CHALLENGES OF THE MORbidLY obese PREGNANT PATIENT

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GOALS AND OBJECTIVES
• Discuss the epidemiology and complications associated with morbid obesity and pregnancy
• Examine relevant concerns of neuraxial anesthesia in morbidly obese parturient
• Focus on issues relating to cardiopulmonary anesthetic care for these patients
• Challenge certain traditional aspects of anesthesia practice and offer potentially better alternatives

DISCLOSURE
• No conflict of interest to report

EPIDEMIOLOGY
• 58% of women of child-rearing age are overweight, 32% obese, and 8% extremely obese
• From 1999-2010, prevalence of obesity increased from 28% to 34%

RISK FACTORS
• Increase rates of C-section in both US and abroad
• In Confidential Enquiries into Maternal Death and Child Health, 35% of all parturients who died were obese
COMPLICATIONS OF MATERNAL OBESITY

Maternal Complications
- Hypertensive disorders
- Gestational diabetes
- Preeclampsia
- Risk of C-section
- Hypercoagulability

Fetal Complications
- Prematurity
- Fetal malpresentation
- Still birth
- Neural tube defects
- Macrosomia

ANESTHETIC RISKS IN MORBIDLY OBESE

- Failed or difficult neuraxial placement
- Patchy or inadequate blocks
- Difficult endotracheal intubation
- Aspiration of gastric contents
- Difficult IV access
- Increased incidence of cardiopulmonary disease

NEURAXIAL CONCERNS

In a recent survey, 50% of obstetrician will discuss peripartum complications of obesity
- But only 13% will discuss potential anesthetic complications
- The same survey also found that while all respondents knew IV placement is difficult in obese pts, few knew epidural placement can be difficult or patchy, and intubation failure is higher

1st step should be to improve awareness amongst obstetricians
AIRWAY CONCERNS
DIFFICULT AIRWAY

- Increased difficulty to visualize larynx → 2X as common in obese parturients vs non-obese individuals
- Combination from fat deposition in oropharynx, soft tissue changes during pregnancy, mucosal engorgement from labor
- In 1 series of parturients undergoing C/S, 33% incidence of difficult intubation in patients weighing > 300 lbs

PREOXYGENATION & APNEIC OXYGENATION

Prolonged laryngoscopy in obese patients: A randomized, controlled trial of buccal RAE tube oxygen administration

Apneic Oxygenation during Prolonged Laryngoscopy in Obese Patients: A Randomized, Controlled Trial of Buccal RAE Tube Oxygen Administration

Preoxygenation
Apneic Oxygenation

Apneic Oxygenation > Preoxygenation??

NIPPV
Non-Invasive Positive Pressure Ventilation

Hypoxemic vs. Hypercapnic Strategies
Respiratory support techniques to avoid desaturation in critically ill patients requiring endotracheal intubation: A systematic review and meta-analysis

Vincenti Russo, MD*, Andrea Cingiapi, MD, Santi Maurizio Bariati, MD, Claudio Cingiapi, MD, Antonio Capoccia, MD

POSITIONING
- Ramp vs sniffing position
- Effects on diaphragm movement
- FRC and closing capacity

OPTIMAL PEEP
- Chest wall adipose tissue exerts pressure on thorax and intra-abdominal adipose tissue further shift diaphragm cephalad
- Obesity predispose to low FRC, TLC, and VC
- Low FRC increases risk of expiratory flow limitation and early airway closure
- autoPEEP and dynamic hyperinflation results
- In a 2015 study by Pirrone et al, clinician selected PEEP for morbidly obese pts (avg BMI 50) in the ICU were on average 10 cm H2O lower than optimal PEEP found by study researchers

A Multicenter, Randomized Trial of Ramped Position vs Sniffing Position During Endotracheal Intubation of Critically Ill Adults

What PEEP should be chosen to optimize WOB while limiting further injury to the lungs?
- Ptranspulm vs Pplateau
- Ptranspulm = Palveolar – Pplateau
- Frequently negative in obese patients
- Concept of driving pressure (ΔP)
  ΔP = Pplateau – PEEP
  ΔP = VT / Crs, where VT is tidal volume, Crs is compliance of the respiratory system
• Are morbidly obese parturient at high risk for aspiration?
  
  Wong et al. examined 10 morbidly obese patients at term, given oral acetaminophen and 50/300 ml of water.
  
  Found no difference in gastric emptying or acetaminophen absorption.

ASPIRATION

CARDIOVASCULAR CONCERNS

• Obesity is associated with HTN, coronary artery disease, left ventricular hypertrophy, and DM
  
  But BMI is an independent predictor of heart failure.
  
  Obesity cardiomyopathy can develop in BMI > 40 for 10 years.
High incidence of diastolic dysfunction in morbidly obese individuals

Paul et al observed an 11% increase in O2 consumption and 44% increase in PCWP when morbidly obese patients were laid supine

Pulmonary HTN is also common can lead to RV dysfunction

SOB? Which etiology is it?

DIASTOLIC DYSFUNCTION

HEMODYNAamic RESPONSE TO NEURAXIAL

- Higher incidence of hypotension despite same dose of epidural medication
- 142 morbidly obese patients receiving neuraxial anesthesia, 3.8% incidence of profound hypotension refractory to fluids and vasopressors
- Dose related?
- ?? Aortocaval compression ??

FETAL EFFECTS

Edwards et al demonstrated for every 10 unit ↑ in BMI, umbilical cord pH ↓ by 0.26 mmol/L.

In the same study, 3.5% of patients with BMI < 25 had cord pH < 7.1, but 7.7% of those with BMI > 40 did.

Negative correlation between BMI and APGAR score has also been consistently demonstrated

MISCELLANEOUS CONSIDERATIONS

- Weight based SC heparin for DVT prophylaxis
- Proper operating table and bed
CONCLUSION
- Morbidly obese parturients often embody multiple comorbidities and need a careful, multidisciplinary approach
- Whenever possible, neuraxial anesthesia offers proven effectiveness and a safer profile compared to general anesthesia
- General anesthesia should go beyond just “difficult airway” concerns in this population
- Point of Care U/S should be increasingly utilized to guide management

THANK YOU

REFERENCES