

Case #1

70 year old male scheduled for ambulatory shoulder arthroscopy with rotator cuff repair

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WSA
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Surgery Center

- Case scheduled at stand-alone surgery center
- Inpatient beds available for overnight admissions
- No physician in-house at night; hospitalist on call
- No ICU, Cath lab
- Basic lab and radiology available
- Ability for temporary BIPAP and CPAP

Medical History

- Hypertension
- Hyperlipidemia
- Atrial Fibrillation
- COPD
- Quit smoking in 2011
- 50 pack/year history
- Obesity
- BMI 46
- OSA - CPAP compliant
- Diabetes Mellitus

Surgical History

- 2015: Left total knee replacement
 - General anesthesia with adductor nerve block
- 2012: Right total knee replacement
 - General anesthesia with femoral nerve block
- 2012: Cardioversion
 - General anesthesia
- 1978: Open appendectomy
 - General anesthesia

Chronic Medications

- Warfarin - held for 5 days
- Aspirin
- Metoprolol
- Hydrochlorothiazide
- Metformin
- Lovastatin
- Advair
- Albuterol PRN
- Vicodin PRN

Pre-op Workup

- Primary care physician evaluation
 - EKG obtained and showed Atrial fibrillation with a rate of 74 beats per minute
- Lab work obtained
 - Hemoglobin 14.6 G/DL
 - Creatinine 1.1 MG/DL, Potassium 4.2 MMOL/L
 - Glucose 132 MG/DL, HgA1c 7.8%
 - INR 1.3

Pre-op Workup

- Noted stable exercise tolerance with no recent COPD exacerbations
 - Sedentary lifestyle
 - Able to climb 2 flights of stairs
- Steady weight gain over time
- Revised Cardiac Risk Index: 0.4% risk of major cardiac event

Summary of Patient Hx

- Has tolerated multiple general anesthetics without complication
- No change in medical history in past 6 months
- No known coronary artery disease
- No known cerebral vascular disease

Day of Surgery

- Patient smells of cigarette smoke
- Lung exam with few expiratory wheezes
- Vital signs: BP 179/96, HR 92, RR 20, SpO2 94%
- Patient reports anxiety about pain control after surgery

Further workup?

- Concerns?
 - Pre-op, Intra-op, PACU, after discharge?
- Is he medically optimized for this procedure?
- Are any other diagnostic tests indicated?
 - Would they change your management?
- Is this procedure safe to perform on this patient in an ambulatory surgery center?

Factors to Consider

- Capabilities of ambulatory surgery center
- Nature of surgery
- Type of anesthesia needed
- Duration of procedure
- Coexisting disease
- Need for post-operative opioids

Not all ambulatory surgery centers are equal

- What resources are available?
 - Emergency airway equipment
 - Fiberoptic scope
 - Respiratory care equipment
 - CPAP, BIPAP
 - Clinical laboratory
 - ABG analysis
 - Radiology
 - CXR, CT
 - Location
 - Nearest hospital

Review of Literature

Patient Selection for Day Case-eligible Surgery: Identifying Those at High Risk for Major Complications

- Published in Anesthesiology in December 2013
- Retrospective analysis of common day case-eligible surgical procedures
- Used the American College of Surgeons' National Surgical Quality Improvement Program Database from 2005-2010
- Primary outcome was morbidity or mortality within 72 hours

Patient Selection for Day Case-eligible Surgery: Identifying Those at High Risk for Major Complications

- Reviewed 244,397 surgeries
- Unplanned admission rate of 1.1%
- Mortality rate 0.009% (1/11,633)
- Total morbidity and mortality rate 0.1%

Patient Selection for Day Case-eligible Surgery: Identifying Those at High Risk for Major Complications

- Reviewed 244,397 surgeries
- 232 (0.1%) experienced morbidity or mortality
 - 46 Pneumonia
 - 37 Unplanned postoperative intubation
 - 25 Wound disruption
 - 21 Post-operative bleeding
 - 19 Sepsis

Patient Selection for Day Case-eligible Surgery: Identifying Those at High Risk for Major Complications

- Procedures associated most frequently with adverse outcomes:
 - Laparoscopic Cholecystectomy
 - Abdominal wall hernia repair
 - Inguinal hernia repair

Results

- COPD (OR 2.39)
- Hx of CVA/TIA (OR 2.15)
- BMI >30 (OR 2.02)
- Prior PCI/Cardiac Surgery (OR 1.73)
- Prolonged Operative Time; >75th percentile (OR 1.66)
- Hypertension (OR 1.66)
- BMI 25-29.9 (OR 1.58)

Predictors of unanticipated admission following ambulatory surgery: a retrospective case-control study

- Published in the Canadian Journal of Anesthesia in 2013
- Used a database of >20,000 patients at three teaching hospitals
- Total sample size was 400 randomly selected patients
 - 200 case and 200 control patients
- Primary outcome was the incidence of unanticipated hospital admission (2.6%)

Results

- Length of surgery 1-3 hours (OR 16.70)
- Length of surgery >3 hours (OR 4.26)
- ASA class III (OR 4.60)
- ASA class IV (OR 6.51)
- Age >80 years (OR 5.41)
- BMI 30-35 (OR 2.81)

Interesting results

- BMI >40 not associated with unanticipated admission
 - Scheduling bias?
 - Small sample size?
- Smoking associated with an 56% reduction in risk for unanticipated admission
 - Highly motivated to be discharged?
- Less PONV?

Should my surgery center have a BMI limit?

Are laparoscopic bariatric procedures safe in super obese (BMI>50kg/m²) patients?

