General Surgery
Resident Handbook

Mount Sinai Hospital

Division of General Surgery

Updated December 2019

Mount Sinai Hospital
Sinai Health System
Joseph & Wolf Lebovic Health Complex

Surgery
UNIVERSITY OF TORONTO

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Useful contact information

Department	Extension
14 North	4588
14 South	4590
14 Surgical Step Down	4448
Admitting	4496
Anaesthesia Coordinator	103401
Biochemistry	4688
CCAC	8732
CT Reporting	6814 *or* 5278
CT Scan	5281
Emergency Department	5054
Endoscopy	4443
GI Imaging	7738 *or* 6817
ICU	4610
Interventional Radiology	4419 *or* 2247
Locating	5133
Microbiology	2016
MRI	4987
OR Desk	4400
PACU	5272
Palliative Care Consult	7884
Psychiatry/Geriatrics Consult	8419
Thrombosis Clinic	P: 416.340.3423 F: 416.340.5682
TPN Pharmacy	2313 *or* 103161
UHN Locating	14-3155
Ultrasound	4495

Office numbers for General Surgery staff

Staff	Secretary	Extension
Dr. D. Bischof	Ingrid	4552
Dr. M. Brar	Carlene	4702
Dr. S. Brar	Carlene	1982
Dr. Z. Cohen	Rina	1555
Dr. A. De Buck Van Overstraeten	Rina	6600
Dr. A. Easson	Maryrose	16-2328
Dr. R. Gladdy	Hamsa	3812
Dr. A. Govindarajan	Lidia	7163
Dr. R. Gryfe		5088
Dr. E. Kennedy	Grace	6872
Dr. H. MacRae	Firdeza	2836
Dr. A. McCart	Ingrid	4552
Dr. C. Swallow	Dionne	1558

Surgical teams

Team Colour	Staff Surgeons
Red (colorectal)	E. Kennedy, M. Brar, A. De Buck Van Overstraeten, Z. Cohen
Orange (colorectal)	R. Gryfe, H. MacRae
Aqua (breast, surgical oncology)	A. Easson, J. Escallon, W. Leong, (M. Reedijk, T. Cil) A. McCart, D. Bischof, A. Govindarajan
Blue (surgical oncology)	S. Brar, R. Gladdy, C. Swallow

Physician Assistants on General Surgery

- Red and Aqua teams each have a Physician Assistant (PA). PA work hours are Monday to Friday 6:30 a.m. to 2:30 p.m. PAs have one dedicated half day per week (Red team PA: Wednesday pm, Aqua team PA: Thursday pm) to allow them time to work on research and quality improvement projects.
- PAs can help with attending ward rounds, junior resident teaching, liaising with allied health professionals, discharge planning, attending clinics and assisting in the O.R as needed. All clinical work should be equally distributed among team members. All orders outside of the PA medical directives must be entered by the residents. PAs can attend but not solely represent the team at family meetings, or other interdisciplinary team meetings.
- PAs have medical directives for certain investigations, medications and procedures. PAs cannot prepare discharge prescriptions, order narcotics and get consents for OR procedures/transfusions.

A Typical Day On General Surgery

Responsibilities of a JR resident

- Read team specific objectives:

  http://generalsurgery.utoronto.ca/academic/shsc/trainees.htm
- Identify learning objectives for this rotation
- Attend morning rounds with team
- Attend teaching rounds
- Assist in patient care including:
  - ◊ Timely in-patient order entry
  - ◊ Timely completion of home care referrals
  - ◊ Completion of discharge summaries within 48 hours of discharge
    - ◊ NB: discharge summaries are required for all admissions through the emergency department but are not required for elective admissions with less than 72 hours in hospital stay (i.e. mastectomy patients)
  - ◊ Completion of all weekend discharge summaries
  - ◊ Frequent check of "scut list" (requests from nursing/allied health that do not warrant urgent physician attention)
- Solicit and obtain midterm and final evaluation from your supervising physician
- Attend clinic and scrub into O.R.
- Familiarize yourself with cases before scrubbing into O.R.

Evaluations

- Plan ahead and make an evaluations appointment to be held during the last week of your rotation with your preceptor.
- If the duration of your rotation is longer than one month, your preceptor will be from the team on which you have been on most recently.

  Preceptors are as follows:
  - ◊ Red: Dr. Kennedy
  - ◊ Orange: Dr. Macrae
  - ◊ Aqua: Dr. Govindarajan
  - ◊ Blue: Dr. Swallow/ Dr. S. Brar

Weekly Schedule

Team	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**
Red	Clinic	OR	Endo	OR	Clinic, Endo
Orange	-	OR, Clinic	OR, Endo	OR	OR, Clinic
Blue	OR	Clinic	Clinic	OR	OR
Aqua	OR, Clinic	OR, Clinic	OR, Clinic	Clinic	OR, Clinic

Teaching Rounds

MON 5:00 pm.	Sarcoma tumour board	MSH 6th flr, Path Classroom 6-412
TUE 12:00pm. 5:00 pm.	IBD rounds GI tumour board	MSH 14th flr, Classroom PMH 6th flr, Auditorium
WED 8:00 am 4:00 pm. 4:00 pm. 5:00 pm.	Sarcoma Imaging Conference Breast tumour board Rectal tumour board GI imaging rounds (first Wednesday of the month) *or* Socratic/core teaching	MSH 6th flr, Path Classroom 6-412 MSH 12th flr, Breast unit classroom MSH 5th flr, Rm 580 MSH 5th flr, Radiology Classroom *or* MSH 14th flr, Classroom
THU 12:00 pm	Melanoma rounds Peritoneal Malignancy rounds	OPG building, 6th floor MSH 6th flr, Path Classroom 6-412
FRI 7:30 a.m. 3:00 pm	University rounds (1st Friday of the month) *or* Quality of care rounds Esophagogastric Rounds	TBA MSH 14th flr, classroom MSH 6th flr, Path Classroom 6-412

Interdisciplinary Team Rounds

Rounds	Team	Location & Time
Interdisciplinary *attendance mandatory	Red Orange Blue and Aqua	Wednesday 10:00 a.m., 14S Monday 1:15 p.m., 14S Monday 9:30 a.m., 14N
TPN *attendance **not** mandatory	ALL	Mondays 3:00 PM,& Thursdays 9am, location TBD
Palliative *attendance mandatory	ALL	Tuesdays 9:00 AM, 14N ,1425B

Call Shifts

- Call coverage
  - On call shifts are 7 a.m. to 7 a.m. the following day.
  - Be sure to receive handover in person from the junior resident on each team the previous night.
  - Overnight handover is facilitated by a sign out email (see below).
  - Junior residents are to round with their team after call shift and address ward issues before leaving hospital.
  - General surgery junior residents are to leave by 12 p.m. post call.
  - All non-general surgery junior residents are to leave by 10 a.m. post call.
  - Senior residents are to leave by 12 pm post call, however may stay beyond noon for unique learning opportunities only.
- Medical students
  - Medical students can see E.R. consults first at the discretion of junior resident.
  - Medical students cannot remain in hospital after 12 hours of work day if not on call or after 8 am if post-call.
- Surgical consults
  - Junior on call is to see all E.R. and inpatient consults as they are received and review with the senior/fellow on-call.
  - New admissions are admitted to the staff surgeon on call unless they are well known to another staff surgeon.
- Sign out
  - Junior on call is expected to email all residents, staff on call and Dr. Swallow the list of consults, ward issues, and emergent operations **before 6:30 a.m.** rounds.
- Call rooms
  - Junior - 14th fl Rm 1437 & 5th fl Anesthesia corridor (door code 12,45)
  - Senior - 16th floor, Rm 1628 (door code 34,1,25)
  - Clerk - 20th floor, Murray Wing, Shared Rooms to be Signed-Out
  - Additional lockers can be found on 1st floor (door code 24,3)
  - House staff lounge on 18th floor (door code 5,1)
- Weekend rounds
  - Weekend junior on call is expected to round with the covering senior resident. Be sure to confirm with the senior resident covering when rounds begin.

