1/30/18 BP

UR Medicine Colorectal Surgery: Enhanced Recovery After Surgery (ERAS) Pathway

Periop Phase	Pre-Admission	Pre-op DOS	Intra-op	POD 0	POD 1	POD 2 through D/C
Medication Notes	• 5 days before surgery, stop: aspirin, clopidogrel, heparin, NSAIDs & warfarin. • 3 days prior to surgery, stop: apixaban & dabigatran. • Other anti-coagulant regimens are managed on an individual basis. • Day prior to surgery: mechanical bowel preparation and oral antibiotics as noted below.	• Enoxaparin 40 mg SQ x1 • Ertapenem 1 gram IV x1 **1st case:** ***All oral*** medications with **sips** of water once admitted: • Acetaminophen 1000 mg po x1 • Alvimopan 12 mg x1 *(ileus prophylaxis)* • Pregabalin 75 mg x1 • Celecoxib 400 mg x1 **Later cases:** Administer acetaminophen in Pre-An. **HOLD celecoxib & acetaminophen with active liver disease. HOLD celecoxib for CrCl < 30 ml/min.**	• *Standardized multi-modal analgesia:* Ketorolac **15-30 mg IV- SURGEON DISCRETION** & Acetaminophen 1 gram IV **(6 h** after previous dose). **HOLD with active liver disease**. • *Minimize opiates:* Consider lidocaine, dexmedetomidine, ketamine infusions, or magnesium 40 mg/kg IV. • *Post-op N&V (PONV) prophylaxis:* Dexamethasone 4 mg IV @ case start (*Consider* HOLD with DM), haloperidol 0.5- 1 mg IV, & ondansetron 4 mg IV prior to awakening. Scopolamine patch in Pre-an to replace dexamethasone or with high-risk PONV (HOLD with close angle glaucoma).	*Standardized multi-modal analgesia:* • Acetaminophen 1 gram IV q 8 h with normal liver function. **HOLD with active liver disease.** • Pregabalin 75 mg orally q 12 h with CrCl >/= 30 ml/min *or* Pregabalin 25 mg orally q 12 h with CrCl < 30 ml/min. • Ketorolac **15 mg IV q 6 h x 4 doses. SURGEON DISCRETION-IF NOT STARTED ON POD 0-PLEASE START ON POD 1 HOLD with advanced renal impairment (CrCl < 30 ml/min) & in pts. at risk of renal failure due** • **When unrelieved by above:** Oxycodone 5 mg orally q 4 h prn moderate pain (VAS 4-7/10); Oxycodone 10 mg orally q 4 h prn severe pain (VAS 8-10/10). • Morphine 2 mg IV q 2 h prn *only if unrelieved by oxy or if not tolerating po.* • *Ileus prophylaxis:* Alvimopan 12 mg orally BID; max 14 doses post-op. • *PONV:* Promethazine 12.5 mg IV q 6 h prn, re-dose ondansetron prn.	*Multi-modal analgesia:* • Acetaminophen 1 gram **IV** x 24 h; then 1 gram orally q 8 h *when tolerating oral diet* . • **Ketorolac 15 mg IV q 6 h x 4 doses. This expires after 24 h.,depending on when it was started. After 4 doses ketorolac, begin Celecoxib 200 mg orally q 12 h on POD 1 or 2** with CrCl > 30 ml/min *or* celecoxib 100 mg orally q 12 h on POD 1 or 2. with Child-Pugh Class B or if patient < 50 kg. **HOLD acetaminophen & celecoxib with active liver disease. HOLD celecoxib if CrCl < 30 ml/min.** • *VTE prophylaxis:* Enoxaparin 40mg SQ q24	**• As per POD 1. Ketorolac expires after 24 h. After 4 doses, begin Celecoxib 200 mg orally q 12 h.** • LMWH (28 days total *including DOS* per NCCN). • Discharge medication regimen TBD.
