A TODDLER WITH RESPIRATORY DISTRESS, CYANOSIS AND STRIDOR.

Authors: Herodotos Ellinas, MD and Tatyana Strong, MD
Affiliation: Medical College of Wisconsin, Children's Hospital of Wisconsin

Acute upper-airway obstruction is one of the most frightening and difficult-to-manage scenarios in pediatric anesthesia. The severity of the obstruction ranges from mild to life threatening. Common causes include inflammatory (bacterial tracheitis, epiglottitis and viral laryngotracheitis) mechanical (foreign body, mediastinal mass) and traumatic. The following case will illustrate some key points regarding the diagnosis and management of airway obstruction in a preschool child. While truly dire consequences are possible, prompt recognition and precise treatment of the inciting condition can optimize clinical outcome.

CASE REPORT

A 3 year old Hispanic boy, recently immigrated to the United States, was brought to the emergency department with respiratory distress and fever. He had been in his usual state of health until 3 days prior, when he developed sore throat, cough and low grade fever. His symptoms progressively worsened and he was brought to the emergency department for further evaluation. Upon arrival, he was febrile to 103.6 ^{0}F, tachypneic with labored respirations, and stridorous with SaO_2 of 89% on RA. He appeared hemodynamically stable with bounding peripheral pulses and brisk capillary refill as well as a normal cardiovascular and abdominal exam.

Initial treatment included 40% FIO_2, nebulized albuterol and racemic epinephrine with minimal improvement. A peripheral intravenous catheter was started, labs were drawn and antibiotics initiated. When these interventions failed to improve his clinical picture, he was started on heliox with dramatic improvement. ENT surgeon was then consulted.

Further review of systems revealed history of heart murmur and "small hole in heart" but no exercise limitations. Immunization status was unknown.

Decision was made to proceed with rigid bronchoscopy for diagnosis and definitive treatment. Parents initially refused any procedure but after long discussion, they consented and the child was transported to the operating room awake, with mother and interpreter present. Standard ASA monitors were applied, and the child was sedated with midazolam incrementally administered until he was calm and accepting the mask. Induction was initiated with halothane and FIO_2 of 1.0. With adequate depth of anesthesia, assisted ventilation was attempted with ability to ventilate. Propofol infusion was started and airway was turned over to the surgeon. Spontaneous ventilation was maintained throughout the procedure. Rigid bronchoscopy was performed without incident. Patient's epiglottitis and larynx were normal, but his trachea revealed mucopurulent pseudomembranes consistent with bacterial tracheitis. Tracheal secretions were cleared. He was intubated with an appropriately sized endotracheal tube and transferred to the ICU. He was extubated 48 hours later, uneventfully, as his clinical course improved and was discharged to home several days later.

DISCUSSION

Acute respiratory compromise in children is a common cause of emergency room visits. Differential diagnosis includes life threatening entities such as bacterial tracheitis, epiglottitis and foreign body aspiration (FBA).

This Hispanic preschooler had an indolent course and symptoms more consistent with bacterial tracheitis a disease of children less than 3 years of age. **Bacterial tracheitis** has become more common

than epiglottitis as a life threatening upper airway obstructive illness with *Staphylococcus aureus* as its main etiology. Although AP neck radiographs and laboratory evaluation may provide clues to this diagnosis, complete airway obstruction is the most feared complication and cautious operating room evaluation is warranted. This was not initially done in this child because the severity of his symptoms was not perceived as threatening. Operating room evaluation, though, with rigid bronchoscopy confirmed the ENT surgeon's suspected diagnosis with findings of subglottic edema with ulcerations, erythema and copious mucopurulent tracheal secretions. Antimicrobial coverage with maintenance of artificial airway usually results in excellent clinical outcome just as in this case.

Rigid bronchoscopy in this Hispanic boy, revealed a normal epiglottis the sine qua non of **epiglottitis**. This disease entity classically described in children 2-8 years of age, has a rapid onset with progressive severity of symptoms. The most common causative agent used to be *Haemophilus influenzae type b* but with the introduction of the HIB vaccine in 1988, the incidence of this critical illness due to this organism has decreased by 80-90%. The unknown immunization status of this toddler further complicated the clinical picture but with a normal epiglottis on endoscopy, epiglottitis was ruled out.

Foreign body aspiration (FBA) can also lead to partial or complete airway obstruction. Most commonly seen in children ages 6 months to 2 years of age, FBA may present with similar symptoms as the aforementioned entities. There may be an inciting event of choking and forceful coughing that was forgotten and an infection that persists despite appropriate treatment. Neither of these was present in our case, though history was difficult to obtain even with an interpreter.

Other key points in our case include:

1. The use of heliox as a modality to improve laminar flow in an obstructed airway.
2. History of cardiac murmur and preoperative and intraoperative management
3. Parental rights and children's interests with decisions made to protect the minor.

Upper airway obstruction in children can be anxiety provoking both for providers and family members. Rapid yet methodical management of a critical airway is of paramount importance to achieve the best clinical outcome.

REFERENCES

1...Behrman: Nelson Textbook of pediatrics 17th edition

2. Bernstein, T, Brilli, R, Jacobs, B. Is bacterial tracheitis changing? A 14-month experience in a pediatric intensive care unit. Clinical Infectious Diseases 1998;27:458-462.

3. Blackstock D, Adderley RJ, Steward DJ: Epiglottitis in young infants. Anesthesiology 1987;67(1):97-100.

4. Damm, M, Eckel, HE, Jungehulsing, M. Management of acute inflammatory childhood stridor. Otolaryngology, Head and Neck Surgery 1999; 121:633-638.

5. Grosz, AH, Jacobs, IH, Cho, C, Shears, GJ. Use of helium-oxygen mixtures to relieve upper airway obstruction in a pediatric population. The Laryngoscope 2001; 111:1512-1514.

6. Motoyama, EK, Davis, PJ. Anesthesia for infants and children. Mosby; 1996; 667-673.

7. Miller: Miller's anesthesia 6th edition.

8. Pinnock, R, Crosthwaite, J. When parents refuse consent to treatment for children and young persons. Journal of Pediatric Child Health 2005; 41:369-373.

9. Rotta, AT, Wiryawan, B. Respiratory emergencies in children. Respiratory care 2003; 48(3):248-257.

10. Stroud, RH, Friedman, NR. An update on inflammatory disorders of the pediatric airway: epiglottitis, croup, and tracheitis. American Journal of Otolaryngology 2001; 22(4):268-275.