OR Start Time

- 7:45 a.m. Monday to Thursday; 8:45 a.m. Friday

Preparing a Patient for Surgery

- Signed consent for **procedure** and **blood transfusion**

  *If patient is not capable of consenting, obtain consent from a family member and witness in person or over the telephone)
- NPO status
- Blood group and screen
- Cross match units of blood (if applicable)
- Coagulation studies
- CBC, electrolytes, creatinine
- ECG (patients >50 yrs. or if clinically indicated)
- CXR (patients >50 yrs. or if clinically indicated)
- Foley catheter to monitor fluid status (if applicable)
- Anesthesia consult (if applicable)
- Reserved monitored bed post-operatively (if applicable)

Emergency OR Booking

- Define priority code

  A: Risk of loss of life/limb; requires surgical intervention within 2 hr

  B: Risk of loss of life/limb; requires surgical intervention within 2-8 hr

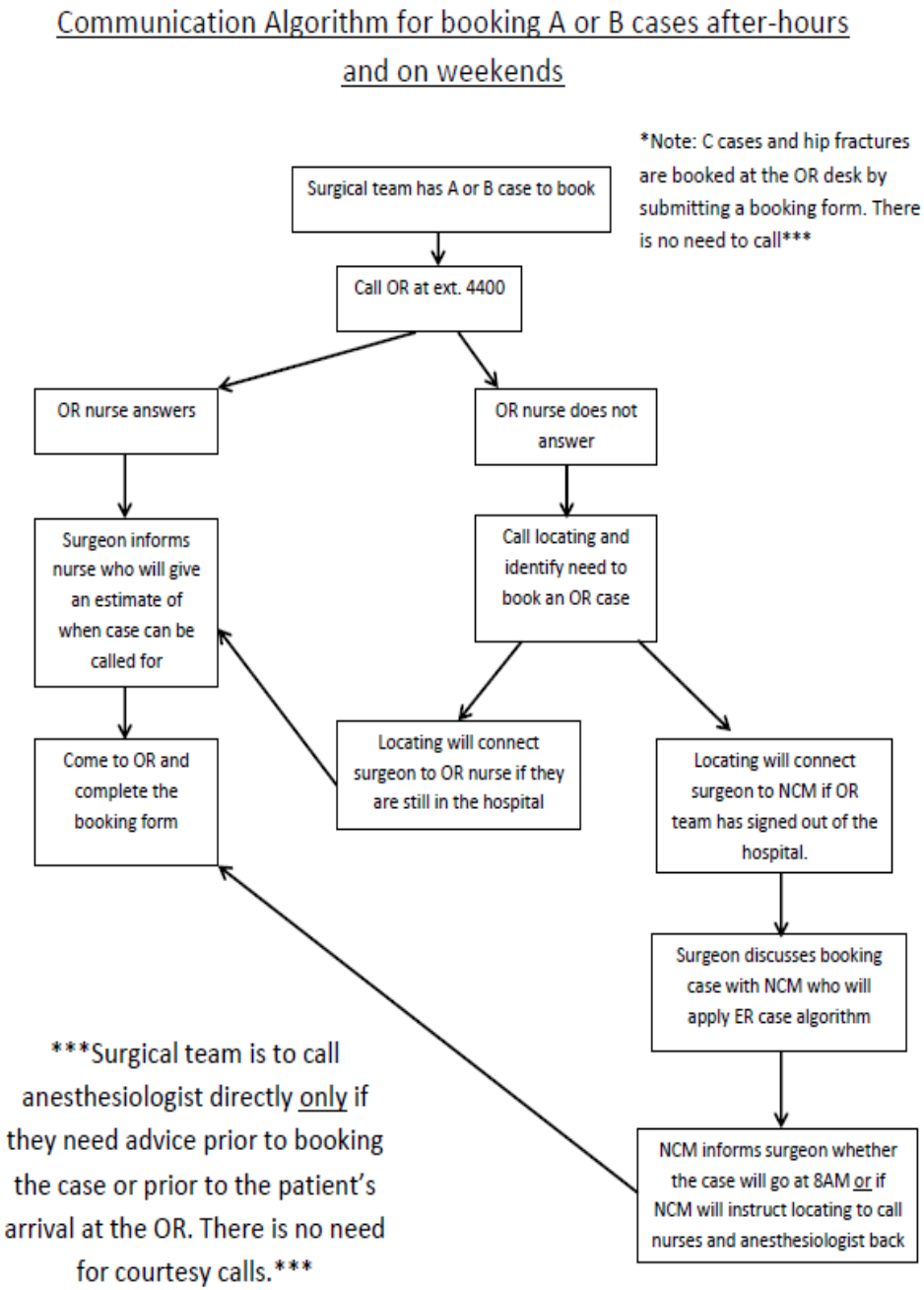
  C: Risk of loss of life/limb; requires surgical intervention within 8-48 hr
- Go to O.R. desk and complete O.R. booking form
  - ◊ Emergent cases are done in order of booking time and priority code.
  - ◊ Be sure to book case as soon as you are aware patient will need surgery and to confirm with SR resident prior to booking

    Regular booking hours:

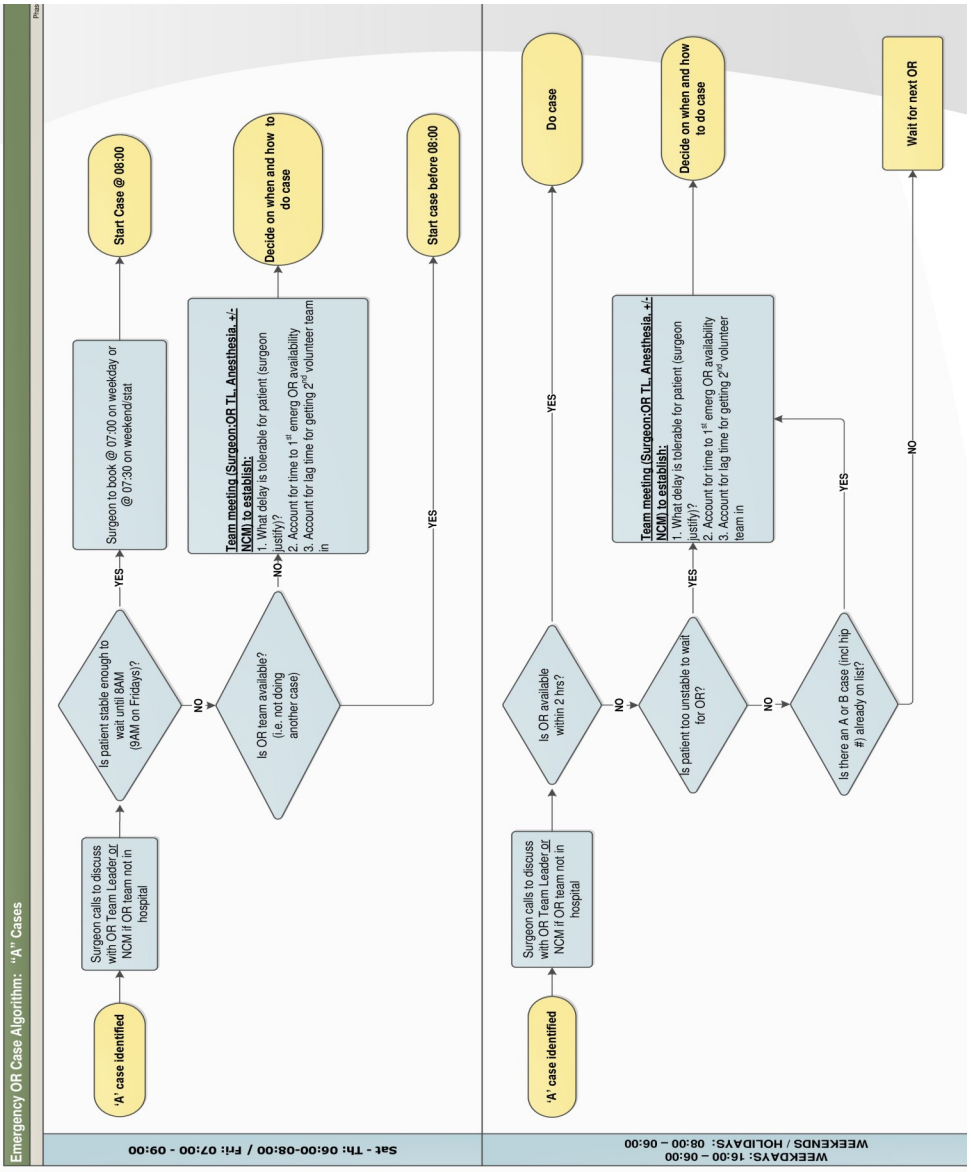
    7:30 a.m. to 5:00 p.m. Monday to Thursday

    8:30 a.m. to 4:00 p.m. Friday

    8:00 a.m. to 4:00 p.m. weekends and holidays
- After hours, contact the OR Nurse Team Lead (x4400) or if unavailable, page the OR Clinical Nurse Manager through locating (x5133).

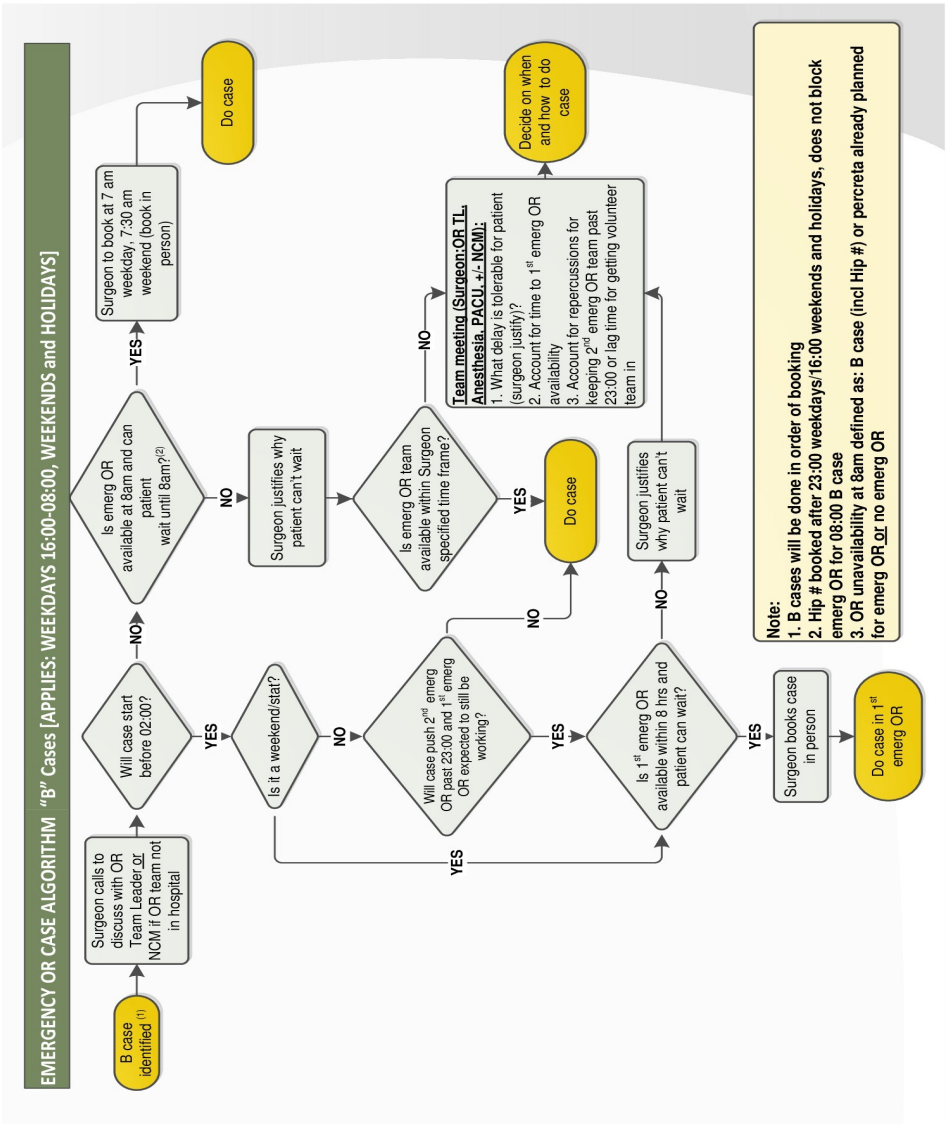

Communication Algorithm for booking A or B cases after-hours and on weekends
*Note: C cases and hip fractures are booked at the OR desk by submitting a booking form. There is no need to call***
Surgical team has A or B case to book
Call OR at ext. 4400
OR nurse answers
OR nurse does not answer
Surgeon informs nurse who will give an estimate of when case can be called for
Call locating and identify need to book an OR case
Come to OR and complete the booking form
Locating will connect surgeon to OR nurse if they are still in the hospital
Locating will connect surgeon to NCM if OR team has signed out of the hospital.
Surgeon discusses booking case with NCM who will apply ER case algorithm
NCM informs surgeon whether the case will go at 8AM or if NCM will instruct locating to call nurses and anesthesiologist back
Surgical team is to call anesthesiologist directly only if they need advice prior to booking the case or prior to the patient's arrival at the OR. There is no need for courtesy calls.

