

## **SPA-AAP Pediatric Anesthesiology 2015**

### **PBLD Table # 25**

#### **Title: Neonate, Can't Ventilate: Let Me Count the Ways, in a Child with TEF**

#### **Presenter Listing**

Bishr Haydar, MD  
Assistant Professor  
Department of Anesthesiology, University of Michigan

Gregory B. Hammer, M.D.  
Professor of Anesthesia and Pediatrics  
Stanford University School of Medicine  
Lucile Packard Children's Hospital

#### **Learner Objectives:**

After participating in this activity the learner will be able to:

1. Establish the common pitfalls and challenges in anesthetizing a neonate, focusing on ventilation and monitoring thereof;
2. Illustrate the anesthetic implications of TEF, including types; associated co-morbidities; phenotypic signs of associated co-morbidities; and anesthetic principles;
3. Evaluate and contrast the anesthetic options for rigid bronchoscopy in the neonate;
4. Differentiate common and uncommon causes of intraoperative decreased pulmonary compliance in this patient, and discuss diagnostic and therapeutic maneuvers for:
  - a. Gastric insufflation due to mask ventilation and management strategies in a patient with TEF
  - b. Occluded endotracheal tube (ETT) due to blood and secretions; timing and management
  - c. Pneumothorax; common cause, timing and management;
  - d. ETT malposition and complete occlusion by entry to newly-ligated fistula;
5. Review extubation criteria and decision making for neonates, focusing on the relative risk and benefits of extubating neonates following TEF repair.

#### **Case:**

You have been assigned to care for a one-day old term male infant weighing 2800 g infant with suspected tracheoesophageal fistula (TEF) with long-gap esophageal atresia (EA) presenting for rigid bronchoscopy, TEF ligation and attempted EA repair. The child was added on last night after you left. He has been evaluated by neonatology and is thought to have no other congenital abnormalities. He is on room air with normal vital signs, with open eyes and spontaneous movement, and has a 22 gauge peripheral IV and no other lines.

#### **Questions for Discussion:**

1. What are your main concerns when caring for a neonate?
2. What are the most common perioperative issues/complications that neonates experience? Organize your concerns by system, if possible.
3. Our case is focused on ventilatory issues. Intraoperatively, how can you assess adequacy of ventilation in a neonate?
4. What would be worrisome on exam in this baby? What syndromes or co-morbid issues should you be concerned for?
5. What specific factors predict intraoperative complications or worse outcomes in patients with TEF?
6. What is your preferred induction strategy for patients with TEF? What adverse events typically occur during induction?
7. How can you avoid ventilating the stomach via the fistula? If the surgeons request lung isolation, how can you achieve it?
8. The surgeons want to start with a rigid bronchoscopy. There are no ventilating bronchoscopes available for this size patient. How can you assess the patient's ventilation and depth of anesthesia during this? What is your preferred anesthetic regimen?
9. The bronchoscopy is complete; the patient is intubated. The surgical fellow wants to perform this thoracoscopically and she is skilled in minimally-invasive surgery in children. What do you think constitute contraindications to thoracoscopic surgery in infants? What issues are common? What access do you feel is necessary for this patient?
10. You position the patient left lateral decubitus and the surgeons begin. Shortly after insufflation, the patient becomes acutely hypoxic; lung compliance is noted to be greatly reduced and the blood pressure drops immediately. What could be going on?
11. They desufflate, re-insufflate, and the surgeons ligate the fistula and proceed to attempt the esophageal atresia repair. Ventilation becomes progressively more difficult, although the changes are abrupt. The child starts to desaturate. Auscultation reveals inspiratory and expiratory stridor. What could be going on? What is your first intervention?
12. If you re-intubate, how do you wish to do so? Drapes up/down, lateral/supine? How would you like to visualize the airway - DL, glidescope/videolaryngoscope or flexible fiberoptic?
13. You extubate and re-intubate; the lung compliance dramatically improves. Now the tidal volumes are very large and the patient's blood pressure decreases slightly. You immediately reduce the inspiratory pressures. A few minutes later, the child is again hard to ventilate. Your

fellow immediately extubates again, and the ETT is clean. What is the most likely cause?

14. The child is now reintubated again, and the chest tube is now in place. Your fellow hears wheezing bilaterally. What can cause bilateral wheezing? What other abnormal breath sounds can be misinterpreted as wheezing? The surgeons proceed again; the surgeons no longer see lung movement, and you can't see chest excursion. What could be going on?

15. You reposition the ETT again and the case now proceeds uneventfully. The surgeons ligate the fistula, repair the esophageal atresia, and ask if you want to extubate. Had things gone perfectly, how would you decide whether or not to extubate? What are the criteria for extubation in a neonate? Are there any contraindications specific to a neonate?

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