THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Enhanced Recovery After Surgery (ERAS): Abdominal Wall Reconstruction/Complex Hernia Repair

Pre-operative Patient Management

History and physical

- Document hernia characteristics
- Grade using modified VHWG or Kanters
- Cedar risk score

Diagnostic Evaluation

Screening

- STOP-BANG questionnaire.
  - Score ≥3 warrants referral for Sleep Study
- Complete CAGE questionnaire.
  - Completion of alcohol contract with 3rd party verification for all patients with suspected abuse required for surgery to be scheduled.
- If patient is a smoker, MUST agree to stop smoking > 30 days prior to (and after) surgery.
  - Advise patient of urine toxicology screens, 2 weeks before AND day of surgery.
  - Provide smoking cessation education.

Laboratory/Other Tests

- **Elective surgery qualifications:** A1C MUST be ≤7.4, Albumin MUST be ≥ 3.25 g/dL; Prealbumin MUST be ≥ 15 mg/dL
- **All patients:** CBC, Chem 6, A1C, Type & Cross, Albumin, Prealbumin, EKG
  - MRSA screen (If positive or high risk, provide patient with education instructions for preoperative MRSA treatment.)
- Pregnancy test for women of child bearing age
- **Consider:** Additional workup based on comorbidities per OSUWMC Preop testing guidelines. If chronic open wound/draining infection: 25 OH Vit D, CRP, Zinc

Education (Provide & Document)

All Patients:

Nutrition 1 week prior to surgery:

- Impact AR (drink) TID
- Peri-operative probiotics: 1 daily
- NPO instructions reviewed:
  - 2 Clearfast carbohydrate drinks (355mL, 12 oz ea)
  - Drink 1 before midnight.
  - NPO midnight surgery, except 1 Clearfast 2-4 hours before surgery

Instructions Given:

- Incentive Spirometry Use
- Pre-op JP Drain
- Periop medication regimen
- Education video provided

At Risk Patients

Referral Programs for Smokers:

- 1-800-QUIT-NOW
- http://smokefree.gov
- http://www.cdc.gov/tobacco/data_statistics/fact_sheets/cessation/quitting/index.htm

MRSA Positive/High Risk Instructions (pre-op):

- Complete Chlorhexadine showers daily x 5 days
- Mupirocin nasal ointment BID x 5 days

High Nutrition Need:

Weight loss >10 lbs, Albumin <3.25 or Pre-albumin <15; NRS 2002 >5.

- Impact AR (Nestle Nutrition): TID (750mL total)

Consults

- Weight loss programs BMI ≥40*:
  - Weight watchers or on-line program
  - Bariatric clinic if low risk of strangulation or mild-moderate symptoms
- PT/OT
  - Inability to climb 2 flights of stairs or deconditioning
- OPAC as needed

Note: **Delay surgery for patients with BMI>42 unless small hernia neck with bowel incarceration with high suspicion for strangulation*

NOTE: Perioperative serum glucose levels >200 mg/dL significantly increase risk for infection and wound healing problems. Initiate Insulin as needed to avoid crossing thresholds.

Day of Surgery: Preoperative - Intraoperative

Order Sets:

- PLS: Pre-Op Orders [3748] HCG, POC glucose, DVT prophylaxis
- Vital signs including weight
- IV Access

Medications

Prior to Surgery

2 hours before surgery:

- PO acetominophen liquid 1000mg
  - (if no hypersensitivity, severe hepatic impairment or severe active liver disease.)
- PO gabapentin 300mg
  - (not in pts. with OSA)
- PO aprepitant (Emend) 40 mg
  - (If no history of post op nausea and vomiting AND ONLY before surgery, never post op, ordered by Anesthesiologist)

20 minutes prior to surgery:

- PO celecoxib 400mg
- Can substitute with:
  - PO meloxican 15mg
  - PO ibuprofen 400mg or PO naprosyn 440mg (in absence of peptic ulcer disease)

Antibiotic Selections

For routine cases or Grade 1-2 hernias:

- 2g Cefazolin
  - (30-59 minutes prior to incision)
  - MRSA+ history: (30-59 minutes prior to incision) PLUS
  - Weight-based Vancomycin 15 mg/kg (1 hour prior to incision to ensure proper skin levels prior to incision)
- 3 g Cefazolin if >120 kg, Q4H
  - Re-dose if >500 mL blood loss
  - Substitute 900mg Clindamycin, Q6H for PCN allergy

Bowel surgery, fistula or Grade 3AB or C hernias:

- 3.375g Zosyn,Q2H OR
- 400mg Cipro PLUS 500mg Metronidazole (no re-dosing)

NOTE: If infected mesh present, cover according to pre-operative culture sensitivities

Anesthesia

Prior to Surgery

Regional Anesthesia/Epidural:

- Managed by Acute Pain Service (6-0597)
- 1L crystalloid bolus initiated after epidural placement
- 0.125% bupivacaine + 2mcg/mL fentanyl (standard solution) at rate of 6 mL/hr.
  - Manage hypotension via Goal-directed Fluid Therapy (Appendix A)
  - Communicate hemodynamic status with surgeon through case

Surgeon Placement:

- 0.25% Marcaine with epinephrine Multi-planar field block OR
- 2.66mg liposomal bupivacaine TAP block (DO NOT administer directly into the tissue.)
- Requires pharmacy order & 30 minutes notice. Administer within 4H.