"A" Case



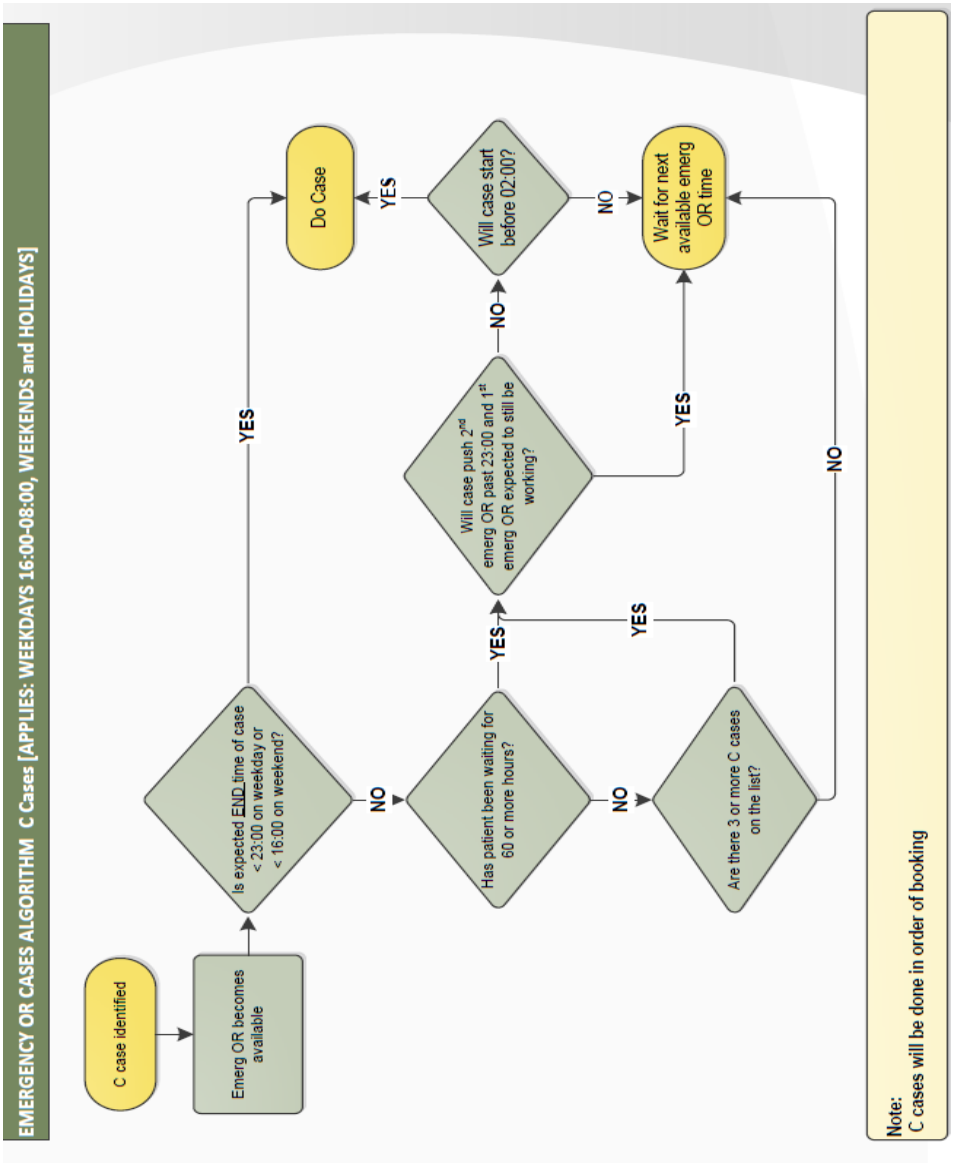
NB: These algorithms are also available on the OR desk

"B" Case



NB: These algorithms are also available on the OR desk

"C" Case



NB: These algorithms are also available on the OR desk

Consulting Services

General Surgery Consult Guidelines

- Consults on new patients who are unknown to any general surgery staff at MSH should be reviewed with the staff surgeon on call, or her/his designate (e.g. Clinical Associate).
- Consults on patients who have previously been evaluated or operated on by an MSH general surgery staff should be reviewed with the staff on call. The default is to admit the patient under the staff on call. The staff on call will contact the patient's original surgeon to determine if the patient should instead be admitted under him/her.
- When a staff surgeon will be unavailable to answer queries about her/his patients, the surgeon should inform locating and house staff of the plan for coverage.
- Urgent transfer of a patient from another hospital to MSH should be arranged by the staff surgeon on call. The staff surgeon is responsible for the decision to accept the patient in transfer, and must verify that a bed at the required level of care is available at MSH. The staff surgeon is to notify admitting (x4496) of the patient's name and admitting diagnosis, and email the flow coordinator Carolyn Farquharson - CFarquharson@mtsinai.on.ca
- Patients with chest tubes: Thoracic surgery will provide consultation where requested. If they have no beds or do not feel the patient requires their service to admit them, they will consult General Surgery here to request admission here.
- The General surgery service will only be involved in the care of patients who swallow foreign bodies if there is evidence or concern for perforation. If patient requires admission, Medicine should admit with GI and or general surgery consulting, if applicable.
- If a PMH patient needs to be admitted, they should go to TGH, unless the patient has a prior affiliation with Mount Sinai Hospital. If being admitted to MSH, the referring physician should also speak to the admitting team on call as a courtesy (but not as a direct, see policy on "directs to medicine" on MSH intranet).
- The Peritoneal Malignancy service (McCart, Govindarajan, Bischof) has instituted a designated *"surgeon of the week"* system. The rota will be provided to Locating and to the general surgery staff and house staff.

General Surgery Consult Guidelines (Continued)

- The Inflammatory Bowel Disease (IBD) service has instituted a *"surgeon of the week"* system for new IBD consults. The rota will be provided to locating and to the general surgery staff and house staff.
- Lower GI bleeds without significant co-morbidity should be referred to General Surgery.
- Small bowel obstruction (partial or complete) in a patient with previous surgery should go to Surgery. IBD patients with a mass and SBO should go to GI.
- Patients with a malignant bowel obstruction are admitted to surgery if they are (or require) undergoing surgical management. If they will not be undergoing surgical treatment, and are undergoing active therapy by a medical oncologist, they should be admitted to Medicine. If the patient is purely palliative they should go to the service that last actively treated the patient.
- Pancreatitis should be admitted to Surgery (alcoholic and gallstones).
- The benign general surgery clinic referral form is for the Emergency MD's to use for patients that need to be seen on an out-patient basis by general surgery, but that don't need a general surgery consultation in the emergency department. If the general surgery team is consulted, the benign general surgery clinic referral form should NOT be used and follow-up should be arranged as per the staff surgeon on call. If the patient is being referred to another surgeon then a direct referral to that surgeon should be made.

