

MGH Hysterectomy ERAS-SSI Bundle

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ANESTHESIA BUNDLE

Element	Definition
Preoperative Testing Surgeons, residents, fellows PPE/PATA Anesthesia	<ul style="list-style-type: none"> In accordance with hospital policy, all patients should receive an anesthesia preoperative phone call, or visit, per departmental guidelines, 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 best practice via e-mail at least 7 days prior to surgery to facilitate preoperative workup In accordance with departmental guidelines, patients older than 65 and patients with a history of cardiac disease should have an EKG performed within 6 months of surgery In accordance with 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: <ol style="list-style-type: none"> Negative serum β-Hcg Negative urine β-Hcg 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Patients should receive 975mg to 1,000mg 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	<ul style="list-style-type: none"> Routine premedication with midazolam is discouraged in older patients 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)
Intraoperative Antiemetic Prophylaxis Anesthesia	<ul style="list-style-type: none"> Unless contraindicated, patients should receive antiemetic prophylaxis with at least two of the following medications administered intraoperatively: <ol style="list-style-type: none"> Zofran 4mg IV Haloperidol 1mg IV Dexamethasone 0.1mg/kg (max 8mg) Scopolamine patch (should not be used in patients over 65)
Postoperative Antiemetic Use Surgeons, residents, fellows Anesthesia PACU Nursing Floor Nursing	<ul style="list-style-type: none"> The following medications are acceptable for rescue antiemetic use: <ol style="list-style-type: none"> Zofran 1-4mg IV Haloperidol 1mg IV Metoclopramide 5-10mg IV Promethazine 6.25-12.5mg IM The first line rescue antiemetic given in the PACU should be a drug not given pre- or intraoperatively

<p>Intraoperative Medication Use</p> <p>Anesthesia</p>	<ul style="list-style-type: none"> The following medications are <u>NOT PREFERRED</u> and should be avoided if possible: <ol style="list-style-type: none"> Isoflurane Morphine Hydromorphone Fentanyl is the preferred narcotic for intraoperative use Total intravenous anesthesia (TIVA) is preferred for appropriate patients Remifentanyl infusions should be used sparingly given concern for remifentanyl-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 If the procedure is open rather than laparoscopic, multimodal analgesia should be achieved with use of two or more of the following, unless contraindicated: <ol style="list-style-type: none"> Ketamine 0.5mg/kg bolus and 5mcg/kg/min Lidocaine 1mg/kg bolus and 1.5mg/kg/hr (should not be used for patients receiving regional anesthesia) Dexmedetomidine 0.5mcg/kg/hr Regional anesthetic techniques (epidural or TAP blocks)
<p>Neuromuscular Blockade</p> <p>Anesthesia</p>	<ul style="list-style-type: none"> 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 <u>or</u> documentation of adequate conditions for reversal (>2 twitches) and appropriate dose of reversal agent per best practice.
<p>Intraoperative Fluid and Ventilation Management</p> <p>Anesthesia</p>	<ul style="list-style-type: none"> 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. Best practice: <ul style="list-style-type: none"> No fluids should be administered in preop holding <u>Goal intraoperatively is net zero fluid balance</u> If patients are hypotensive <u>with</u> 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 <ul style="list-style-type: none"> Accept urine output of 0.2mL/kg/hr Do not give fluid to treat low UO if other data imply euvoolemia Ventilation strategy <ul style="list-style-type: none"> Goal ventilation strategy should be TV of 5-7 mL/kg of IBW with PEEP ≥ 5 cm H₂O
<p>Postoperative Analgesia</p> <p>Surgeons, residents, fellows Anesthesia PACU Nursing Floor Nursing</p>	<ul style="list-style-type: none"> Patients should receive <u>scheduled</u> non-narcotic therapy <ol style="list-style-type: none"> 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. Acetaminophen 1g q8h. This may start as IV therapy but should be converted to oral therapy once the patient tolerates clear liquids.

Anesthesia

- 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 equivalent anesthesia provider on call
 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 consider epidural placement unless otherwise contraindicated. Patients with contraindications to epidural placement should be considered for TAP blocks to assist with postoperative analgesia.

TAP Block Best Practice

- Consent should be obtained and the regional service if applicable should be notified by the OR anesthesia team
- Ultrasound guided blocks are preferred
- Bupivacaine 0.25% is the preferred agent

Epidural Best Practice

- 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 per institutional best practice.
- Epidural mixture should be chosen to minimize narcotics per institutional best practice

