~25% of all meso, 60/year in Canada
- Systemic therapy (Cis/Pem) 25% response rate and median survival is about 1 year
- Surgery continues to be the main treatment: fails due to local recurrence
- Intensive loco-regional treatment strategy: CRS & HIPEC

Peritoneal Mesothelioma

- Treatment for peritoneal malignancies utilizing cytoreductive surgery with intraperitoneal hyperthermic chemotherapy (HIPEC) was not offered by any hospital in Ontario

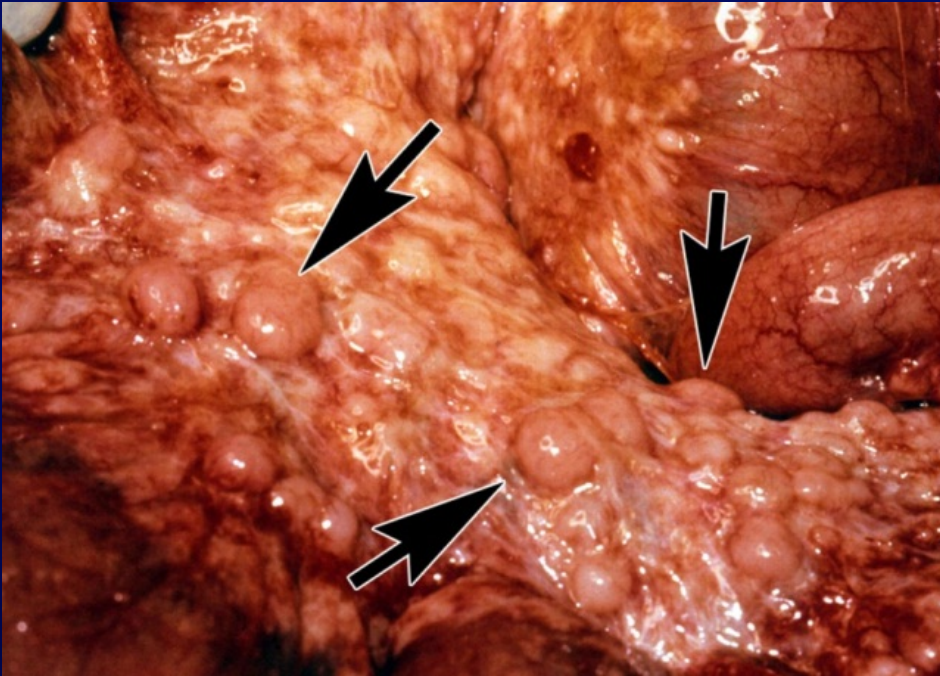


There were only three provinces in Canada offering cytoreductive surgery and HIPEC (Quebec/Alberta/ Nova Scotia) for their eligible patients

Peritoneal Mesothelioma



Peritoneal Mesothelioma



Peritoneal Mesothelioma

- **Cytoreductive Surgery**
 - Localized peritoneal stripping where nodules attached
 - Resection of involved organs: colon, small bowel, ovaries, uterus, stomach, spleen.
 - * bowel sparing
 - 8 hour + operation

Peritoneal Mesothelioma

- Rationale for Hyperthermic Intraperitoneal Chemotherapy (HIPEC):
 - high concentration of drug to tumour nodules but not systemically
 - heat alone (42.5 °C) is cytotoxic in vitro
 - heat enhances the tumorcidal action of many drugs such as oxaliplatin, cisplatin, MMC

Peritoneal Mesothelioma

Chemotherapy infused at 42-43°C

- Closed circuit (30 minutes)
 - Pump, heater, heat exchanger, real time temp monitor
- Closed abdomen technique

The Ontario Peritoneal Surface Malignancy Program

- nurse co-ordinator
 - Triage referrals
 - Arranging clinic visits/testing? F/U
 - Follow patients through surgery from pre-op clinic to home
 - A resource for patients after discharge
 - Patient information pamphlet

- Database
 - Research co-ordinator
 - Maintain prospective data on all PSM patients seen in clinic.
 - Assist/Perform research projects

The Ontario Peritoneal Surface Malignancy Program

February 1st, 2011 we performed our first CRS & HIPEC procedure.
280 as of September 2018.

176 females/ 104 males

123 Appendiceal LG neoplasms, 129 colorectal/SB/HG appendix PC,
27 mesothelioma, 1 sarcoma

Intra-op PCI range 2-39 (39 max)

Procedures range 6 - 24 hours of surgical time
including 30 (oxali) or 90 (MMC) minutes of
closed HIPEC, inflow 43° outflow 40°



