MGH Hysterectomy ERAS-SSI Bundle - DRAFT
Updated 1.29.2018

ANESTHESIA BUNDLE

Element	Definition
Preoperative Testing Surgeons, residents, fellows PPE/PATA Anesthesia	• All patients should receive an anesthesia preoperative phone call prior to the day of surgery. Anesthesia consultant will communicate any recommendations for further testing with primary surgeon's office. • Patients with high degree of medical or anesthetic complexity as assessed by the surgeon at the preoperative visit should be referred to anesthesia for preoperative evaluation per institutional protocol via e-mail at least 7 days prior to surgery to facilitate preoperative workup • Patients older than 65 and patients with a history of cardiac disease should have an EKG performed within 6 months of surgery • Preoperative CBC should be performed within 90 days for patients with a history of anemia or concern for moderate blood loss (> 500mL) • Routine preoperative chest x-rays and coagulation studies are not indicated • Patients should have pregnancy status documented as one of the following: 1. Negative serum β-Hcg 2. Negative urine β-Hcg 3. Patient refusal or physiologic inability to become pregnant • Diabetic patients should have a preop fingerstick on day of surgery
Preoperative Medication Management Surgeons, residents, fellows PPE/PATA Anesthesia	• Hold ACE inhibitors and ARBs on the day of surgery • Take prescribed beta-blockers on the day of surgery • Patients on long-acting narcotic therapy (e.g. OxyContin) should take their extended-release narcotic on the day of surgery • Anticoagulation management will be at the discretion of the primary surgeon • Vitamin/herbal supplements, fish oil, and NSAIDs should be held 7 days prior to surgery
Preemptive Analgesia Surgeons, residents, fellows CPC / pre-op Nursing Anesthesia	• Patients should receive 975mg of acetaminophen orally prior to surgery • Patients should receive 400mg of celecoxib orally prior to surgery except for patients with known or suspected renal disease • Patients may receive gabapentin per institutional or surgeon discretion
Premedication CPC / pre-op Nursing Anesthesia	• Routine premedication with midazolam is discouraged • Epidural placement may be facilitated by fentanyl +/- midazolam for procedural sedation; however, patients over 65 should receive no more than 1 mg IV midazolam (fentanyl only sedation preferred) • Heparin 5,000u SC should be administered prior to surgery for DVT prophylaxis
Intraoperative Antiemetic Prophylaxis Anesthesia	• Unless contraindicated, patients should receive triple antiemetic prophylaxis with at least two of the following medications administered intraoperatively: 1. Zofran 4mg IV 2. Haloperidol 1mg IV 3. Dexamethasone 0.1mg/kg (max 8mg) 4. Scopalamine patch (should not be used in patients over 65)
Postoperative Antiemetic Use Surgeons, residents, fellows Anesthesia PACU Nursing Floor Nursing	• The following medications are acceptable for rescue antiemetic use: 1. Zofran 4mg IV 2. Haloperidol 1mg IV 3. Metoclopramide 5-10mg IV 4. Promethazine 6.25-12.5mg IV • The first line rescue antiemetic given in the PACU should be a drug not given pre- or intraoperatively

