Perioperative Management of a Pediatric Patient with a Large Anterior Mediastinal Mass for VATS with Biopsy

Objectives:

1) Review the preoperative evaluation of patients presenting with an anterior mediastinal mass

2) Review the goals and options for induction of anesthesia in these patients

3) Review data using signs and symptoms, radiologic tests and pulmonary function tests to risk stratify patients undergoing general anesthesia

4) Propose a set of guidelines for the preoperative anesthetic evaluation and preparation

Stem Case:
An 18 year old female presents for a scheduled VATS biopsy of an anterior mediastinal mass. Three weeks prior to admission she presented to the emergency department of an outside hospital complaining of cough that was worse in the supine position, left sided chest pain, 2 episodes of syncope and orthopnea. A chest radiograph showed left upper lobe consolidation. The patient was diagnosed with pneumonia and was treated with antibiotics. Her symptoms persisted despite antibiotic therapy and the patient returned to the hospital. A chest CT was done which revealed a large anterior mediastinal mass that encased the great vessel takeoff at the aortic arch. There was also severe attenuation of the left main bronchus with complete obstruction of the left upper lobe and partial collapse of the left lower lobe.

Questions:
1) What additional information would you like to know regarding this patient’s presentation?
2) Does the specific diagnosis effect your anesthetic management?
3) Are there any comorbid conditions associated with the anterior mediastinal mass that concern you and that would prompt further investigation?

On physical exam the patient did not have acute respiratory distress while lying on 2 pillows. Her respiratory rate was 12-14 breaths per minute with a room air oxygen saturation of 96%. Of note, the patient’s blood pressure did vary with positioning with a systolic pressure decrease of 18 mmHg from sitting to the right lateral decubitus position (operative position). She did not have facial or upper extremity edema. There were decreased breath sounds over the left hemithorax. The airway exam was unremarkable.
**Questions:**
1) What further preoperative evaluation would you like to have for this patient? 
2) What signs and symptoms are predictive of potential intraoperative and postoperative complications? 
3) What is the role of preoperative pulmonary function tests? 
4) What is the role for a preoperative cardiac echocardiogram? 
5) What is pulsus paradoxus? How do you check for it and what is the clinical significance if this is found.

No further preoperative testing was obtained. Because the patient did not have any suitable peripheral site to biopsy, the plan was to proceed with a VATS biopsy of the mass.

**Questions:**
1) How would you plan to induce anesthesia in this patient? Would you choose a mask induction or an IV induction? 
2) How would you plan to secure the airway, awake or asleep? 
3) How would you manage the patient if she were to develop airway collapse? 
4) What type of monitors would you plan for this case? 
5) Is a central line necessary for the case? Is a pulmonary artery catheter useful in this case? 
6) What anesthetic agents would you use for induction and maintenance? 
7) Would you consider neuromuscular blockade in this patient? 
8) What concerns do you have regarding the effects of the lateral position on pulmonary function? 
9) If the patient were started on steroids would that effect your anesthetic management of this patient?

Upon positioning the patient in the lateral decubitus position she becomes hypotensive. What are your thoughts regarding the possible causes of hypotension? How would you treat the hypotension?

After securing large bore IV access and an arterial catheter prior to induction, an awake fiberoptic intubation was done with the patient in a semi Fowler’s position using an armored endotracheal tube. Once intubated, anesthesia was induced with etomidate and maintained with volatile agent, air, oxygen and remifentanil infusion. No neuromuscular blockers were given; however, controlled ventilation was maintained during thoracoscopy. A rigid bronchoscope was prepped and available should airway collapse occur during the perioperative period.

**Questions:**
1) Are there any other precautions that you would have taken in regards to induction and maintenance of anesthesia? 
2) Would you plan on extubating this patient?
3) Would you make any particular preparations in regards to extubation?
4) Should the patient be monitored in the intensive care unit post operatively?

**Discussion Outline:**
I. Review the causes of anterior mediastinal mass and how they may effect the anesthetic management.
II. Discuss the preoperative evaluation with particular attention to signs and symptoms of airway or cardiovascular compromise and review the data regarding the correlation of preoperative symptoms with the risk of perioperative complications including airway or cardiovascular collapse.
III. Discuss the pertinent findings of radiologic studies and how they pertain to surgical and anesthetic management.
IV. Explore the role of pulmonary function tests and cardiac echocardiogram in terms of predicting risk and affecting anesthetic management.
V. Discuss the option for inducing anesthesia in these patients. Discuss the role of neuromuscular blockade.
VI. Discuss the effects of anesthesia itself on pulmonary mechanics in relation to patients with an anterior mediastinal mass.
VII. Discuss a set of guidelines addressing preoperative and intraoperative management that can help prepare these patients for the operating room.

References: (Short list, I have 13 total)
10) Hammer GB. Anaesthetic management for the child with a mediastinal mass. Pediatric Anesthesia 14: 95-97, 2004