Surgical Team & APP	• Review ERAS educational materials with patient/family; discuss pre-operative optimization at surgical consult and/or PRAT visit. • Invite to joint Twistle. • *Standardized order set #2102141 "ERAS pre-op":* Order set includes guidelines for multi-modal analgesia dosing. • *Standardized order set #2102137 "Colorectal Ambulatory":* Enter bowel prep/oral antibiotic orders for the day before surgery. Regular diet until 2 pm, then: - Miralax 238 gram orally with 32 oz. Gatorade/G2 @ 2 pm; 6 pm: bisacodyl 20 mg orally. -Promethazine 12.5 mg/25 mg orally prn nausea. -Neomycin 1500 mg orally & metronidazole 500 mg orally for 3 doses: @ noon, 1 pm, & 8 pm. If contraindication to neomycin, take metronidazole. • Carbohydrate loading: Apple juice-16 oz. evening before surgery & 8 oz. on DOS 2 h. prior to Strong Surgical Center (SSC) arrival (non-IDDM). • Skin preparation: Chlorhexidine gluconate (CHG) scrubs evening before & DOS. • Ostomy Nurse: consult/stoma marking prn.	• Reinforce ERAS core components as is feasible. • Confirm stoma marking; contact Ostomy Nursing team if patient has not been marked previously. • Ensure appropriate SSI, VTE, ileus prophylaxis, & multimodal analgesia are ordered (ertapenem, enoxaparin, alvimopan, acetaminophen, pregabalin, & celecoxib) as applicable.	• Skin prep, asepsis, & wound management per protocol(s). • Minimally invasive surgery (Laparoscopic or Robotic) approach is preferred • Open procedures: Use low transverse incision. If this is not possible, use a lower or upper midline approach; minimize incision length. • Ensure esophageal Doppler probe is utilized for goal-directed fluid therapy *if indicated.* • Avoid NGT/drains. • Avoid urinary catheters (Foley) or remove at end of case if possible. • Consider TAP (transverse abdominus plane) block for open cases or local infiltration for laparoscopies.	• Maintain glycemic control. *ERAS post-op order set #2872:* • Medications: Alvimopan, PONV medications, multi-modal analgesia: acetaminophen, pregabalin, & ketorolac; ***minimize opiates.*** **Follow order set guidelines for appropriate dosing.** • Early mobilization: OOB to chair; ambulate as tolerated. PT consult if having difficulty mobilizing. • Diet/IVF: Clear liquids, NS @ 100 ml/hr. • SSI prophylaxis: Incentive spirometer (I/S), flutter valve, deep breathing & coughing (DB & C), early foley removal, maintain operative wound dressing for 48 h. • VTE prophylaxis: IPC's continuously when in bed/resting. • Other: Strict I&O q 4 h, gum chewing for 20 minutes 3 times a day, Ostomy Nurse consult for *all* ostomy patients, order discharge teaching for: LMWH, foley, drains, etc. *Ileostomy patients:* Order Nutrition & Ostomy Nurse consults, follow Ostomy Care pathway, monitor for high output (> 1200 ml/24 h).	• As per POD 0. • Medication changes: acetaminophen orally when tolerating diet. Ensure ketorolac is d/c'd & celecoxib is ordered. Enoxaparin SQ q 24 h. **Follow order set guidelines for multimodal analgesia dosing.** • Early mobilization: OOB to chair for all meals/ about 6 h per day; ambulate 3 times daily. • IVF: Discontinue when oral intake is established & UOP is adequate. • Diet: Regular (diabetic, etc.); patient will "self-regulate". • Discontine foley: For colon surgery; document if n/a. • Follow-up initiation of consults. • Re-assess drain/tube requirements.	• As per POD 1. • Progressive mobilization: OOB x 8 h & ambulate 4 times daily. • Discontine foley: For rectal/low pelvic; document if n/a. • Reinforce: progressive mobilization, adequate hydration, eating small portions, healthy diet, monitoring I&O (prn). • Target LOS (# days): Colon cases- 4, rectal & pelvic procedures- 5, ostomy reversal-3. • F/U phone call: within 48 business hours; verify that appropriate follow-up appointments are arranged.

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Periop Phase	Pre-Admission	Pre-op DOS	Intra-op	POD 0	POD 1	POD 2 through D/C
Anesthesiology Team	• **Center for Perioperative Medicine (CPM)**: *Anesthesia consultation* per Division APP request or pre-admission protocol. *Optimization consults* : Smoking cessation, ETOH modulation, diet/nutrition & I/S. • *Anemia management :* Arranging iron infusions prn • *Pain management :* Evaluation & liaison between Acute Pain Service & Surgical team.	• Initiate Normothermia Protocol (as applicable): forced-warm air blanket, warmed IVF, adequate OR temperature. • Glucose Management per Protocol.	• Normothermia & BG's per protocol. • Avoid NGT & urinary catheters & remove at end of case if possible. • Consider TAP block for open cases. *Fluid management:* • Avoid 0.9 % normal saline. • Restriction **if ASA I/II** for cases without expected significant EBL or fluid shifts. • Otherwise, goal-directed fluid therapy using esophageal Doppler per protocol. *Lung protection:* • TVs 6-8 ml/kg, PEEP= 6-10, recruitment maneuvers.	• APS consultation for lidocaine management.	• As per POD 0.	• Routine post-op f/u per protocol.
