



Perioperative Medicine Summit

Evidence Based Perioperative Medical Care

Rapid Fire

Answering challenging,
common clinical questions

Perioperative Considerations for the Obese Patient

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Disclosures

- No relevant financial relationships with pharma
- Author's royalty from uptodate.com
- No Off Label Use of Medications
- Full Disclosure statement on file with AML Events
- Attempts at humor/sarcasm are solely my own and do not reflect the opinions of the Periop Summit or my employer, the UT MD Anderson Cancer Center.

Objectives

- Define obesity
- Understand organ level dysfunction due to obesity
 - Perioperative Pulmonary Issues covered by Dr. Frances Chung on Thursday 2/25/16
 - Dr. Lee Fleisher wrote the CV citation ... ask him!
- Learn to calculate risk score for bariatric surgery
- Identify some strategies to limit perioperative issues
- Understand post operative VTE prophylaxis management
- **In ten minutes!**

ARS Question



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- **55 Man, BMI 47, needs a laparoscopic cholecystectomy. PMx: IDDM, HTN, asymptomatic CAD on imaging, snoring, neck size 21.**
- **Stable on meds, passable functional status, mows the lawn on weekends (riding!).**
- **Where do you do the surgery?**
 - A. Local For Profit Ambulatory Surgery Center**
 - B. Local Ambulatory Surgery Center owned by Local Community Hospital**
 - C. Local Community Hospital**
 - D. Medical School University Hospital**

Ambulatory Center vs Hospital

- BMI should not be the sole criteria
 - Type of Surgery
 - Surgeon's and Facility's experience
 - Anesthesia technique
 - Medical comorbidities
- BMI: > 50: Hospital preferred
- BMI: 40 to 49: Careful preoperative evaluation
- BMI: <40, usually safe in ambulatory environment
- The “most complex case we ever had” criteria

Joshi, G. P., et al. (2013). "Selection of obese patients undergoing ambulatory surgery: a systematic review of the literature." *Anesth Analg* **117**(5): 1082-1091.

Defining Obesity

Category	BMI	Over Ideal Body Weight (%)
Underweight	<18.5 kg/m ²	
Normal	18.5–24.9 kg/m ²	
Overweight	25–29.9 kg/m ²	
Obesity (class 1)	30–34.9 kg/m ²	>20%
Severe obesity (class 2)	35–39.9 kg/m ²	>100%
Severe obesity (class 3)	≥40 kg/m ²	
Super obesity	>50 kg/m ²	>250%

<http://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/endocrinology/obesity/#cetable1>

Cardiovascular Issues

- Morbidly obese patients have 2x the risk of post op cardiac complications
- Increased Cardiac Output
 - increased metabolic demand imposed by adipose tissue results in a hyperdynamic circulation with increased blood volume.
- Left ventricular (LV) afterload is increased
 - increased peripheral resistance
 - greater conduit artery stiffness.
- Right ventricular afterload may be increased
 - due to associated sleep disordered breathing and LV changes

King, D. R. and G. C. Velmahos (2010). "Difficulties in managing the surgical patient who is morbidly obese." *Crit Care Med* 38(9 Suppl): S478-482.

Bamgbade, O. A., et al. (2007). "Postoperative complications in obese and nonobese patients." *World J Surg* **31**(3): 556-560; [discussion 561](#).

Vasan, R. S. (2003). "Cardiac function and obesity." *Heart* 89(10): 1127-1129.

Cardiac and pulmonary algorithm assessment for elective noncardiac surgery in severely obese patients.

Comprehensive medical history, physical examination, blood chemistry as clinically indicated

STEP 1 Very low risk patient → yes → proceed with planned surgery

↓

No

↓

STEP 2 One risk factor for CAD → 12-lead ECG
or presence of stable CVD

if signs of RVH: consider pulmonary hypertension

if signs of LBBB: consider occult CAD

Chest X-ray

→

if hypoventilation or other pulmonary conditions

↓

consider arterial blood gas

↓

STEP 3 Good functional capacity → yes → proceed with planned surgery

↓

No, unknown or unable to exercise

↓

STEP 4 Imaging technique to assess cardiac function

↓

STEP 5 Decreased left ventricular systolic function → consider obesity cardiomyopathy or hibernating myocardium

↓

consider angiography



Gastrointestinal

- H Pylori prevalence in the obese as high as 60%
 - GERD
 - Ulcers
 - GI Cancers
- Screen and Treat for 14 days
- Post Operative Nausea and Vomiting (PONV)
 - Aprepitant effective, but costly

Erim T, Cruz-Correa MR, Szomstein S et al. Prevalence of Helicobacter pylori seropositivity among patients undergoing bariatric surgery: a preliminary study. *World J Surg.* 2008; 32:2021-5.

Papasavas PK, Gagne DJ, Donnelly PE et al. Prevalence of Helicobacter pylori infection and value of preoperative testing and treatment in patients undergoing laparoscopic Roux-en-Y gastric bypass. *Surg Obes Relat Dis.* 2008; 4:383-8.

