MASSACHUSETTS GENERAL HOSPITAL

MGH ERAS Spine
Updated 7.29.2021

ANESTHESIA BUNDLE

Element	Definition
Preoperative Testing Surgeons, residents, fellows PPE/PATA Anesthesia	• 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 • A CBC should be performed within 90 days for patients • Routine preoperative chest x-rays are not indicated • 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 • **Patients should be transitioned from long-acting narcotic to short acting opiates (i.e. oxycodone) pre-operatively** • **Anticoagulation** management will be at the discretion of the primary surgeon • Vitamin/herbal supplements, and fish oil should be held 7 days prior to surgery
Preemptive Analgesia Surgeons, residents, fellows CPC / pre-op Nursing Anesthesia	• Patients should receive 975mg to 1,000mg of acetaminophen orally prior to surgery OR IV acetaminophen 1,000mg intravenous during the case. • Patients should receive gabapentin 300mg prior to surgery unless patient is already taking gabapentin and already took gabapentin at home. • Patients should receive 400mg of celecoxib orally prior to surgery except for patients with known or suspected renal disease
Pre-operative Fluid Management Anesthesia	• In order to restrict pre-operative fluid administration, pre-operative fluid administration should be limited to KVO.
Premedication CPC / pre-op Nursing Anesthesia	• Routine premedication with midazolam is discouraged in older patients • Regional anesthesia 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	• Unless contraindicated, patients should receive 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. Scopolamine 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 1-4mg IV 2. Haloperidol 1mg IV 3. Metoclopramide 5-10mg IV 4. Promethazine 6.25-12.5mg IM • 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:
	  ○ Isoflurane
	  ○ Morphine
	• An opiate-sparing adjunct should be incorporated into the anesthetic. Please consider one of the following:
	  ○ Dexmedetomidine. **Please turn dexmedetomidine OFF one hour before the end of the procedure.**
	  ○ Lidocaine 1.5mg/kg/hr. IV infusion (should not be used for patients receiving regional anesthesia)
	  ○ Ketamine bolus or infusion: If infusion: 5mcg/kg/hr. **Discuss administering ketamine with surgeon before initiating medication.**
	  ○ If possible, remifentanil should be **AVOIDED** to minimize the risk of PONV and hyperalgesia.
	• Antibiotic prophylaxis should be provided with cefazolin (unless allergic in which case an appropriate substitute should be given) within 60 minutes of incision
	• Use of local anesthetic pre-incision/post-incision by surgical team.
	• Consider liposomal bupivacaine for pre-incision and post-incision infiltration.

Neuromuscular Blockade Anesthesia	• If paralysis is necessary, NMB may be maintained with either rocuronium 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 best practice.

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.
	• Best Practice:
	  ○ No fluids should be administered in preop holding
	  ○ If patients are hypotensive with other indicators of hypovolemia, crystalloid boluses should be given at no more than 3-5mL/kg/hr with appropriate time allowed for clinical response
	  ○ Colloid may be substituted for crystalloid at the anesthesiologist's/surgeon's discretion
	• If a urinary catheter exists, then:
	  ○ Accept urine output of 0.3mL/kg/hr
	  ○ Do not give fluid to treat low urine output if other data imply euvolemia
	• Ventilation strategy:
	  ○ Goal ventilation strategy should be TV of 5-7 mL/kg of IBW with PEEP ≥ 5 cm H_2O
	• **Discuss blood transfusion parameters during pre-operative huddle.**

Postoperative Analgesia Surgeons, residents, fellows Anesthesia PACU Nursing Floor Nursing	• Patients should receive scheduled acetaminophen 650gm PO q 6 hrs. • Initiate surgical outpatient medications (See Surgical Bundle). • Narcotic therapy should be minimized: 1. First line rescue therapy for mild to moderate pain should be a non-narcotic such as Acetaminophen 2. Oxycodone 5-10mg PO or tramadol 50-100 mg PO are the preferred first line narcotic agents; 3. IV narcotic therapy should be used for third line rescue use only for patients tolerating oral agents