Nursing Staff	*ERAS Care Coordinator* : • PRAT follow-up/reinforce ERAS core components; review bowel preparation, carbohydrate loading, & CHG skin scrub. • Connect patient/family with additional support as needed (SW, Cerfified Ostomy Nurse, smoking cessation resources, etc.). • Follow-up *Twistle* invite. • Begin auditing process. *CPM staff* : • Pre screening phone call prior to surgery per CPM protocol; Anesthesia evaluation & testing per standard. • Comprehensive reconciliation including allergies, medications, review of systems, disease management, & infection prevention. • Optimization consult per CPM protocol.	• Confirm/document: Curtailed fast, bowel prep with oral antibiotics, CHG skin scrub, & carbohydrate loading. • Review education: Pulmonary hygiene, & preventing SSI's & VTE's. • Ensure ertapenem, enoxaparin, alvimopan, acetaminophen, pregabalin, & celecoxib are ordered. • IVF: LR @ 20 ml/hr. • Maintain normothermia.	• Normothermia maintainence. • Apply IPC's. • Insert/maintain urinary catheter.	• Early mobilization: Encourage OOB to chair & ambulation. Request PT consult order prn. • Medications: Alvimopan, prn PONV, multi-modal analgesia: acetaminophen, pregabalin, & ketorolac; minimize opiates. • Diet/IVF: Clear liquids, NS@ 100 ml/ hr. • SSI prophylaxis: Reinforce I/S, flutter valve, DB & C hourly while awake; maintain operative dressing x 48 h. • VTE prophylaxis: Enoxaparin, IPC's when in bed/resting; reinforce foot/ankle pumps if IPC's not in use. • Other: Strict I&O q 4 h, encourage gum chewing, Ostomy & CHN consults for all ostomy patients, discharge teaching: LMWH, foley, drains, etc. *Ileostomy patients:* • Verify Nutrition & Ostomy Nurse consults, follow Ostomy Care Pathway, notify Provider with high output (> 1200 ml/24 h).	• Per POD 0. • Progressive mobilization: OOB to chair for all meals/ about 6 h per day; ambulate 3 times daily. • Reinforce: Adequate hydration, regular diet with small portions, & chewing food well. Gum chewing may be stopped with return of regular bowel function. • Anticipate foley removal for colon surgery unless specified otherwise. • Follow-up on consults. • LMWH teaching (all *new* cancer surgeries)	• As per POD 1. • Mobilization: OOB x 8 h & ambulate 4 times daily. • Anticipate foley removal for rectal/low pelvic surgery unless specified otherwise. • Reinforce: continued mobilization, hydration, eating small portions, healthy diet, monitoring I&O (prn). • Target LOS (# days): Colon cases- 4, rectal & pelvic procedures- 5, ostomy reversal- 3.
Patient/ Support Person	• Optimization: Weight mgt., high-protein diet, exercise, & limit or stop smoking/alcohol. Review ERAS information. • Curtailed fast: Light diet until 2 pm day before surgery. Clear liquids after prep completion. • Bowel prep & antibiotics day before surgery: Miralax 238 gram orally mixed in 32 oz. Gatorade/G2 @ 2 pm, bisacodyl 20 mg orally @ 6 pm, Neomycin 1500 mg orally & metronidazole 500 mg orally for 3 doses: @ noon, 1 pm, & 8 pm. *If contraindication to neomycin,just take the metronidazole.* Promethazine prn nausea per Rx. • Carbohydrate load: Drink 16 oz. apple juice evening before surgery (non-IDDM).	• Shower/bathe with CHG in the morning on DOS. • Clear liquds up to 2 h prior to SSC arrival. • Carbohydrate load: Drink 8 oz. apple juice 2 h prior to hospital arrival (non-insulin dependent diabetics). • Review: SSI/infection prevention materials, pulmonary hygiene & VTE prophylaxis with SSC staff.	• n/a	• Use multi-modal analgesia- **minimize opiates.** • OOB to chair; ambulate if feasible. • Drink clear liquids as tolerated. • Respiratory exercises- every hour while awake: I/S, DB & C,& flutter valve. • IPC's: when in bed or resting; foot/ ankle pumps if IPC's not in use. • Other: Chew gum for 20 minutes 3 x a day (may stop when passing gas regularly), meet Ostomy Nurse (prn), LMWH, foley, drain teaching prn. *Ileostomy patients:* • Meet Nutritionist; review ileostomy nutrition guide & Ostomy educational materials. • Measure I&O every 4 h; notify staff with high ostomy output (> 1200 ml/24 h).	• As per POD 0. • Sit in chair for all meals/about 6 h per day, walk 3 times daily. • Drink plenty of fluids, eat small portions as tolerated; chew very well. *Ostomy patients:* • Follow nutrition & fluid intake recommendations. • Work with Ostomy Nurse & staff toward increased independence with ostomy mgt. & monitoring I&O.	• As per POD 1. • OOB x 8 h, walk 4 times daily. Slowly increase daily activity. • Continue: keeping hydrated, eating small portions of healthy & high protein diet. • Continued independence with ostomy/drain/foley management. • Target LOS (# days): Colon cases- 4, rectal & pelvic procedures- 5, ostomy reversal-3.