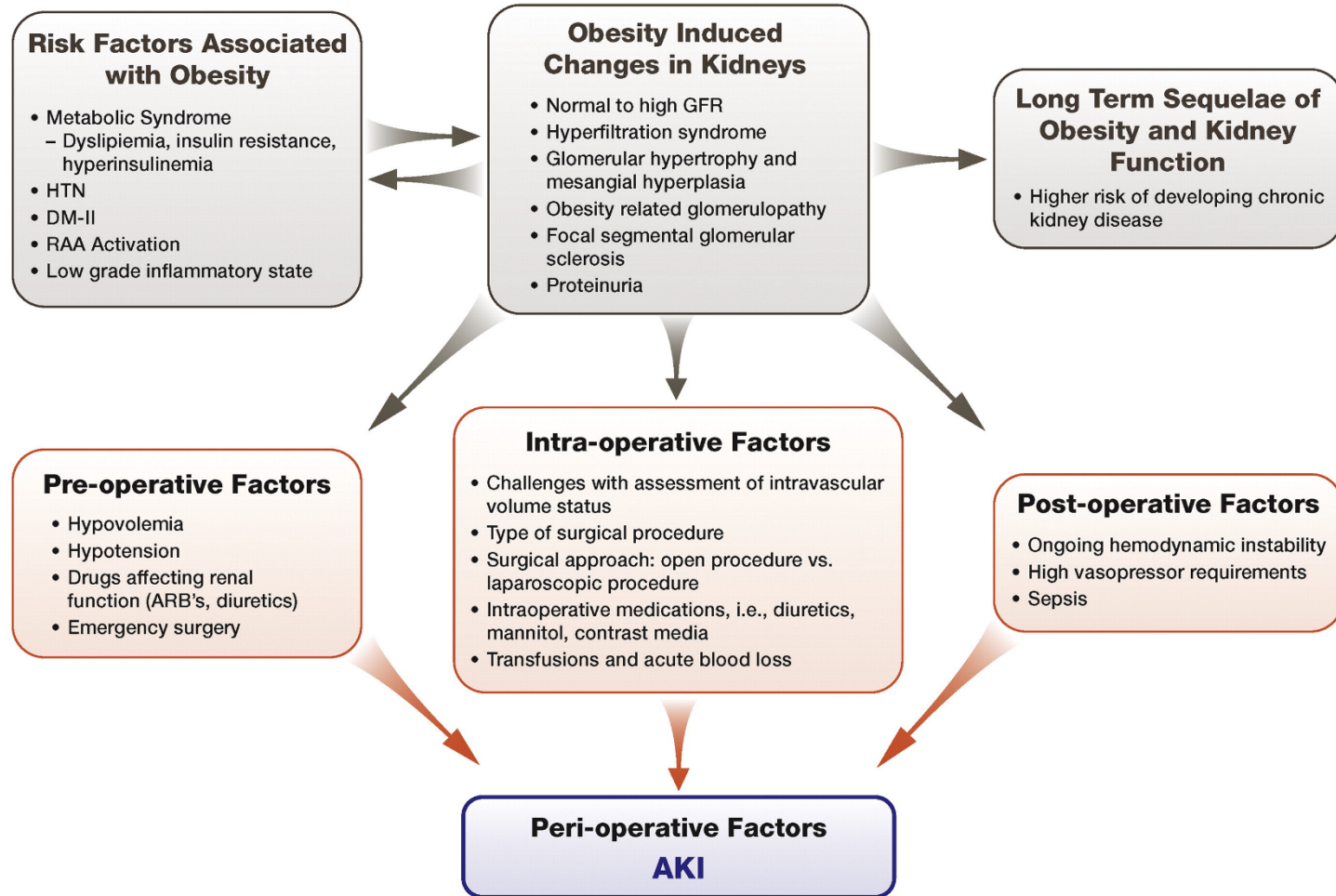
Sinha AC, Singh PM, Williams NW et al. Aprepitant's prophylactic efficacy in decreasing postoperative nausea and vomiting in morbidly obese patients undergoing bariatric surgery. *Obes Surg.* 2014; 24:225-31.

The Liver

- Nonalcoholic fatty liver disease
 - Central obesity
 - Insulin resistance
 - Hypertension
 - Obesity related dyslipidemia
- 10 to 20% of NAFLD have nonalcoholic steatohepatitis (NASH)
 - NASH not associated with increased postoperative complications in bariatric surgery
 - Wise to limit agents metabolized by liver
- Bariatric surgery may mitigate NAFL

Weingarten, T. N., et al. (2011). "Nonalcoholic steatohepatitis (NASH) does not increase complications after laparoscopic bariatric surgery." *Obes Surg* 21(11): 1714-1720.