UHN Consult Services

- UHN consults are required for the following consulting services:
    - ◊ Plastic Surgery
    - ◊ Radiation Oncology
    - ◊ Transplant
    - ◊ Thoracic Surgery
    - ◊ Neurosurgery
    - ◊ Vascular Surgery
    - ◊ Hepatobiliary
- To contact UHN locating from MSH phone, dial 14-3155

Palliative Care Consult Service

- Palliative care consult service assists in managing patients with life-threatening illness.
- Typical indications for consults:
  - ◊ Pain and symptom management i.e. nausea, pain, fatigue
  - ◊ Discharge planning i.e. palliative care unit, home, LTC
  - ◊ Psychosocial distress i.e. diagnosis, management
- Patients do NOT necessarily need a prognosis < 3 months, DNR status or diagnosis of cancer for referral.
- Call ext. 7884 between 8:30 a.m. to 4:30 p.m.
- After hour consultations are done via on-call palliative care physician.

Arranging an Interventional Radiology Procedure

- Common IR procedures:
  - ◊ Percutaneous drainage of intra-abdominal collection
  - ◊ Sinogram (to check position of a percutaneous drain)
  - ◊ Fistulogram (to delineate the anatomy of a fistula)
  - ◊ Tissue biopsy
  - ◊ Insertion of PICC line or port-a-cath
- Enter the IR order in Powerchart and clearly state the reason for exam.
- Call IR to speak with radiologist and provide brief history and indication for the procedure (x 2247 or 4419).
- Ensure patient has a recent INR/PTT (within last 72 hours).
- Hold thromboprophylaxis and make the patient NPO on the morning of IR procedure.

Interpreter Services

- **Monday to Friday 8:00a.m. to 4:00 p.m.** Call ext.2121
- After 5:00 p.m. and on weekends, call *Language Services Toronto* at **416-504-4LST (4578).**
- Always record in the patient's chart that an interpreter has been used, or that you attempted to find an interpreter.

TPN Consult Service

- Total parenteral nutrition is typically provided after 7-10 days of NPO status in previously well-nourished patients.
- GI TPN staff must be consulted before noon in order for TPN to start that evening; new TPN consults are not accepted on weekends and holidays.
- Patients require a double lumen PICC line (inserted by interventional radiology) and pre-TPN bloodwork ordered in Powerchart.
- For home TPN, please see discharge services section (pg. 27).

Arranging an ERCP

- Patients requiring ERCP are referred to St. Michael's Hospital.
  - Dr. P. Kortan — P: 416-864-3094 F: 416-864-5619
  - Dr. G. May — P: 416-864-5345 F: 416-864-5749
  - Dr. J. Mosko — P: 416-864-5684 F: 416-864-5882
- Fax the following to SMH:
  - Completed referral request clearly stating history of presenting illness and indication for the procedure
  - Relevant ancillary investigation (i.e. ultrasound results, lab results)
  - Recent INR
  - Copy of face sheet from patient's chart
- Ensure that the patient is NPO at midnight and thromboprophylaxis is held the day of procedure.

Inpatient Care

Template for Progress Note

General Surgery
Date
Patient identification (i.e. post-operative day/post-admission day #)
Status of vital signs (i.e. Tmax, tachycardic, hypotensive, oxygenation or AVSS)
Outputs (i.e. urine, stoma, drains, bowel movements, vomitus)
Brief patient subjective history
Objective physical exam findings
Overall impression of patient status
(This is critical for communication to other services involved)
Plans
Document daily changes to orders or anticipated direction of patient care (i.e. advance diet, follow up leukocytosis)
Resident name and designation
Surgical team colour

Handover

- Daily report on patients must be given to the unit Team Lead after morning rounds, prior to clinical activities (OR, clinic).

Best Practice in Surgery Guidelines

Go to **www.bestpracticeinsurgery.ca** for full guidelines on:

- Pre-operative fasting
- Enhanced Recovery After Surgery (ERAS)
- Surgical Site Prevention
- Management of Acute Pancreatitis
- Mechanical Bowel Preparation
- Surgical Wound Care

BPIGS app (Apple only): **https://itunes.apple.com/us/app/best-practice-in-general-surgery/id751595906?ls=1&mt=8**

Summary of ERAS Guidelines

- Early Mobilization:
  - POD 0 - Dangle off side of bed, sit or walk
  - POD 1 - Walk x2
- Early Enteral Nutrition:
  - Clear fluids 2hrs post-op
  - POD 1 - solid food
  - Chew gum (5 mins) 3x/day
- Foley Catheters:
  - Avoid, if possible
  - Remove within 24hrs post-op, unless contraindicated (i.e. urologic surgery, rectal surgery)

Perioperative Pain Management

- In opioid-naïve patients undergoing surgery, use multimodal therapy consisting of non-opioid pharmacotherapy (i.e. Acetaminophen, NSAIDs) with physical (i.e. ice, heat, massage) and/or psychological interventions, with opioids added only when appropriate.
- When prescribing opioids, give the lowest effective dose of the least potent immediate-release opioid.
- Provide patients with information about the potential benefits and harms of opioid therapy and a tapering plan.
- Oral to parenteral conversion is approximately 2:1.
  - ◊ Routine doses of immediate release opiates should be Q4h
  - ◊ Breakthrough (PRN) should be 1/2 the Q4h dose Q1-2h PO
  - ◊ Monitor and titrate frequently. Check the frequency of PRN use over 24h and adjust Q4h dosing accordingly
- Do not start sustained release or transdermal patches until pain control is achieved for several days on stable doses of immediate release opiates.
- Always give concurrent antiemetic and consider adding a bowel regimen.

Medication	*Oral dose*
Codeine	15-100 mg
Morphine	5-10 mg
Oxycodone	2.5-5 mg
Hydromorphone	0.5-2 mg
Tylenol #1	300 mg acetaminophen & 8 mg codeine
Tylenol #2	300 mg acetaminophen &15 mg codeine
Tylenol #3	300 mg acetaminophen & 30 mg codeine
Percocet	325 mg acetaminophen & 5 mg oxycodone
Tylenol #2 is equivalent to ≈ 3 mg of morphine + 300 mg acetaminophen	
Percocet is equivalent to ≈ 10 mg of morphine + 325 mg acetaminophen	

The Acute Pain Service (APS)

- APS manages acute pain in surgical patients admitted to hospital.
- There is 24 hour coverage and the Anesthesiologist can be reached by pager via Locating (Ext. 5133).
- **IMPORTANT**: General Surgery team **CANNOT** order any analgesics, drugs with sedating properties (ie. hs sedation, anti-anxiety medications, antidepressants), antiemetics, or antipruritic while the patient is being managed by the APS.

Venous Thromboembolism Prophylaxis

- Prescribed to all admitted patients regardless of age or risk factors, operative versus non-operative management.
- Low risk patients undergoing day surgery or minor procedures (i.e. lumpectomy, anorectal procedures) do not require thromboprophylaxis.
- Patients receive daily low molecular weight heparin (i.e. Enoxaparin) dosed according to body weight and renal function.
- The first dose is administered intra-operatively (if applicable) and daily thereafter.