SURGICAL BUNDLE

Element	Definition
<p>Demarcation and Verification as ERAS/SSI Patient</p> <p>Surgeons, residents, fellows Amb Gyn/clinic nursing</p>	<ul style="list-style-type: none"> • 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
<p>Preoperative screening</p> <p>Surgeons, residents, fellows Amb Gyn/clinic nursing PPE/PATA</p>	<p>Preoperative screening should include:</p> <ol style="list-style-type: none"> 1. Anemia screening 2. Nutritional screening per institutional best practice 3. Tobacco and alcohol use screening and cessation counseling
<p>Patient Education</p> <p>Surgeons, residents, fellows Amb Gyn/clinic nursing PPE/PATA</p>	<p>Educational material will be provided by the surgeon's office at the time of booking covering:</p> <ol style="list-style-type: none"> 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
<p>Bowel Preparation</p> <p>Surgeons, residents, fellows Amb Gyn/clinic nursing</p>	<ul style="list-style-type: none"> • 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: <ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 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
<p>Preoperative Nutritional Supplement</p> <p>Surgeons, residents, fellows Amb Gyn/clinic nursing</p>	<ul style="list-style-type: none"> • All patients should receive a preoperative nutritional supplement drink shipped to their home or provided by their Surgeon's office prior to surgery. 1. If the above is not provided, up to 20 oz of Gatorade (no red) is an acceptable alternative. • Patients should be given instructions to drink the provided carbohydrate drinks 4 hours before surgery and complete or stop drinking 2 hours before surgery. • If the patient is diabetic, instruct them to follow their recommend diet and do not drink the carbohydrate drink as it may increase their blood sugar.

<p>Preoperative antibacterial shower</p> <p>Surgeons, residents, fellows Amb Gyn/clinic nursing</p>	<ul style="list-style-type: none"> Shower/bathe with liquid Chlorhexidine wash starting 2 days before, the day before, and on the morning of surgery (i.e., once daily for 3 days) per the special instructions included for bathing with Chlorhexidine, an antimicrobial soap. The Chlorhexidine will be shipped to the patient's home or provided by the Surgeon's office. If Patient was tested for STAPH and is positive, defer to instructions provided by their surgeon's office for the use of Chlorhexidine wash and mupirocin nasal ointment. Their doctor will let them know if testing is needed.
<p>Maintenance of Normothermia</p> <p>Surgeons, residents, fellows Anesthesia OR Nursing</p>	<ul style="list-style-type: none"> Actively warm before and throughout surgery to achieve target temperature of 36° C using one or more of the following: <ol style="list-style-type: none"> Room temperature at >68° F until patient prepped and draped Fluid warming device Forced warm air under-body or over-body device
<p>Intraoperative Skin Prep</p> <p>Surgeons, residents, fellows OR Nursing</p>	<ul style="list-style-type: none"> Acceptable skin preps: <ol style="list-style-type: none"> Chloroprep is the preferred skin prep Duraprep is an acceptable substitute Prep must be allowed to air-dry (minimum 3 minutes) before draping and incision Exclusive iodine-only solutions are <u>not</u> acceptable except in emergent cases Vaginal prep can be a iodine solution
<p>Instrument Segregation Best practice (Dirty Tray Best practice)</p> <p>Surgeons, residents, fellows OR Nursing</p>	<ul style="list-style-type: none"> 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.
<p>Use of Wound Protectors During Bowel Resection</p> <p>Surgeons, residents, fellows OR Nursing</p>	<ul style="list-style-type: none"> Acceptable types of wound protectors: <ol style="list-style-type: none"> Single ring wound protectors Double ring wound protectors Standard steps for removing contaminated wound protector: <ol style="list-style-type: none"> 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 best practice above). 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. Gowns should be changed routinely after completion of the dirty portion of the case If the wound protector is grossly contaminated during the procedure, it should be removed and replaced using the above procedure 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.
<p>Intraoperative Drain Placement</p>	<ul style="list-style-type: none"> Routine use of peritoneal drains are not indicated. Routine use of nasogastric tubes are not indicated.

Surgeons, residents, fellows OR Nursing	
Optimized Postoperative Fluid Management Surgeons, residents, fellows Anesthesia PACU Nursing Floor Nursing	<ul style="list-style-type: none"> Initial postoperative fluid orders: 75mL/hr or 1 mL/kg/hr, discontinue after 6 hours or once PO intake > 500 mL <p><u>Postoperative Hypotension and Fluid Responsiveness:</u></p> <ul style="list-style-type: none"> Do not intervene unless: <ol style="list-style-type: none"> MAP < 65 or 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: <ol style="list-style-type: none"> Crystalloid or colloid 250mL bolus up to 3 times <u>and/or</u> 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: <ol style="list-style-type: none"> A call to the senior resident or attending before administering additional fluid 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). The on-call Acute Pain Service (APS) resident or equivalent anesthesia provider on call should be notified for patients with fluid-refractory hypotension with an epidural.
Early Postoperative Diet Advancement Surgeons, residents, fellows PACU Nursing Floor Nursing	<ul style="list-style-type: none"> 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: <ol style="list-style-type: none"> Senna Colace Miralax Dulcolax
Early Postoperative Mobilization Surgeons, residents, fellows PACU Nursing Floor Nursing	<ul style="list-style-type: none"> The following activity orders should be placed for all ERAS patients: <ol style="list-style-type: none"> 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. Patients should be OOB to chair at the latest 8 hours postoperatively (goal would be OOB to chair in the PACU, if tolerated). Patients may ambulate as tolerated starting immediately postoperatively. 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 or equivalent anesthesia provider on call 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Per departmental guidelines, while epidural catheters are in place, DVT prophylaxis should consist of subcutaneous heparin. After epidural catheter removal or for patients without epidurals, patients should receive DVT prophylaxis with enoxaparin or heparin per institutional best practice. Patients who undergo an open hysterectomy or who have other risk factors for VTE should receive enoxaparin or heparin per institutional best practice.