The Kidneys



Suneja, M. and A. B. Kumar (2014). "Obesity and perioperative acute kidney injury: A focused review." Journal of Critical Care 29(4):

Preoperative Evaluation

- Inform the patient that they are morbidly obese and that it has perioperative consequences
 - Emotional conversation
- Rapid weight loss rarely successful for time sensitive surgery
- Focus on physical / functional status instead
- For elective surgery, targeted weight loss lowers complications
- Are you using the right sized blood pressure cuff?

OS-MRS Score for Bariatric Surgery

Obesity Surgery Mortality Risk Score			
Risk Factor	Points	Interpretation	
Age > 45	1	Class	Mortality
Hypertension	1	"A" Low (0-1)	0.2%
Male	1	"B" Moderate (2-3)	1.2%
Pulmonary Embolus Risk: Previous VTE, pulmonary hypertension, IVC filter, or hypoventilation due to obesity.	1	"C" High (4-5)	2.4%
BMI > 50 kg/m ²	1		

DeMaria, E. J., et al. (2007). "Validation of the obesity surgery mortality risk score in a multicenter study proves it stratifies mortality risk in patients undergoing gastric bypass for morbid obesity." *Ann Surg* **246**(4): 578-582; discussion 583-574.

Preoperative Weight Loss

- In most cases, it ain't gonna happen, move on
- Use the periop visit to emphasize the need for lifestyle changes
- Consider referral to bariatric surgery for elective procedures
- Optimize medical therapy
- Focus on Functional Status
 - Exercise capacity
 - Strength training

Preop Day Minus One

- Consider preoperative PICC line placement
 - Obese people are hard sticks
 - Internal Jugulars are more or less impossible
 - NPO after midnight will dehydrate patient and collapse veins, but ERAS protocols diminish likelihood.
 - PICC line access the day before will prevent delays on the day of surgery
- If OSA, bring CPAP device to hospital
- Notify OR control, as may need a bigger bed

VTE Prophylaxis in the Obese Pt

- LMWH + SCDs preferred
- Dosing of Anticoagulants: low bleeding risk
 - BMI based dosing
- High bleeding risk
 - Standard dosing, but ramp up as quickly as possible
- Highest thrombotic risk:
 - No dose capping, titrate to plasma anti-Xa levels
 - Peak anti-Xa levels between 0.2 & 0.5 U/mL obtained 3-5 hours after LMWH should be appropriate.
- Novel Oral Anticoagulants: unknown
 - After gastric/bariatric surgery, is absorption altered?

Quidley, A. M., et al. (2014). "Perioperative management of bariatric surgery patients." *Am J Health Syst Pharm* 71(15): 1253-1264.

Shelkrot, M., et al. (2014). "Appropriate enoxaparin dose for venous thromboembolism prophylaxis in patients with extreme obesity." *Hosp Pharm* 49(8): 740-747.

Enoxaparin for BMI >40

- Prophylaxis: Clinical literature has recommended doses of Enoxaparin ranging from 0.5mg/kg SC Q12h or a 25% increase from the standard prophylaxis dos
- Bariatric Surgery (Roux-en-Y gastric bypass):
 - BMI \leq 50 kg/m²: 40 mg every 12 hours
 - BMI >50 kg/m²: 60 mg every 12 hours
- Treatment: Dose should be based on actual body weight 1mg/kg SC Q12H for the inpatient (or 1.5mg/kg SC Q24H for outpatient) is sufficient to reach appropriate levels in the body
- Consider monitoring anti-Xa levels in patients weighing \geq 190 kg

Dalteparin for BMI >40

- Prophylaxis: Dalteparin 7500 int. units q 24h.
 - This recommendation is based on clinical studies since the current FDA approved dosing provides no specific dose adjustment in obese patients
- Treatment: Dalteparin 200 – 240 int. units/kg/day
- The manufacturer reports not to exceed 18,000 int. units/day for DVT/PE treatment and 10,000 int. units SC every 12 hours for ACS treatment, however, literature has shown that most patients still reach target anti-factor Xa range without dose capping at a ceiling dose.

Further Reading

- Cullen, A. and A. Ferguson (2012). "Perioperative management of the severely obese patient: a selective pathophysiological review." Can J Anaesth **59(10)**: 974-996.
- Poirier, P., et al. (2009). "Cardiovascular Evaluation and Management of Severely Obese Patients Undergoing Surgery: A Science Advisory From the American Heart Association." Circulation **120(1)**: 86-95.
- Leonard, K. L., et al. (2015). "Perioperative Management of Obese Patients." Surgical Clinics of North America **95(2)**: 379-390.



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Making Cancer History®

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END OF PRESENTATION

ARS answer follows

ARS Question



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Answer

Where do you do the surgery?

C. Local Community Hospital

D. Medical School University Hospital

“Although there is no consensus, patients with known or presumed coronary artery disease and high perioperative risk should be managed in an intensive care unit setting for the first 24 to 48 hours postoperatively **(grade D)**.”

Poirier, P., et al. (2009). "Cardiovascular Evaluation and Management of Severely Obese Patients Undergoing Surgery: A Science Advisory From the American Heart Association." *Circulation* **120**(1): 86-95.