Patient Risk	Patient Population	Recommendation
Low Risk	Minor procedures i.e. Breast Sx, EUA, hernia repair	No Thromboprophylaxis
Moderate Risk	Abdominal surgery (laparoscopic & open), Non-operative admission	Give tx at start of OR Enoxaparin 40mg SC q24hrs *or* Heparin 5000 U SC q8-12 hrs
High Risk	Cancer pts, Major surgical procedure	Give tx at start of OR Heparin 5000 U SC q8-12 hrs *or* Enoxaparin 40mg SC q24hrs

Special Considerations	Adjustment
OR starts >6pm	Give half dose at start of OR
Epidural	Give tx 2-8hrs post insertion Restart 2hrs after epidural removal
Weight <40kgs BMI 35-50 BMI >50	 Enoxaparin 30mg SC q24hrs Enoxaparin 40mg SC BID Enoxaparin 60mg SC BID
Renal Dysfunction eGFR 15-30 eGFR <30	 Enoxaparin 30mg SC q24 Unfractionated Heparin

- Anticoagulation should be temporarily suspended to avoid bleeding:
  - ◊ Prior to Interventional Radiological procedures (i.e. insertion of percutaneous drain, biopsy)
  - ◊ Prior to insertion and removal of an epidural catheter, and administered 2hrs after (see above)
  - ◊ Evidence of acute GI bleed (until hemostasis achieved)

Perioperative Steroid Management

- Perioperative adrenal insufficiency is an uncommon but serious complication of surgery.
  - ◊ Patients taking ≥ 10 mg of prednisone daily (or steroid equivalent) within 3 months of surgery require perioperative stress dosing.
  - ◊ If they have been off steroids > 3 months, they likely have an adequate adrenal response and do not require steroid coverage.

Pre-operative Prednisone dose	**Stress steroid regimen**	**Duration of therapy**
> 30 mg daily	Hydrocortisone 100 mg IV 12h *then* Hydrocortisone 50 mg IV Q12h *then* Resume oral prednisone	X 4 doses (first dose intraoperatively) X 4 doses Begin tapering (unless continued therapy indicated)
10-25 mg daily	Hydrocortisone 50 mg IV Q12h *then* Resume oral prednisone	X 6 doses Begin tapering (unless continued therapy indicated)

Postoperative Steroid Tapering

- Most often patients may discontinue steroids but require weaning to avoid symptoms associated with HPA axis suppression (unexplained hypoglycemia, hypotension, shock)

Duration of steroid use	**Weaning regimen**
< 1 month	Decrease dose by 5 mg weekly
> 1 month	Decrease dose by 5 mg every 2 weeks

Pre-medication Protocol for CT Contrast Dye Allergy

13 hrs pre-examination	Prednisone 50 mg PO x 1 dose *or* 40 mg solumedrol IV (if patient cannot tolerate PO)
1 hr pre-examination	Prednisone 50 mg PO x 1 dose *or* 40 mg solumedrol IV (if patient cannot tolerate PO) *and* Benadryl 50 mg PO x 1 dose (50 mg IV if patient cannot tolerate PO)

Biochemistry & Microbiology

- Urinalysis and Urine culture is ordered in Powerchart.
  - ◊ Microbiology does not automatically process all positive urine cultures as most may represent asymptomatic bacteriuria. Call (x2016) within 48 hours to process urine sample for culture.
- There are location specific fluid biochemistry order sets on Powerchart:
  - ◊ JP Drain Biochemistry Set
  - ◊ Ascites Order Set
  - ◊ Ileostomy Fluid Order Set
  - ◊ Fistula Drainage
  - ◊ Joint Fluid Analysis Set
  - ◊ Peritoneal Fluid Procedure Set
  - ◊ Wound Drainage Biochemistry
  - ◊ Synovial Fluid Analysis set

Blood Product Transfusion

- Obtain consent for Blood Product Transfusion prior to administering.
- Adult Red Cell Transfusion Set
  - ◊ Can only transfuse 1 unit of PRBCs at a time, then must reassess Hb.
  - ◊ Ensure Group & Screen is ordered (valid for 96hrs).
  - ◊ Ensure to click both "Crossmatch" & "Transfuse" within the nested care set.
- Adult Albumin Transfusion Set
  - ◊ Available in 5% (iso-osmotic with plasma) and 25% (hypertonic). Consider furosemide to prevent fluid-overload.

Correcting Electrolyte Imbalances

Potassium Normal level 3.5-5.0 mmol/lL

Hyperkalemia K +6mmol/L or greater	*obtain ECG to determine if changes are consistent with hyperkalemia
Medications	• Calcium Gluconate 1 gram IV direct over 5 minutes (10 ml of 10% solution) Repeat ECG following completion of calcium infu-
Shift K intracellularly	• Salbutamol 100 mcg, 4 puffs via space once • D50W, 50 ml IV direct • Regular insulin 10 units IV direct X1
Increase K elimination	Consider Lasix in volume overloaded patient

Hypokalemia	**Normal renal function**	**Impaired renal function (Cr Cl < 50 mL/min)**
3.1-3.5 Mild	PO 40 mEq	PO 20 mEq
2.6-3.0 Moderate	PO 40 mEq x 2 doses	PO 20 mEq
< 2.5 Severe	PO 40 mEq x 2 doses and consider adding 40 mEq KCl to IVF	PO 40 mEq

Options:
PO potassium chloride (KDur)
IV KCl is only available through a central line

Magnesium Normal level 0.71-1.10 mmol/lL

	Normal renal function	**Impaired renal function (Cr Cl < 50 mL/min)**
0.55-0.70 Mild	PO/NG 30 mL Q6h x 4 doses *or* IV 2 g in 100 mL NS over 2 hr	PO/NG 30 mL Q6h x 4 doses *or* IV 2 g in 100 mL NS over 2 hr
0.40-0.54 Moderate	IV 2 g in 100 mL NS over 2 hr x 2 doses	IV 2 g in 100 mL NS over 2 hr x 2 doses
< 0.39 Severe without life threatening signs or symptoms	Day 1: IV 2 g in 100 mL NS Q4h over 2 hr x 4 doses Day 2: IV 2 g in 100 mL NS Q12h over 2 hr x 2 doses, then reassess	Day 1: IV 2 g in 100 mL NS Q8h over 2 hr x 3 doses Day 2: IV 2 g in 100 mL NS over 2 hr, then reassess
< 0.39 Severe with life threatening signs or symptoms	Day 1: IV 2 g in 100 mL NS Q4h over 2 hr x 4 doses *then;* IV 2 g in 100 mL NS Q6h over 2 hr x 2 doses Day 2: IV 2 g in 100 mL NS Q12h over 2 hr x 2 doses, then reassess	Day 1: IV 2 g in 100 mL NS Q4h over 2 hr x 3 doses Day 2: IV 2 g in 100 mL NS over 2 hr, then reassess

Options:
- PO magnesium glucoheptonate (100 mg/ mL suspension)
- IV magnesium sulfate (1 g = 2mL $MgSO_4$ in NS)

