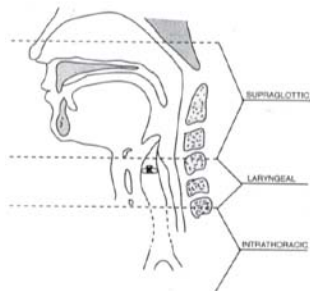


## **SEDATION EFFECTS ON AIRWAY CONTROL AND RESPIRATORY DRIVE**

All sedative drugs suppress the central nervous system in a dose-dependent manner. Loss of airway control and respiratory depression are the most common serious adverse effects associated with sedative drug administration. The greater the degree of sedation, the greater the degree of respiratory depression. Respiratory depression increases when combining sedative drugs or when using large doses of a single drug.

## **THE PEDIATRIC AIRWAY**

The most important feature of conducting safe pediatric sedation is the ability to assess and manage the pediatric airway. The upper airway is composed of three segments; the supraglottic, laryngeal and intrathoracic.



1. Supraglottic – The supraglottic area consists of the pharyngeal structures and is the most poorly supported and collapsible segment of the upper airway. This segment is the most impacted portion of the airway during sedation.

2. Glottic (larynx) – The glottic structures consist of the vocal cords, subglottic area, and cervical trachea. During sedation the most common cause of airway obstruction in this area is laryngospasm.

3. Intrathoracic – The intrathoracic segment consists of the thoracic trachea and bronchi. There are a number of developmental characteristics that distinguish the pediatric airway from the adult airway:

- The pediatric airway is smaller in diameter and shorter in length.
- The young child's tongue is relatively larger in the oropharynx.
- The larynx in infants and young children is located more anteriorly.
- The epiglottis in infants and young children is relatively long, floppy, and narrow.
- In children younger than 10 years of age, the narrowest portion of the airway is below the glottis at the level of the cricoid cartilage.

The small caliber of the pediatric upper airway, the relatively large tongue, and the “floppy” and relatively long epiglottis predispose young children to airway obstruction during sedation. In addition, the large occiput of the infant places the head and neck in the flexed position when the patient is placed recumbent, further exacerbating airway obstruction.

The keys to appropriately managing the pediatric airway during sedation are proper airway positioning and application of positive pressure ventilation when required. Routine management of airway obstruction includes placement of the patient's neck in the sniffing position, often with a rolled towel placed underneath the shoulders and administration of “blow-by” oxygen. If obstruction persists despite these maneuvers, the patient's airway should be repositioned and a chin lift performed to move the supraglottic soft tissue structures, primarily soft palate and

epiglottis, anteriorly and away from the posterior pharynx. If a simple chin lift fails to relieve the obstruction, this should be followed by a jaw thrust and application of positive pressure (PEEP) through a flow-inflating anesthesia bag and mask. Supraglottic obstruction and laryngospasm may be difficult to differentiate. One distinguishing feature of complete laryngospasm is the lack of response to simple airway maneuvers. Failure to relieve the obstruction following application of positive pressure suggests complete laryngospasm and requires positive pressure ventilation with cricoid pressure and endotracheal intubation when necessary.

The 2 most common causes of Pediatric airway obstruction are:

**Pharyngeal Obstruction:** Neuromuscular control of the upper airway (CN IX, X and XII) is inhibited to a greater degree than diaphragmatic activity (phrenic nerve) during sedation/anesthesia.

**Laryngospasm:** The other primary cause of upper airway obstruction during sedation is laryngospasm occurring at the level of the glottis □ Laryngospasm is defined as glottic musculature spasm and may result in partial or complete airway obstruction. Risk factors for laryngospasm include the upper airway secretions, airway manipulation, recent upper respiratory infection, gastroesophageal reflux disease, passive exposure to tobacco smoke, use of an airway device, young age and higher ASA classification.<sup>9</sup> Unlike pharyngeal obstruction simple airway maneuvers do not reverse laryngospasm.

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