Intraoperative Medication Use Anesthesia	• The following medications are **NOT PREFERRED** and should be avoided if possible: 1. Isoflurane 2. Morphine 3. Hydromorphone • Fentanyl is the preferred narcotic for intraoperative use • Total intravenous anesthesia (TIVA) is preferred for appropriate patients • Remifentanil infusions should be used sparingly given concern for remifentanil-induced hyperalgesia • Antibiotic prophylaxis should be provided with cefazolin (unless allergic in which case an appropriate substitute should be given) within 60 minutes of incision • Multimodal analgesia should be achieved with use of two or more of the following, unless contraindicated: 1. Ketamine 0.5mg/kg bolus and 5mcg/kg/min 2. Lidocaine 1mg/kg bolus and 1.5mg/kg/hr (should not be used for patients receiving regional anesthesia) 3. Dexmedetomidine 0.5mcg/kg/hr 4. Regional anesthetic techniques (epidural or TAP blocks)
Neuromuscular Blockade Anesthesia	• NMB may be maintained with either rocuronium, vecuronium or cisatracurium; cisatracurium is preferred in patients with renal dysfunction • Adequate offset of neuromuscular blockade should be ensured with either: sustained handgrip on 100 Hz tetanic stimulation of >5 seconds or quantitative TOF monitor with ratio >0.9 or documentation of adequate conditions for reversal (>2 twitches) and appropriate dose of reversal agent per protocol.
Intraoperative Fluid and Ventilation Management Anesthesia	• Intraoperative fluid management should be aimed at maintaining adequate end-organ perfusion while minimizing iatrogenic volume overload • Hypotension alone should not necessarily be treated with fluid boluses unless other clinical signs point to hypovolemia • Vasopressors should be considered a first line treatment for hypotension due to induction of general anesthesia • Insufficient data exists for noninvasive cardiac output monitors (NICOMs) to recommend their routine use; however, clinicians may opt to use these devices to guide resuscitation in patients whose volume status is difficult to ascertain clinically. NICOMs or other measures of volume status should be used in cases where fluid administration exceeds 1600 mL or EBL exceeds 500 mL. • Protocol: ○ No fluids should be administered in preop holding ○ Goal intraoperatively is net zero fluid balance ○ If patients are hypotensive with other indicators of hypovolemia, crystalloid boluses should be given at no more than 3-5mL/kg with appropriate time allowed for clinical response ○ Colloid may be substituted for crystalloid at the anesthesiologist's/surgeon's discretion • Urine output ○ Accept urine output of 0.2mL/kg/hr ○ Do not give fluid to treat low UO if other data imply euvolemia • Ventilation strategy ○ Goal ventilation strategy should be TV of 5-7 mL/kg of IBW with PEEP $\geq$ 5 cm H_2O
Postoperative Analgesia Surgeons, residents, fellows Anesthesia PACU Nursing Floor Nursing	• Patients should receive scheduled non-narcotic therapy 1. Ketorolac IV 15mg q6h except patients with known renal impairment; first dose of ketorolac should be given intraoperatively except for patients who had significant intraoperative bleeding. 2. Acetaminophen 1g q8h. This may start as IV therapy but should be converted to oral therapy once the patient tolerates clear liquids.

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- Narcotic therapy should be minimized
  1. First line rescue therapy for mild to moderate pain should be a non-narcotic such as an additional 15 mg IV ketorolac, 1 g IV Tylenol, 1 g po or pr Tylenol, or adjustment of neuraxial analgesia catheter
  2. Patients should not receive more than 0.5mg hydromorphone (or equivalent) in the PACU without notification of the PACU resident or attending
  3. Oxycodone 5-10mg PO or tramadol 50-100 mg PO are the preferred first line narcotic agents; IV narcotic therapy should be used for third line rescue use only for patients tolerating oral agents
  4. For patients receiving IV narcotic therapy, PCA is preferred rather than intermittent IV bolus dosing

- Patients undergoing planned open surgery should undergo epidural placement unless otherwise contraindicated. Patients with contraindications to epidural placement should be considered for TAP blocks to assist with postoperative analgesia.

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<tr><td>Anesthesia</td><td>

TAP Block Best Practice Protocol

- Postoperative placement is preferred to avoid case delays
- Consent should be obtained and the regional service should be notified by the OR anesthesia team
- Ultrasound guided blocks are preferred
- Bupivicaine 0.25% is the preferred agent

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Epidural Best Practice Protocol

- Epidural should be placed preoperatively
- Ideally epidural should be placed at T7-T8 or T9-T10 to adequately cover incision while decreasing leg weakness and urinary retention
- Epidural catheters should be started intraoperatively and continued postoperatively as PCEA
- Epidural mixture should be chosen to minimize narcotics per institutional protocol