- Published in 2011 in Surgery for Obesity and Related Diseases
- A National Surgical Quality Improvement Program database study of 29,323 patients
- Retrospective review from 2005-2008
- Gastric bypass and gastric banding procedures
- Compared two groups
 - BMI 40-50
 - BMI >50

Superobese population had increased comorbidities

- OSA
- Hypoventilation syndrome
- Pulmonary hypertension
- Resistant systemic hypertension
- Coronary artery disease
- CHF
- Bleeding disorders
- CKD on dialysis

Results-Gastric bypass population

- Superobese have significantly increased complications
 - Superficial wound infections (OR 1.68)
 - Reintubation (OR 1.97)
 - Pulmonary embolism (OR 2.13)
 - DVT (OR 2.06)
 - Septic Shock (OR 1.74)
 - 30-day mortality (OR 2.26)

Selection of Obese Patients Undergoing Ambulatory Surgery: A Systemic Review of the Literature

- Published in Anesthesia and Analgesia November 2013
- Review of 23 studies and 1 systemic review
- Total of 106,119 ambulatory surgery patients
 - 39,548 underwent bariatric surgery

Conclusions

- There was no difference in the rate of unanticipated admission between obese and non-obese patients
- No difference in rate of unanticipated admission between bariatric surgery patients and all others

- Multiple studies found a statistically significant higher incidence of the following in the obese

- Oxygen desaturation
- Bronchospasm
- Stridor/Laryngospasm
- Airway obstruction
- Need for oxygen supplementation
- Overall increased airway complications

Discussion

- Airway events not associated with serious complications or unplanned hospital admission
- Most patients in this review (except bariatric surgery group) had BMI ~30
- Bariatric surgery patients have a very rigorous pre-operative workup
- Two studies showed worse ambulatory surgery outcomes with BMI >50

Should my surgery center have a BMI limit?

- BMI >50
 - Likely at higher risk for ambulatory surgery
- BMI 40-50
 - May be at higher risk with certain comorbidities
- BMI <40
 - Ambulatory surgery appears to be safe

How should OSA status be used to risk stratify for ambulatory surgery?

Obstructive Sleep Apnea

- 60-70% of obese patients have OSA
 - Mostly undiagnosed
- Rates are increasing
- There are concerns about safety in ambulatory surgery patients

Does Obstructive Sleep Apnea Influence Preoperative Outcome? A Qualitative Systematic Review for the Society of Anesthesia and Sleep Medicine Task Force on Preoperative Preparation of Patients with Sleep-Disordered Breathing

- Published in Anesthesia and Analgesia May 2016
- Retrospective review of 61 studies
 - 413,304 patients with OSA
 - 8,556,279 controls
- Majority of studies reported worse outcomes among patients with OSA compared to controls
- Mixed results on mortality

Complications with OSA

- Pulmonary complications
 - Desaturations
 - Difficult intubation
- Atrial Fibrillation
- Resource Utilization

Society for Ambulatory Anesthesia Consensus Statement on Preoperative Selection of Adult Patients with Obstructive Sleep Apnea Scheduled for Ambulatory Surgery

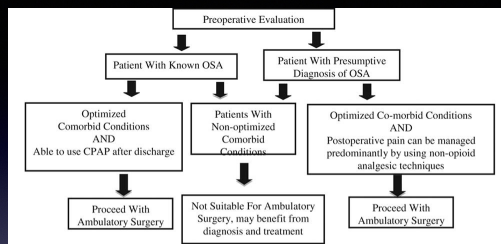
- Published in Anesthesia and Analgesia November 2012
- Review of 7 studies
 - 2 prospective observational
 - 5 retrospective review

Results

- Compared to non-OSA patients, patients with OSA had significantly:
 - Higher BMI
 - More comorbidities
 - DM, HTN, CVA, MI, CHF

Results

- Several studies showed a higher incidence of postoperative hypoxemia in the OSA group
- No study showed a difference in need for ventilatory assistance or reintubation
- Recommend using STOP-bang questionnaire to risk stratify patients who have not had sleep study
- Recommend aggressive use of CPAP whenever sleeping (day and night) for first few days post-op



Preoperative Considerations:

- Comorbid conditions include hypertension, arrhythmias, heart failure, cerebrovascular disease, and metabolic syndrome.
- If OSA is suspected during the preoperative evaluation, one could proceed with a presumptive diagnosis of OSA albeit with caution.
- Educate surgeon, patient and family (see the text for details)

Intraoperative Considerations:

- Non-opioid analgesic techniques, when possible.

Postoperative Considerations:

- Exercise caution in OSA patients who develop prolonged and frequent severe respiratory events (e.g., sedation analgesic mismatch, desaturation, and apneic episodes) in the postoperative period.

How did the case turn out?

- Decided that the patient's comorbidities were optimized
- Intraoperative course was uneventful
- Sedation/pain mismatch in PACU; requiring BIPAP
 - Transfer to local hospital
- Discharge to home on post-operative day 2; back on home CPAP settings

Take home points

- Understand your ambulatory surgery center's resources and limitations
- Optimize comorbidities
- Pre-operative identification and treatment of OSA
 - Minimization of opioids
 - CPAP in the postoperative period

STOP-Bang Questionnaire

- An easy, highly sensitive pre-operative tool to assess for OSA risk
 - ≥ 5 presumptive diagnosis of OSA
- May also provide an indication of severity of OSA
 - ≥ 6 is associated with severe OSA

STOP-Bang Questionnaire used to determine the risk of OSA

- Snoring. Do you snore loudly?
- Tiredness. Do you often feel tired, fatigued or sleepy during the daytime?
- Observed apnea. Has anyone observed you stop breathing during your sleep?
- Pressure. Do you have or are you being treated for high blood pressure?
- BMI >35
- Age >50
- Neck circumference $>40\text{cm}$
- Male Gender

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