The Ontario Peritoneal Surface Malignancy Program

Survival Analysis of Patients Treated with CRS and HIPEC in Ontario, Canada

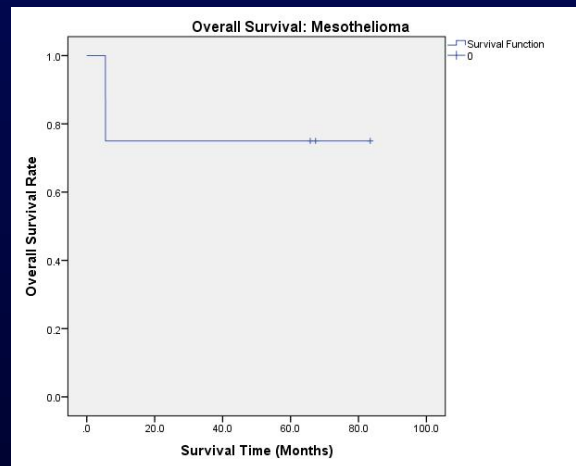
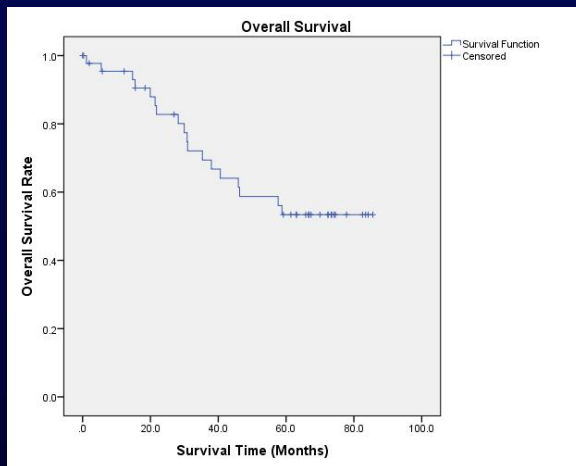
David Mealiea MD, Jessica Bogach MD, Emily L. Taylor, Jordyn Vernon, Miranda Nardin RN, Danielle A. Bischof MD, Anand Govindarajan MD, J. Andrea McCart MD.

Division of General Surgery, Mount Sinai Hospital; Department of Surgical Oncology, Princess Margaret Cancer Centre, UHN; Department of Surgery, University of Toronto, Toronto, Ontario, Canada

Analysis of first 87 patients (5 years of follow up):

Overall: 54% 5 year OS

Meso (n=7): 71.4% 5 year OS



The Ontario Peritoneal Surface Malignancy Program

Morbidity and Mortality

90 day mortality: 2(2.3%)

56% overall morbidity with 20.6 % significant morbidity (DINDO 3/4: bleeding, anastomotic leak, fistula, abscess, PE, pleural effusion, pneumonia, wound dehiscence)

37% TPN for ileus > 7 days

Complication	No. Patients (%)
Ileus requiring TPN	16 (34.8)
Surgical Site Infection (superficial or deep)	5 (10.8)
Urinary Tract Infection	4 (8.6)
Bleeding requiring transfusion or intervention	4 (8.6)
Venous Thromboembolism	3 (6.5)
Other	3 (6.5)
Death	2 (4.3%)

Peritoneal Surface Malignancy

Example

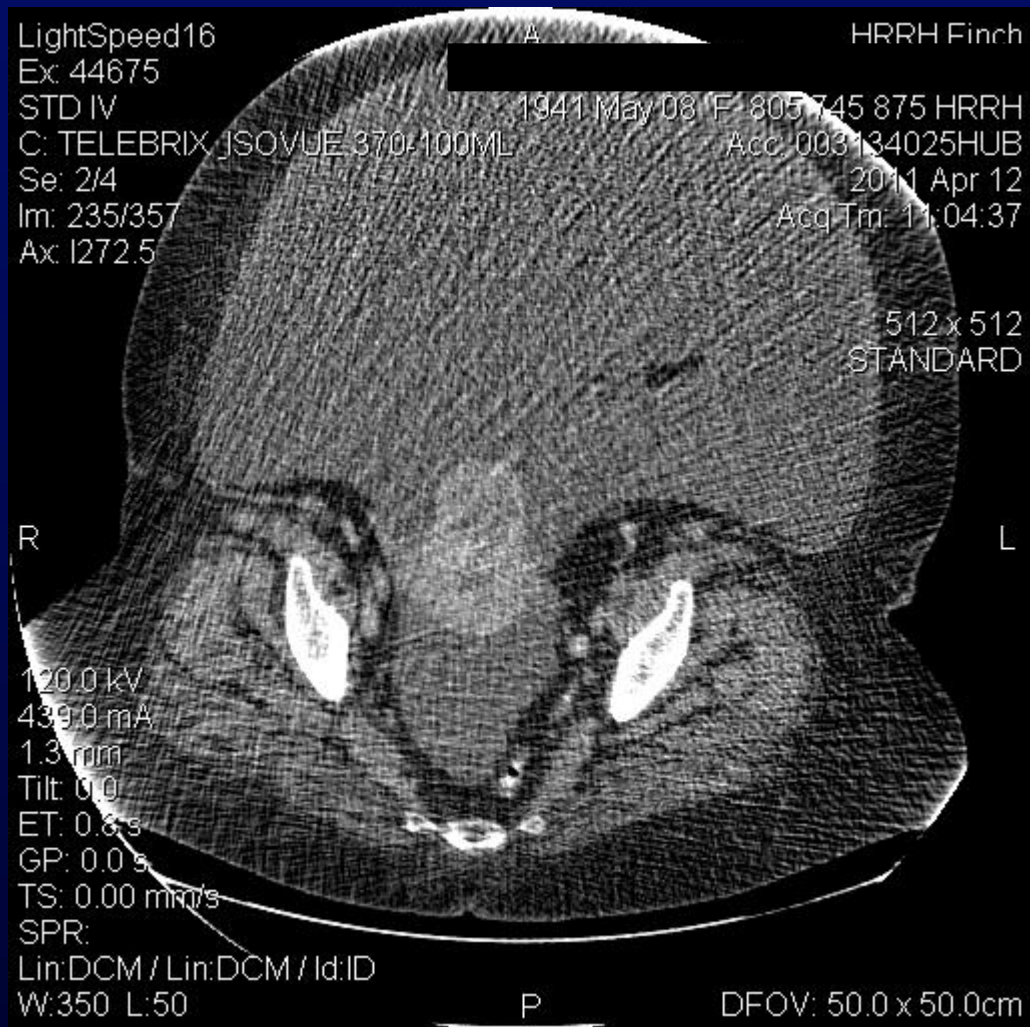
62 year old female with increasing abdominal distension.