Intraoperatively

Use of OSUWMC 2 protocol announced during Anesthesia Sign In:

- Antibiotics (given preop, and # minutes prior to incision)
- SCDs on and functional prior to induction
- Anticoagulation plan discussed
  - 5000 units Unfractioned Heparin given 2H after epidural placement
  - 50mg QD Lovenox given, start POD1 (≥12H after epidural placement)
- Maintain patient temperature >36°C
- Discuss postop intubation, NGT vs. OGT

Induction/Itubation per Anesthesiologist Access & Monitoring:

- Maintain paralysis (0 out of 4 TOF). Use vecuronium gtt, prn
- Administer N/V prophylaxis:
  - 8mg IV dexamethasone upon case initiation
  - 4mg IV ondansetron 30 min. prior to emergence
- AVOID hydromorphone IV, fentanyl NOT to exceed 2-4 mcg/kg (IDEAL)
- 7.5mg Ketorolac (surgeon approval) at case end
- Follow OSUWMC Periop/Periprocedural Glucose Management guideline.

Ventilation Management

Timeout

Surgeon Reviews:

- Anticipated case duration
- MAP goals
- Positioning checklist & padding (heels, flank, sacrum, ax roll, bean bag, arms)
- Ventilation Management:
  - Fascial closure, plateau pressure, PIP, TV, RR (documented)

Ventilation Management

Ventilation Management:

Changes in plateau pressure from opening pressures:

- >6 cmH2O: Remain intubated x 24H in SICU
- >9 cmH2O: Remain intubated + paralytics x 24-48H in SICU

Changes in peak inspiratory pressures from opening pressures:

- ≥10 cmH2O: Discuss with surgeon decision to remain intubated x 24H in SICU
- ≥12 cmH2O and/or above absolute value of 40: Remain intubated + paralytics x 24-48H in SICU

NOTES:

Postop intubation may be required for patients with moderate to severe COPD or dyspnea at rest AND 2 or more of the following:

- Recurrent incarcerated hernia
- Operative time >240 minutes
- ASA 4
- Albumin <3.5

NOTE: Prior to leaving OR, surgeon will determine drain placement, wound vac use, and continuation of NGT.

Turquoise wristband placed on patient prior to leaving OR.

Daily Management

- DVT prophylaxis
- D/C foley per nursing protocol, evaluate urine output
- Diet based on patient tolerance and history
- Drains: Strip Q2H and record q shift. Empty when 25% full. Bulbs attached to abdominal binder. Biopatch and Tegaderm dressings to drain sites; change PRN soiling.
- Aggressive pulmonary toileting, including cough & deep breathing with IS 10 times every hour
- OOB to chair. Ambulate 2-4 x POD 0, ≥ 5 x thereafter. (Consult PT ONLY in cases of baseline mobility issues)
- Hernia pillow/Abdmonial binder
- Discharge Teaching: Drain & Site care, abdominal binder, pain regimen

Medication Management

POD 0-14 days Post-Op:

- PO celecoxib 200 mg TID (not in pts. with cardiac hx)
  - Can substitute:
  - PO meloxicam 15 mg BID
  - PO ibuprofen 400 mg Q6H OR
  - PO naprosyn 440 mg Q12H (not in pts. with PUD)
- PO acetamnophen 1000 mg Q6H
- PO gabapentin 300 mg TID (not in pts. with OSA)
- PO oxycodone 5 mg (Q4H PRN moderate to severe pain)

POD 0-Discharge:

- SQ Lovenox 40mg in thigh (NOT abdomen) **HOLD 24H prior to epidural removal**

POD 0

- Follow medication & daily management
- If intubated, wean to extubate
- Acute Pain Service to titrate epidural PRN
- Medications:
  - MIVF: LR @125 mL/H
  - PO Simethicone chewable tablets 80 mg TID
  - IV hydromorphone 0.5-1 mg Q3H PRN (ONLY for severe pain in patients not tolerating PO)
- Drains to LWS
- Ambulate Patient with assistance ≥1 within 6 hours of surgery
- Bladder scan if no spontaneous voiding 6H after foley removed

POD 1

- Follow medication & daily management
- If intubated, wean to extubate
- Titrate epidural PRN
- PO pain meds when ileus resolved
- MIVF: LR @ 125 mL/H
- Drains to bulb suction
- Labs: CBC, Mg, Renal function

POD 2 – Discharge

- Follow medication & daily management
- D/C MIVF if hydration adequate
- 10mg Dulcolax rectal suppository x 1 dose if no bowel function. Avoid PO osmotic laxative until spontaneous return of bowel function.