Calcium Normal level 2.20-2.60 mmol/lL

(ensure to correct for hypoalbuminemia)

	Normal renal function	**Impaired renal function (Cr Cl < 50 mL/min)**
2.0-2.19 Mild	PO/NG 1250 mg 2 tabs TID x 6 doses	If PO_4 < 2.0, PO/NG 1250 mg 2 tabs TID x 3 doses
1.7-1.99 Moderate	IV 1 g in 100 mL NS over 60 min	If PO_4 < 2.0, IV 1 g in 100 mL NS over 60 min
< 1.7 Severe	IV 1 g in 100 mL NS over 30 -60 min	If PO_4 < 2.0, IV 1 g in 100 mL NS over 30-60 min
Options: PO calcium carbonate (1 g = 400 mg elemental Ca) IV calcium gluconate (1 g = 2.33 mmol Ca)		

Phosphate Normal level 0.9-1.45 mmol/lL

	Normal renal function	**Impaired renal function (Cr Cl < 50 mL/min)**
0.70-0.89 Mild	PO/NG 500 mg BID x 2-4 doses *or* IV 15 mmol in 500mL NS over 5 hr	PO/NG 500 mg BID x 2-4 doses *or* IV 15 mmol in 500mL NS over 5 hr
0.50-0.69 Moderate	IV 15 mmol in 500mL NS over 5 hr x 2 doses	IV 15 mmol in 500mL NS over 5 hr x 1-2 doses
< 0.5 Severe	IV 15 mmol in 500mL NS over 5 hr x 3 doses	

Options:

- PO/NG phosphate Novartis
- IV potassium phosphate (5 mL = 15 mmol PO_4 and 22 mEq K)
- IV sodium phosphate (5 mL = 15 mmol PO_4 and 20 mmol Na)
  - If K > 4.0, consider $NaPO_4$
  - If K < 3.5, consider KPO_4

Discharge Planning

What services are involved in discharge planning?

- Physiotherapy, occupational therapy, social work, and other consulting services.
- Assessments and progress notes from allied health can be found on Powerchart (under Clinical Documentation tab).
- All teams have rounds with allied health weekly to liaise and discuss patient care (see Interdisciplinary Rounds section pg. 7).

Discharge tools available on Powerchart:

- Discharge Medication Reconciliation
- Discharge Prescriptions
- Discharge Summary Note

Homecare (CCAC) Referrals

- Click on TC LHIN Referrals tab (top of Powerchart).
  - Ensure all tabs are completed (green), signed off and sent.
  - Complete referrals **before** 9:00 a.m. on day of discharge.
- There are templates in the TC LHIN referral portal for:
  - JP drain care in breast surgery
  - JP drain care in abdominal surgery
  - Percutaneous drain care in abdominal surgery
  - Simple wound care orders
- Arrangements for VAC therapy requires coordination with the ETN and may take 2-3 business days.

The Transitional Pain Service (TPS)

TPS manages pain in surgical inpatients to minimize the likelihood of progressing to chronic pain, and to ensure an appropriate and safe amount of pain medication is prescribed upon discharge

Prescribing Pain Medications

- Affix patient label on the prescription.
- For opioid-naïve adults, first line is non-opioid treatment (unless contraindicated).
  - ◊ Acetaminophen 1 g PO 3x day for 7 days then PRN
  - ◊ NSAIDS 3x day for 3 days then PRN
- Prescription for opioid-containing tablets should be based on consumption in hospital 24hrs prior to discharge (use same analgesic).
- If opioids are prescribed, they should be short-acting at the lowest effective dose for shortest duration. i.e.:
  - ◊ Morphine 5 mg, q6-8hrs, PRN for 3 days
  - ◊ Hydromorphone 1 mg, q6-8hrs, PRN for 3 days, q12 prn
  - ◊ Oxycodone^ 5 mg, q6-8hrs, PRN for 3 days, q12 prn
  - ◊ Tramadol^ 50 mg q8h, PRN for 3 days
- Always specify the total dispensing quantity and strength of the drug.

  i.e. Morphine 5-10 mg PO Q4h PRN for pain
  Mitte: 40 tablets of 5 mg tablets
- Opioid prescriptions including Codeine, Fentanyl patch, Hydromorphone, Morphine, Oxycodone, Percocet and Lomotil, prescriptions must be written or faxed (i.e. no verbal prescriptions).
  - ◊ Refills are not permitted.
  - ◊ May be written as part-fills and dispensed in divided portions.
- Provide instructions for safe storage and disposal of opioids:
  - ◊ Store opioids (including used patches) in a secure place to prevent theft, problematic use or accidental exposure.
  - ◊ Keep opioids out of sight and reach of children and pets.
  - ◊ Never throw opioids (including used patches) into household trash where children and pets may find them.
  - ◊ Return expired, unused or used opioids (including patches) to a pharmacy for proper disposal.

Thrombosis Follow Up

- For patients started on anticoagulation for a new DVT, follow up at the TGH Thrombosis clinic after discharge is required.
- Fax a completed referral form to thrombosis clinic at TGH **(https://www.uhn.ca/PrincessMargaret/Health_Professionals/Patient_Referral/Documents/DMOH_Hemostasis_Thrombosis_referral_form.pdf)**
  - ◊ Refer to this form for treatment guidelines.
- Patients are usually seen in thrombosis clinic within 3-4 weeks of discharge; Ensure anticoagulation prescription is provided for minimum 3-4 weeks.
- For urgent referrals, call 416-268-0206.

Home TPN Request

- REQUEST home TPN consult from Dr. Hillary Steinhart (x5121) - even if patient is currently an inpatient on TPN, and **PROVIDE** the following information:
  - ◊ Anticipated time patient will be on home TPN (MSH GI is only able to follow someone for up to 3 months).
  - ◊ Plan for readmission (i.e. surgery) or stopping of TPN within 3 months.
- If a longer duration of TPN (>3months) is required/anticipated a referral must be made to the long term HTPN program at TGH (Dr. Johane Allard ext.14-5159). **COPY Dr. Steinhart on this letter.**
- Inform the appropriate dietitian for your team and/or the TPN pharmacist of the plan for home TPN. The TPN team will cycle the patient's TPN over a **minimum of 3 days.**
- CALL (Resident or Charge Nurse) CCAC to see if home TPN is available in the patient's community. Some smaller CCACs may need to organize special resources to provide home TPN.
- Complete TC LHIN referral for home TPN. Template found under Medical Treatment Orders/Medication & Hydration/TPN.
- The TPN prescription will be finalized **by Dr Steinhart ONLY** when labs are stable and patient is otherwise ready for discharge.
- It typically takes **3-5 business days** for TPN bags to be prepared by community pharmacy and delivered to the patient's home. CCAC will inform you of the delivery date to anticipate discharge.

All Teams

How do I manage a small bowel obstruction?

