MASSACHUSETTS GENERAL HOSPITAL

MGH TMJ Arthroplasty ERAS Pathway
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 30 days • Routine preoperative chest x-rays are not indicated • Diabetic patients should have a preop fingerstick on day of surgery • Additional pre-operative labs per surgeon's preference
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

Preemptive Analgesia
 	
Surgeons, residents, fellows
CPC / pre-op Nursing
Anesthesia
	• Patients should receive 975mg to 1,000mg of acetaminophen orally prior to surgery
	• Patients may receive gabapentin per institutional or surgeon discretion
	  ○ 600mg PO if <65 yr
	  ○ 300mg PO if >65 yr
	  ○ 100mg PO if >75 yr

Pre-operative Fluid Management Anesthesia	• Saline lock IVs prior to arrival in operating rom • OK to access Porta-Cath
Premedication CPC / pre-op Nursing Anesthesia	• Routine premedication with midazolam is discouraged in older patients
Intraoperative Antiemetic Prophylaxis Anesthesia	• Unless contraindicated, patients should receive intraoperative antiemetic prophylaxis with dexamethasone 0.1mg/kg (max 12mg) IV and at least one of the following medications: 1. Zofran 4mg IV 2. Haloperidol 1mg IV 3. 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: 1. Isoflurane 2. Morphine • 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 appropriate antibiotic per institutional guidelines within 60 minutes of incision • Multimodal analgesia should be achieved with use of <u>one</u> of the following, unless contraindicated: 1. Lidocaine 1mg/kg bolus and 1.5mg/kg/hr 2. Ketamine 0.5mg/kg bolus and 5mcg/kg/min 3. Dexmedetomidine 0.5mcg/kg/hr 4. Local multimodal infiltration in wound by surgeon
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 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 • Best Practice: o No fluids should be administered in preop holding o 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 o Colloid may be substituted for crystalloid at the anesthesiologist's/surgeon's discretion • Urine output o Accept urine output of 0.5mL/kg/hr o Do not give fluid to treat low urine output if other data imply euvolemia • Ventilation strategy o 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 30mg IV at end of case except patients with known renal impairment. 2. Acetaminophen 1g q8h. This may start as IV therapy but should be converted to oral therapy once the patient tolerates clear liquids. • 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 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

SURGICAL BUNDLE

Element	Definition
Demarcation and Verification as ERAS/SSI Patient Surgeons, residents, fellows Surgical clinic nursing	• All patients undergoing TMJ surgery are considered ERAS patients
Patient Education Surgeons, residents, fellows Surgical clinic nursing PPE/PATA	Educational material will be provided by the surgeon's office at the pre-operative visit: 1. Preoperative discharge preparation including dietary recommendations, home preparation, physical activity, and alcohol/tobacco abstinence 2. Day of surgery workflow / expectations 3. ERAS pain control methodology, including regional anesthesia 4. Routine postoperative care and expectations
Preoperative Nutritional Supplement Surgeons, residents, fellows Surgical 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 "Thirst Quencher" or other complex carbohydrate containing solution is an acceptable alternative. Of note, G2 or artificially-sweetened sports drinks should not be consumed. • Confirm NPO status.
Preoperative antibacterial shower Surgeons, residents, fellows Surgical clinic nursing	• Shower/bathe washing face and hair with soap and shampoo 2 days prior and on the morning of surgery • Clean ears with cotton-tip applicator (q-tip) 2 days prior 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. Betadine [Povidone-iodine] preparation is utilized standard, unless precluded by patient allergy. 2. Chlorohexidine based preparation will be secondarily implemented in the case of iodine or other allergy.
Intraoperative Drain Placement Surgeons, residents, fellows OR Nursing	• Nasogastric tubes should be removed on POD #1, or as indicated. • 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 and/or 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)
PACU Care PACU Nursing	• Incentive spirometry • Fingerstick glucose every six hours if diabetic. • Head of bed at 30 degrees.
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-to-full liquid diet postoperatively for the first 24-72 hours; Patients will be upgraded to blenderized-to-soft diet consistency post-operative day 3 as tolerated. If nausea or vomiting, delay advance until symptoms have improved • Regular diet to be ordered at surgeon's digression. • Inpatients 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 POD #1 and thereafter: Ambulate in hallway at least 3 times daily • Patient may shower on POD 1. Home-care • Surgical wounds must be covered with a Tegaderm when in shower • Do not submerge wound under water • No heavy lifting or strenuous physical activity • Do not bend head below waist • Sleep with head elevated - 30 degrees or greater Wound care management: • Remove dressing on post-operative day 1. Clean wounds twice per day using a 50:50 Saline-Hydrogen Peroxide mixture. Apply with a saturated cotton tip applicator. • Apply a thin layer of antibiotic ointment over the wounds after the above step • Continue for two weeks. • Avoid direct sun exposure to surgical facial wounds Apply ice packs indirectly to face for 72 hours post-operatively: 20-30 minute increments four times daily. Post-Op Physical Therapy Regimen will be advised by your surgeon Use of oral appliance will be advised by your surgeon Use of elastic-therapy (rubber-bands) to control occlusion ("bite") will be advised by your surgeon
Early Urinary Catheter Removal Surgeons, residents, fellows PACU Nursing Floor Nursing	• For inpatients Urinary catheters should be removed upon demonstration of ambulation.

DVT prophylaxis Surgeons, residents, fellows CPC / pre-op Nursing OR Nursing PACU Nursing Floor Nursing	• Pre-operative DVT prophylaxis per primary surgeon orders. • DVT prophylaxis per departmental guidelines and/or surgeon's preference.
Post-Operative Labs Surgeons, residents, fellows PACU Nursing Floor Nursing	• POD Labs per surgeon's discretion.
Post-Operative Meds Surgeons, residents, fellows PACU Nursing Floor Nursing	Same-day Discharge – Outpatient Surgery: Percocet 5/325mg PO Q4H PRN pain. Disp 20 – or equivalent Meloxicam 7.5mg PO Q daily. Disp 30 tabs Cyclobenzaprine 5mg PO QHS. Disp 30 tabs Antibiotics per surgeon's discretion For Inpatients: Pain Meds: • Tylenol 650mg PO q 6 hrs Fever or mild pain: • Ketorolac 30mg IV Q6H unless contra-indicated. Moderate pain:: • Oxycodone immediate release 5-19mg PO q4 hrs PRN Severe pain: • Hydromorphone 0.2-1mg IV q 2-3 hrs PRN* higher doses may be required with patients with prior opioid exposure • Morphine 2.5-5mg IV q 3-4 hrs PRN – opioid naïve patients * dose range of 4-10mg with patients with prior opioid exposure Antiemetic: • Zofran 4mg IV/PO q 6 hrs PRN • Compazine 10mg PO q 6 hrs PRN • Reglan 10mg IV/PO q 8hrs PRN Antibiotics: • Per primary surgeon order (should be discontinued within 24 hours unless clinically indicated for source control).
GI Prophylaxis Surgeons	GI Prophylaxis • Proton pump inhibitor per primary surgeon order