References

- Lau, C. S., & Chamberlain, R. S. (2016). Probiotics are effective at preventing Clostridium difficile-associated diarrhea: a systematic review and meta-analysis. International Journal of General Medicine, 9, 27–37.
- Reuben, S. S., Connelly, N. R., Lurie, S., Klatt, M., & Gibson, C. S. (1998). Dose-response of ketorolac as an adjunct to patient-controlled analgesia morphine in patients after spinal fusion surgery. Anesthesia & Analgesia, 87(1), 98-102.
- Springer, J. E., Elkheir, S., Eskicioglu, C., Doumouras, A. G., Kelly, S., Yang, I., & Forbes, S. (2018). The Effect of Simethicone on Postoperative Ileus in Patients Undergoing Colorectal Surgery (SPOT), A Randomized Controlled Trial. International Journal of Surgery.

Appendix A
Goal-Directed Fluid Management

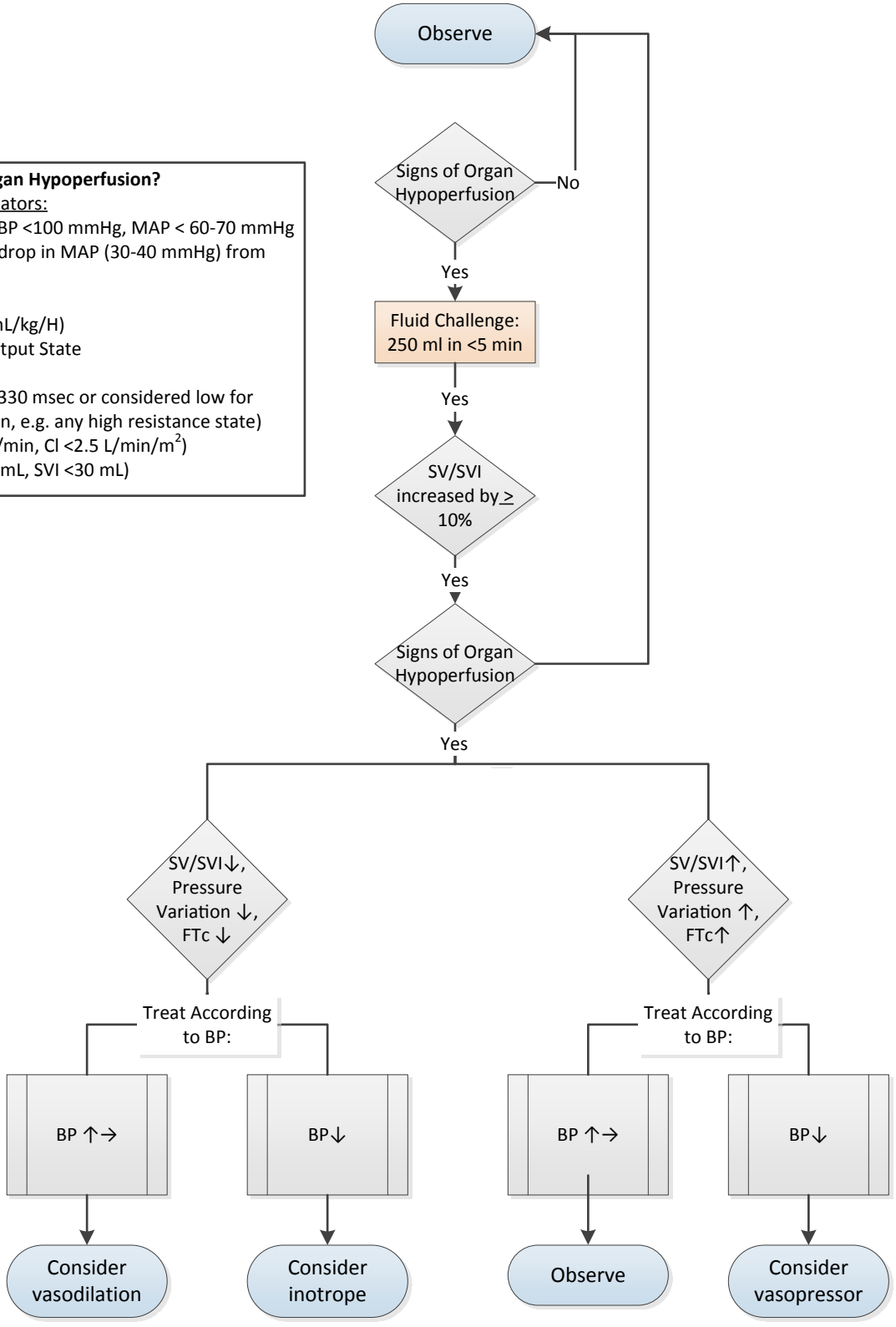
Organ Hypoperfusion?

Primary clinical indicators:

- Hypotension (SBP <100 mmHg, MAP < 60-70 mmHg or a significant drop in MAP (30-40 mmHg) from baseline)
- Tachycardia
- Oliguria (<0.5 mL/kg/H)
- Low Cardiac Output State

Flow indicators:

- Reduced FTc (<330 msec or considered low for clinical condition, e.g. any high resistance state)
- Low CO (<4-6 L/min, CI <2.5 L/min/m^2)
- Low SV (<50-8- mL, SVI <30 mL)



For questions regarding esophageal Doppler use smartphone App: US Deltex Guide