SURGICAL BUNDLE

Element	Definition
Preoperative screening Surgeons, residents, fellows Surgical clinic nursing PPE/PATA team	Preoperative screening should include: 1. Anemia screening 2. Nutritional screening albumin and pre-albumin per institutional best practice 3. Tobacco and alcohol use screening and cessation counseling 4. Identify any bleeding risk, anyone on anticoagulants 5. COVID testing 6. HgbA1C within 6 months if patient is diabetic 7. Check BMI within 3 months of surgery
Patient Education Surgeons, residents, fellows Surgical clinic nursing PPE/PATA	Educational material will be provided by the surgeon's office at the time of booking covering: 1. Decision Aids (per surgical team discretion) 2. Preoperative discharge preparation including dietary recommendations, home preparation, physical activity, and alcohol/tobacco abstinence 3. Day of surgery workflow / expectations 4. ERAS pain control methodology, including regional anesthesia (if applicable) 5. Hospital LOS and inpatient expectations 6. Routine postoperative care and expectations 7. Physical Therapy arranged by Surgeon Office
Preoperative Nutritional Surgeons, residents, fellows Surgical clinic nursing	• Recommend increasing protein intake prior to surgery • Stop eating at 10pm the night before surgery • Patient should drink clear carbohydrate drink the night before and the day of surgery (2 hours prior to 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. Forced warm air over-body device
Intraoperative Skin Prep Surgeons, residents, fellows OR Nursing	• Acceptable skin preps: 1. Clear Chloroprep is the preferred skin prep 2. Prep must be allowed to air-dry (minimum 3 minutes) before draping and incision 3. Exclusive iodine-only solutions are <u>not</u> acceptable except in emergent cases
Intraoperative Drain Placement Surgeons, residents, fellows OR Nursing	• Drain care per surgeon orders
Optimized Postoperative Fluid Management Surgeons, residents, fellows Anesthesia PACU Nursing Floor Nursing	• Initial postoperative fluid orders: 75mL/hr or 1 mL/kg/hr, discontinue within 36 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. Vasopressors 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).
PACU Care	• Incentive spirometry • Fingerstick glucose every six hours if history of glucose intolerance. • Head of bed at 30 degrees unless incidental durotomy. • Continue SCDs • Surgeon to send designee to check on patient prior to discharge.
Early Postoperative Diet Advancement Surgeons, residents, fellows PACU Nursing Floor Nursing	• Advance diet as tolerated in PACU.

Early Postoperative Mobilization
 	
Surgeons, residents, fellows
PACU Nursing
Floor Nursing
	• Patients should ambulate on POD 0:
	  • Outpatient Procedure: within 2-4 hours of arrival in PACU.
	  • Inpatient Procedure: within 4-8 hours of arrival in PACU.

DVT prophylaxis Surgeons, residents, fellows CPC / pre-op Nursing OR Nursing PACU Nursing Floor Nursing	• DVT prophylaxis per primary surgeon order.
Post-Operative Meds Surgeons, residents, fellows PACU Nursing	Inpatient Meds: <u>Mild Pain (1-3 pain score)</u> • Acetaminophen 1000 mg PO TID • Toradol 15 mg IV TID x 48 hours (unless contraindicated) OR • Celebrex 200 mg PO daily • Lidocaine patches • Heat/ice pack <u>Moderate Pain (4-6 pain score)</u> • Gabapentin 300 mg PO TID (age<65) • Cyclobenzaprine 10 mg PO TID or Valium 5−10 mg TID (age<65) <u>Severe Pain (7-10 pain score)</u> • Oxycodone immediate release 5-10 mg PO q4 hrs PRN (breakthrough) OR • Tramadol 50mg PO q6-8 hrs PRN <u>Geriatric Pain Best Practice</u> • Methocarbamol 500 mg PO TID or Tizanidine 4 mg TID (age>65) • Gabapentin 100 mg PO BID + 300 mg qHS (age>65) Discharge Meds: • Acetaminophen 1000 mg TID • Celebrex 200 mg daily x 2 weeks • Muscle relaxant (breakthrough x 2 weeks) <u>AND/OR</u> • Gabapentin • Oxycodone immediate release 5-10 mg PO q4 hrs PRN (breakthrough x 2 weeks, weaning as tolerated) • Heat/ice packs

Physical Therapy	• If mobility will delay same-day discharge, PT will see, otherwise, PT will evaluate if inpatient on POD 1 • Progress mobility as tolerated • Stairs as appropriate
Occupational Therapy	• OT will evaluate on POD 1 if ADL impairment (</= 3 levels, OT is not consulted)
Case Management	• Discharge planning: • Set up with VNA vs. inpatient rehab
Spine Team	• PO phone call 2 days after discharge