COMMON PEDIATRIC RESPIRATORY PROBLEMS

INTRODUCTION
Pediatric patients can present with many different types of respiratory problems, including upper and lower airway obstruction and pneumothorax, each with characteristic signs and symptoms.

UPPER AIRWAY OBSTRUCTION
Upper airway obstruction can have a variety of causes including: subglottic or supraglottic edema (Figure 1), choanal atresia, laryngomalacia, tongue swelling, poor pharyngeal motor tone, excessive nasal or oropharyngeal secretions, or a mass lesion in the upper airway.

Children with upper airway obstruction present with increased work of breathing as the patient attempts to inhale against higher than normal resistance in the upper airway. This can be observed as:
- Suprasternal retractions (also called tracheal tugging)
- Sternal retractions (Figure 2), specifically in young infants with a compliant sternum
- Stridor - a high pitched noise occurring during inspiration which results when air is inhaled through a narrowed area
- Stertor - a noise more coarse than stridor, which sounds like a snoring or rattling respiration

Note: Stertor is indicative of obstruction at a higher level (i.e. swelling of the tongue, poor oropharyngeal muscle tone). It can be distinguished from stridor by performing a jaw-thrust maneuver (Figure 3), where the mandible is pulled forward, displacing the tongue anteriorly, relieving the upper airway obstruction. Subglottic edema will not respond to jaw-thrust maneuver, it requires other therapy, such as inhaled racemic epinephrine or steroids.

SPECIFIC DISEASES
Croup
- Edema of the supraglottic and/or subglottic region, usually associated with a viral upper respiratory infection and low-grade fever.
- Patients present with inspiratory stridor and a barking cough.

Epiglottitis
- Edema of the epiglottis, associated with a bacterial infection.
- Typically has a quick progression from being healthy to having a high fever, who is toxic-appearing and has major signs of upper airway obstruction, including inspiratory stridor.
- Often characterized by drooling, which is a child's refusal to swallow due to throat pain.
- Many children also refuse to speak, but those who do exhibit a 'hot-potato voice' in which it sounds like there is something hot in their mouth that they are trying to talk around.
- Many children have a preference for the tripod position (Figure 4), where they lean forward with their neck extended in an attempt to elongate and help open the upper airway.

Note: Epiglottitis is an emergency! It can rapidly progress to complete airway obstruction and cardiac arrest, so if you care for a child with epiglottitis, obtain expert airway help early. Expert help is usually a person with training in anesthesia and the capability to do a surgical airway (emergency tracheotomy) in the event that the
patient cannot be intubated. These children are also very anxious and stressing them more could precipitate further obstruction. So in most cases, it is best to avoid other forms of stress, such as starting IVs or trying to reposition them. Allow them stay in their position of comfort while you gather your expert team.

**LOWER AIRWAY OBSTRUCTION**

Lower airway obstruction can have a variety of causes including: infection, reactive airways disease or asthma, allergic reaction, or pulmonary edema.

Children with upper airway obstruction present with wheezing and increased work of breathing because of delayed emptying of alveoli from narrowed distal airways and higher resistance in the lower airways. This can be observed as:

- Wheezing- coarse whistling sound heard on exhalation or inspiration
- Forced and prolonged expiratory phase
- Suprasternal, intercostal and/or subcostal retractions (Figure 6)
- See-saw respiration (Figure 7)- chest pulls inwards and the abdomen rises with inspiration, chest moves outwards and abdomen inwards with expiration
- Tachypnea

**PNEUMOTHORAX**

Pneumothorax (Figure 8) is when air accumulates in the pleural space in between the lung and chest wall resulting from conditions such as pulmonary infection and mechanical ventilation or traumatic injury to the chest. Clinical signs of pneumothorax include:

- Asymmetrical breath sounds and/or chest rise
- Tracheal deviation, especially with a tension pneumothorax
- With tension pneumothorax, the infant may have signs of venous congestion (distended neck veins) and low cardiac output (tachycardia, hypotension and poor perfusion)

Treatment includes decompression of the pleural space with placement of a chest tube (Figure 9), possibly proceeded by an emergent needle thoracostomy (Figure 10).

**REFERENCES**


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