

PERIOPERATIVE MANAGEMENT OF UPPER RESPIRATORY INFECTION

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Question

A 2-year-old child with clear rhinorrhea and a resolving 1 week history of cough presents for inguinal hernia repair. The child has no history of recent fever, malaise, or wheezing. Which of the following treatments, in conjunction with the use of a supraglottic airway (SGA), is MOST LIKELY to reduce the risk of a perioperative respiratory adverse event?

- A. Topical lidocaine administered to the vocal cords after induction of anesthesia
- B. Preoperative administration of inhaled albuterol
- C. Intravenous glycopyrrolate administered with induction of anesthesia
- D. Topical oxymetazoline nasal spray administered preoperatively

Key Points

- Upper respiratory infection (URI) is the most common infection in childhood.
- Exposure to anesthesia and airway instrumentation while the child has an active or recovering URI has been shown to increase the risk of perioperative respiratory adverse events (PRAEs).

Pathophysiology

URIs are usually viral in etiology, but bacterial superinfection is also common. Infants and preschool age children may have 6 to 8 URIs a year. