

Tonsillectomy/Adenoidectomy

Indications:

T&A is one of the most common ambulatory pediatric surgery procedures in the United States. The most common indications include recurrent or chronic tonsillitis refractory to medical therapy and obstructive adenotonsillar hyperplasia. The association of tonsillitis with peritonsillar abscess or airway obstruction is also an indication for surgical removal. Hypertrophic tonsils may lead to: chronic airway obstruction (OSA), carbon dioxide retention, cor pulmonale, cardiac failure, failure to thrive, dysphagia, halitosis, or persistent pharyngitis.

Preoperative assessment:

Children less than 3 years of age presenting for this surgery require special attention because they have the highest respiratory morbidity following adenotonsillectomy. The indication in this age group is OSA, which has an excellent response to adenotonsillectomy. The gold standard of diagnosis is an overnight sleep polysomnography. The following table defines the severity of the AHI. No pre-op sedation is to be used because these children are high risk due to their: age, comorbidities, and severity of sleep apnea/sleep-disordered breathing.

Pediatric Sleep Studies

Table 4. A Severity Ranking System Based on Polysomnography

	Apnea-hypopnea index	Oxygen saturation nadir
Normal	0-1	>92
Mild OSA	2-4	
Moderate OSA	5-9	
Severe OSA	>10	<80

Peak $ETCO_2$ values and percent of time spent with $ETCO_2 >50$ mm Hg should also be considered when assessing severity.

OSA = obstructive sleep apnea syndrome.

Induction:

Anesthesia usually involves mask induction; establishment of vascular access and tracheal intubation with an oral RAE cuffed tube. Typically tracheal intubation is performed deep (without paralysis) after inhalation induction, 1-3 mg/kg of propofol may be needed to aid to deepen the patient before laryngoscopy. The rationale behind this technique is to avoid the need to reverse the muscle relaxant in the case of a very fast surgery and allows easier resumption of spontaneous ventilation if the plan is to extubate the trachea under deep sedation.

Maintenance:

The procedures are usually short, about 15-30 minutes. After the airway is secured the patient is then positioned with head of bed turned 90 degrees and the FIO₂ should be reduced to the lowest practical level (21-30%) to minimize the risk of airway fire. A cuffed tube will decrease the risk of an airway fire as well. It is best to keep the patient deep during this stimulating surgery; however it is best to avoid nitrous during these airway surgeries to avoid an airway fire.

Pain management:

Opioids are the mainstay of analgesic treatment in this patient population; however children with OSA may be more sensitive to the effect of opioids and reduced doses may be required to prevent postoperative respiratory depression. In patients with severe OSA consider giving no narcotics and giving precedex in place of opioids for analgesia. NSAIDs are not associated with respiratory depression but there is concern for their effect on hemostasis, which has limited their use. Consider the following medications for a standard pain regimen, which would be best to give up front as soon as the IV is established:

1. Fentanyl: 1 mcg/kg
2. Ofirmev: 10 mg/kg (age <2y); 15 mg/kg (age >2y)
3. Precedex: 0.3 – 0.5 mcg/kg
4. Decadron: 0.5 mg/kg (max 20 mg)
5. Zofran: 0.15 mg/kg (max 4 mg)

Emergence:

The patient can be extubated awake or deeply anesthetized provided they are breathing comfortably without episodes or breath holding. There is no evidence that any one method is associated with increased risks of adverse respiratory events. Some anesthesiologists are reluctant to extubate deep when a child with OSA has undergone adenotonsillectomy after the administration of intraop opioids because of the risk of adverse respiratory events. This is the practice at Loma Linda due to the patient's comorbidities. Before extubation it is best to suction the mouth using a red robin or clear suction catheter (Dyleski), do not use a yankauer. Keep the suction midline and gently suction to assess for bleeding.

Postop Complications:

Postoperative hemorrhage and respiratory impairment are the most frequently observed complications. Other complications include: negative pressure pulmonary edema, PONV, and pain. Postop hemorrhage is more common in children older than 10 while respiratory complications such as supraglottic obstruction, breath holding, and need for rescue airway maneuvers is more common in children younger than 3. In many institutions children less than 3 are observed overnight (particularly if they have developmental delay, Down's syndrome, or OSA). Always have your airway equipment and medications available for re-intubation due to uncontrolled bleeding, laryngospasm, or airway obstruction. Postop hemorrhage may occur within the first hour after surgery or more commonly within 2 weeks after the initial surgery. This is due to dislodgement of the eschar on the surgical site requiring surgical exploration and cauterization of the bleeding surface. Usually children have been swallowing blood and therefore should be treated as having a full stomach. The bleeding may be severe enough to cause severe dehydration and placement of a large bore IV and resuscitation may be necessary. During severe bleeding the vocal cords may not be visible, in this case the anesthesiologists should direct the ETT at the site where air bubbles are seen escaping from the glottis opening when an assistant presses on the chest wall to produce forced exhalation.

Reference:

Gregory, George A. *Gregory's Pediatric Anesthesia*. Hoboken: Blackwell Publishing Ltd, 2012. p781-785.