- Etiology
  - ◊ Postoperative adhesions
  - ◊ Hernia (abdominal wall, groin, incisional)
  - ◊ Inflammatory bowel disease
  - ◊ Volvulus
  - ◊ Intussusception (typically inflammatory mass or neoplasm)
  - ◊ Gallstone ileus
- May be complete or partial
- Tachycardia, fever, localized or generalized abdominal tenderness, rebound tenderness and leukocytosis are concerning signs of bowel compromise
- If any of these signs are present, discuss urgently with senior resident and/or staff surgeon Investigations
  - ◊ XR - air fluid levels, distended proximal loops proximal, collapsed distal bowel, no air in colon and rectum in complete obstruction
  - ◊ CT scan
  - ◊ Upper GI series in inflammatory bowel disease
- Management
  - ◊ Fluid and electrolyte resuscitation- often preexisting profound losses through decreased absorption, increased secretions, vomiting and transudation of fluid into the peritoneal cavity
  - ◊ Urgent operative management if SBO in virgin abdomen
  - ◊ Gut decompression - NG tube
  - ◊ Serial exams for monitoring of progression or resolution

How do I manage a large bowel obstruction?

- Less common than SBO (15% of bowel obstructions)
- Etiology: Cancer, Diverticular stricture, Volvulus (Sigmoid or cecum), Ischemic or inflammatory stricture, fecaloma hernia, foreign body.
- May be complete or partial

- Investigations
    - XR - distended proximal loops proximal, collapsed distal bowel
        - If the ileocecal valve is incompetent, may have associated SB dilatation
        - If the ileocecal valve is competent, a closed-loop obstruction may result and greater risk of perforation
    - CT scan
- Management
    - Fluid and electrolyte resuscitation
    - Consider urgent operative management if cecum > 9 cm, signs of perforation or strangulation, generalized sepsis
    - Gut decompression - NG tube, rectal tube if distal obstruction
    - Colonic stent
    - Sigmoidoscopy (for sigmoid volvulus)

Aqua team

Breast surgery

- Day surgeries
    - Lumpectomy ± sentinel lymph node biopsy
        - Requires prescription for analgesia and stool softener
- Admissions
    - Mastectomy ± reconstruction
    - Axillary node dissection
        - Requires prescription for analgesia and stool softener
        - Requires CCAC for JP drain care
- Requires follow up with surgeon in 2-3 weeks

Peritoneal Malignancy Program (PMP)

- Surgeon of the week– One of the three PMP staffs manage the inpatients from Friday to Thursday. All inpatient issues should be reviewed with the surgeon of the week
- Discharge follow up
    - elective patients should follow up with the operating surgeon.
    - On call patients that required an operation should follow up with the operating surgeon. If no surgery was performed, then they should follow up with the surgeon of the week on day of discharge.

Cytoreductive surgery (CRS) and Hyperthermic Intraperitoneal Chemotherapy (HIPEC)

- Performed on patients with peritoneal malignancies for curative intent
    - ◊ Candidates include carcinomatosis from colorectal cancer, appendiceal tumours (including psuedomyxoma peritonei) and peritoneal mesothelioma
- Surgeries typically last from 8 to > 20 hours and pose significant physiologic stress on the body
- Many patients undergo splenectomy and require post-splenectomy vaccines 2 weeks post-operatively
    - ◊ Pneumococcal conjugate (PPSV23); booster 5 years later
    - ◊ *Haemophilus influenza* conjugate
    - ◊ Meningococcal conjugate (ACWY-135); booster every 5 years
    - ◊ Influenza; annual vaccination recommended

How do I manage HIPEC patients postoperatively?

Postoperative issues	**Management**
Hemodynamic instability	ICU admission, Ok to transfer to surgical step down unit on POD#1, if hemodynamically stable. Transfer from ICU to surgical ward need to be discussed with staff first.
Fluid and electrolytes	Expect marked fluid shifts in early postoperative period with requirements of several fluid boluses Serum PO_4 and Mg are usually low and require aggressive replacement Check extended electrolytes daily until stabilized.
Respiratory	Pleural effusion and pulmonary edema are common on POD# 1-3, especially if stripping of the diaphragmatic peritoneum is performed Consider chest tube or pigtail insertion for symptomatically significant effusions
Bleeding	May have late bleeds (POD 9), especially in cases with Oxaliplatin chemotherapy perfusion.

How do I manage HIPEC patients postoperatively? (cont'd)

Postoperative issues	Management
Nutrition and bowel function	Expect prolonged ileus Patients are to remain NPO with NG tube decompression until bowel function resumes If no sign of bowel function by POD# 6-7, consider TPN Patients typically have loose stool once bowel function resumes especially after bowel resection
Drains	JP drains remain in situ until outputs are minimal or patient is tolerating a regular diet
Anticoagulation	POD#0 Ensure DVT prophylaxis (heparin 5000u sc) is given 12 hrs after the first dose given intra-op. High risk of DVT thus standard BPIGS practice for thromboprophylaxis apply

Red and Orange team

How do I manage patients with high ileostomy outputs?

- >1200cc of effluent over 24 hr
- Exclude partial SBO or resolving SBO (AXR may be indicated)

	Strategies
Fluid and electrolytes	Monitor for signs of dehydration and electrolyte imbalances Hydration replacement for volumes >1000cc/24hr with 1:1 of NS + 20 mmol/L KCl IV BID
Oral feeds Consider dietician consult	Separate solids and liquids by 30 min Avoid hyperosmolar beverages (ie. sweetened juices, carbonated beverages) Increase intake of foods that can thicken outputs (i.e. rice, toast, bananas, cheese)
Antidiarrheal (do not start until discussing with staff surgeon)	1st line: Lomotil (max. dose 5 mg QID) 2nd line: Loperamide (max. dose 4 mg QID) 3rd line: Codeine (starting dose 30 mg Q6h) 4th line: Cholestyramine (starting dose 1-2 sachets daily)

How do I manage patients with an enterocutaneous (EC) fistula?

- Common risk factors for developing EC fistulae:
  - IBD (particularly Crohn's)
  - Emergent surgery
  - Malnutrition
- Infection/sepsis >500cc of affluent over 24hr considered high output fistula
- Some patients may be treated with bowel rest to create an optimal environment for spontaneous closure
- Treatment principles:
  - Rule out intraabdominal abscess
  - Monitor for signs of dehydration and electrolyte imbalances
  - Protect peri-fistula skin and consider enterostomal therapy nurse (ETN) consult
  - Decrease intestinal secretions
    - Consider NPO status with parenteral nutrition
    - PPI– Lansoprazole 30mg PO BID
    - Octreotide 100-300mg SC TID may help in high output fistulae only with difficulty protecting skin

Blue team

- Sarcoma patients typically undergo complex surgeries including multivisceral resections requiring very close monitoring perioperatively.
- Consult with attending staff or fellow prior to making any changes to the patients (i.e. removing tubes and drains, removing staples and sutures, consulting other services, accepting or making transfers to other services, imaging studies and blood transfusions).
  - Staff and fellows are very approachable and encourage junior residents to review plans of care with them.
- Many patients have skin grafts and flap closures. Defer to plastic surgery for care and follow up.

Enjoy your rotation!

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We appreciate any feedback that you might have to help us improve this handbook. Please contact the Physician Assistants on the service for any comments, opinions or suggestions.

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