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SURGICAL BUNDLE

Element	Definition
Demarcation and Verification as ERAS/SSI Patient Surgeons, residents, fellows Amb Gyn/clinic nursing	• Selected patient placed on ERAS/SSI pathway • Flag placed in Epic that will be visible whenever Epic opened during episode of care that makes it clear to all providers that patient is on ERAS/SSI pathway
Preoperative screening Surgeons, residents, fellows Amb Gyn/clinic nursing PPE/PATA	Preoperative screening should include: 1. Anemia screening 2. *(Brigham) Nutritional screening* 3. Tobacco and alcohol use screening and cessation counseling
Patient Education Surgeons, residents, fellows Amb Gyn/clinic nursing PPE/PATA	Educational material will be provided by the surgeon's office at the time of booking covering: 1. Preoperative discharge preparation including dietary recommendations, home preparation, physical activity, and alcohol/tobacco abstinence 2. Preoperative hydration and bowel preparation regimen 3. Day of surgery workflow / expectations 4. ERAS pain control methodology, including epidural analgesia 5. Routine postoperative care and expectations
Bowel Preparation Surgeons, residents, fellows Amb Gyn/clinic nursing	• Mechanical bowel preparation should be given only for patients with high risk for or planned large bowel or rectal resections • Actual mechanical prep chosen is not critical. Acceptable alternatives include but are not limited to: 1. 2-4 Dulcolax pills at 2PM followed by 1 bottle of Miralax in 64oz clear liquid taken from 3-5PM 2. 2-4 Dulcolax pills at 2 PM followed by 1 bottle of Mg Citrate at 3PM • Patients who receive bowel preparation should receive <u>both</u> mechanical and antibiotic preparation • A combination of at least 2 antibiotics (e.g. Neomycin/Erythromycin or Neomycin/Metronidazole), for at least 2 doses, should be given one hour after completion of mechanical bowel prep. • Suggested antibiotic regimens include but are not limited to: 1. 1g Neomycin + 1g Erythromycin at 5-7pm and at 10-11pm 2. 1g Neomycin + 500 mg Metronidazole at 5-7pm and at 10-11pm 3. 1g Neomycin + 500 mg Metronidazole (or 1g Erythromycin, if allergic to Metronidazole) at 5, 6 and 8-10pm
Preoperative Nutritional Supplement Surgeons, residents, fellows Amb Gyn/clinic nursing	• All patients should receive a preoperative nutritional supplement drink prior to surgery. • Patients should be given instructions to drink one of the accepted carbohydrate drinks starting 4 hours before induction and finishing no later than 2 hours prior to induction • Acceptable pre-op nutritional supplement drinks: 1. A carbohydrate drink containing at least 45gm of complex carbohydrates in at least 400cc of isotonic fluid is strongly recommended (e.g. 24oz of Clearfast or an equivalent preparation) 2. If above option is unavailable, up to 20oz of Gatorade Quencher or other complex carbohydrate containing solution is an acceptable alternative

Preoperative antibacterial shower Surgeons, residents, fellows Amb Gyn/clinic nursing	• Shower/bathe with liquid chlorhexidine soap for 2 days prior and on the morning of surgery
Maintenance of Normothermia Surgeons, residents, fellows Anesthesia OR Nursing	• Actively warm before and throughout surgery to achieve target temperature of 36° C using one or more of the following: 1. Room temperature at >68° F until patient prepped and draped 2. Fluid warming device 3. Forced warm air under-body or over-body device
Intraoperative Skin Prep Surgeons, residents, fellows OR Nursing	• Acceptable skin preps: 1. Chloroprep is the preferred skin prep 2. Duraprep is an acceptable substitute 3. Prep must be allowed to air-dry (minimum 3 minutes) before draping and incision 4. Iodine-based solutions are <u>not</u> acceptable except in emergent cases
Instrument Segregation Protocol (Dirty Tray Protocol) Surgeons, residents, fellows OR Nursing	• When bowel is to be opened, a pan, tray or additional mayo stand is brought to the field • All instruments used until the bowel is closed are taken from and placed back on this surface • The ST cannot go with his/her hands to retrieve a clean instrument, but must use another clean instrument to retrieve the needed item off the sterile instrument table • If drapes are contaminated a sterile towel is placed over the contaminated area • When bowel is closed, suction tip and electrocautery pencil are added to the instruments on this surface and the pan/tray/mayo is passed off or moved away. • Light handle covers are removed if they were touched during the dirty portion of the case. • Gown and gloves should be changed routinely at the end of the dirty portion of the case.
Use of Wound Protectors During Bowel Resection Surgeons, residents, fellows OR Nursing	• Acceptable types of wound protectors: 1. Single ring wound protectors 2. Double ring wound protectors • Standard steps for removing contaminated wound protector: 1. A plastic wound protector is placed at the beginning of the surgery (in open cases) and at the time of bowel division (in laparoscopic cases) Single ring and double ring wound protectors are acceptable. The protector is also covered by towels during the time that the bowel is open (see dirty tray protocol above). 2. Once the dirty portion of the procedure is concluded and the dirty pan/tray/mayo has been passed off or moved away, one of the surgeons will remove the wound protector (unless the anastomosis needs to be completed under laparoscopic vision) taking care not to contaminate the subcutaneous tissues. The Tech and the other surgeon(s) will change gloves before touching the field or instruments. The surgeon who discarded the wound protector will change his/her gloves after. 3. Gowns should be changed routinely after completion of the dirty portion of the case 4. If the wound protector is grossly contaminated during the procedure it should be removed and replaced using the above procedure 5. If gloves are grossly contaminated during the procedure they should be changed and then changed again when the manipulation steps are finished and the towels/wound protectors are removed.
Intraoperative Drain Placement Surgeons, residents, fellows OR Nursing	• Routine use of peritoneal drains are not indicated. • Routine use of nasogastric tubes are not indicated.