U/S showed ++ fluid.

CT guided biopsy: Mesothelioma

At time of consult needed paracentesis every 2 weeks for 6
– 8 litres of ascites drainage at a time.

The Ontario Peritoneal Surface Malignancy Program



The Ontario Peritoneal Surface Malignancy Program



The Ontario Peritoneal Surface Malignancy Program

Ongoing initiatives

- Prospective database
 - Matched tumour/normal tissues banked



BAP1 haploinsufficiency predicts a distinct immunogenic class of malignant peritoneal mesothelioma  CrossMark

Raunak Shrestha^{1,2,3†} , Noushin Nabavi^{1,2†}, Yen-Yi Lin^{1,3}, Fan Mo^{1,6,7}, Shawn Anderson¹, Stanislav Volik¹, Hans H. Adomat¹, Dong Lin^{1,5}, Hui Xue⁵, Xin Dong⁵, Robert Shukin¹, Robert H. Bell¹, Brian McConeghy¹, Anne Haegert¹, Sonal Brahmibhatt¹, Estelle Li¹, Htoo Zarni Oo^{1,3}, Antonio Hurtado-Coll¹, Ladan Fazli¹, Joshua Zhou¹, Yarrow McConnell⁴, Andrea McCart⁸, Andrew Lowy⁹, Gregg B. Morin⁵, Tianhui Chen^{1,9}, Mads Daugaard^{1,3}, S. Cenk Sahinalp^{1,11}, Faraz Hach^{1,2}, Stephane Le Bihan¹, Martin E. Gleave^{1,3}, Yuzhuo Wang^{1,3,5}, Andrew Chug^{12*} and Colin C. Collins^{1,3*}

- Quality of life study
 - Patients surveyed before and after (3, 6, 12, 24 months) with standard QOL surveys

THE TEAM

Surgical oncology: McCart, Govindarajan, Bischof

- surgical oncology fellows
- residents

Medical oncology: Dr. Ron Burkes

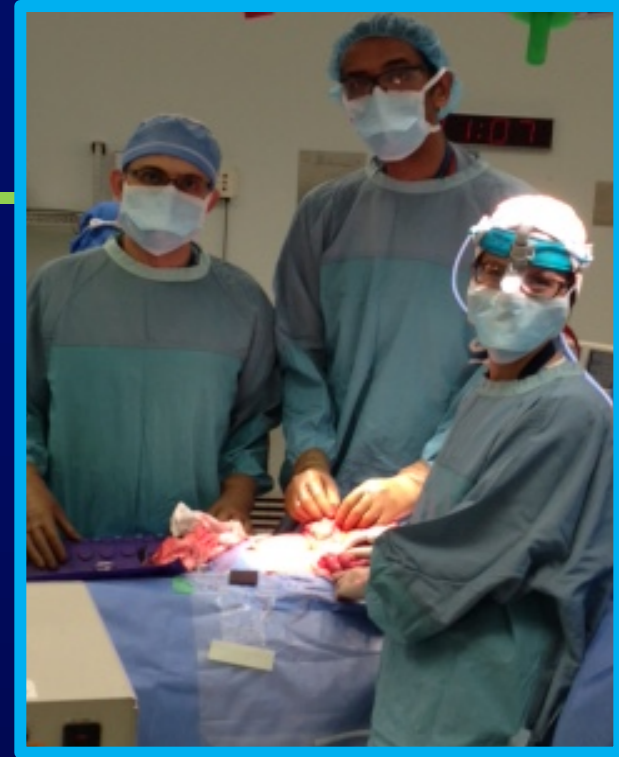
OR Team: nursing, anesthesia

Clinical Co-ordinator:

- Soojin Lee

Research Co-ordinator

- Mohana



Thank You

