Case #1

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

Brett Frodl, MD
Eau Claire Anesthesiologists
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

- Patients 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 a 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 (expect 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

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 >40cm
  - Male Gender
References 1


References 2


References 3