Optimized Postoperative Fluid Management Surgeons, residents, fellows Anesthesia PACU Nursing Floor Nursing	• Initial postoperative fluid orders: 75mL/hr or 1 mL/kg/hr, discontinue after 6 hours or once PO intake > 500 mL <u>Postoperative Hypotension and Fluid Responsiveness:</u> • Do not intervene unless: 1. MAP < 65 **or** 2. UOP < 0.2 mL/kg/hr **and** patient has other signs of hypovolemia • If any of the above occur, the patient should be examined and causes of hypotension other than inadequate fluid administration excluded (e.g. bleeding, myocardial ischemia etc.) • If the patient meets above criteria, initial response may be: 1. Crystalloid or colloid 250mL bolus up to 3 times <u>and/or</u> 2. Pressors if patient is in a step-down or ICU setting (consider placing patients in such a setting if you anticipate fluid management challenges) • Failure to respond appropriately should result in: 1. A call to the senior resident or attending before administering additional fluid 2. A more objective measure of fluid status. Inferring fluid status is difficult and frequently inaccurate. Ideally, non-invasive monitoring should be made available (e.g. ultrasound machines that allow simple echocardiography). 3. The on-call Acute Pain Service (APS) resident should be notified for patients with fluid-refractory hypotension with an epidural.
Early Postoperative Diet Advancement Surgeons, residents, fellows PACU Nursing Floor Nursing	• Encourage clear liquids once patient is awake in PACU • Patient should be ordered for at minimum a clear liquid diet postoperatively; regular diet may be ordered at surgeon's discretion • Do not order “sips” of liquids • If nausea or vomiting, delay advance until symptoms have improved • All patients should receive a bowel regimen with at least two of the following medications: 1. Senna 2. Colace 3. Miralax 4. Dulcolax
Early Postoperative Mobilization Surgeons, residents, fellows PACU Nursing Floor Nursing	• The following activity orders should be placed for all ERAS patients: 1. Patients should be out of bed as soon as tolerated with goal by POD#1 to be OOB for all meals and at least 8h per day. 2. Patients should be OOB to chair at the latest 3-6 hours postoperatively (goal would be OOB to chair in the PACU, if tolerated). Patients may ambulate as tolerated starting immediately postoperatively. 3. On Post-Op day #1 and thereafter: Ambulate in hallway at least 3 times daily • Expectations regarding early postoperative mobilization will be clearly conveyed to patients with patient education bundle. • The Acute Pain Service (APS) on-call resident should be notified for any patients who are unable to ambulate due to leg weakness from an epidural.
Early Urinary Catheter Removal Surgeons, residents, fellows PACU Nursing Floor Nursing	• For non-radical laparoscopic hysterectomies without extensive bladder mobilization or sling: urinary catheters should be removed prior to leaving the OR or after backfill TOV in PACU. • For open procedures, urinary catheters should be removed POD 1 via backfill trial of void. If patients with epidurals fail this removal, catheter should remain in place and be removed when epidural is removed. • For urogynecologic procedures or procedures with significant bladder dissection or repair, catheters may remain in place at the discretion of the attending surgeon.
DVT prophylaxis Surgeons, residents, fellows CPC / pre-op Nursing OR Nursing PACU Nursing Floor Nursing	• While epidural catheters are in place, DVT prophylaxis should consist of subcutaneous heparin 5,000 units TID. • After epidural catheter removal or for patients without epidurals, all patients should receive enoxaparin 40 mg SC daily (patients with contraindications to enoxaparin may receive heparin TID instead) while inpatient • Patients who undergo an open hysterectomy or who have other risk factors for VTE should receive enoxaparin prophylaxis for 28 days postoperatively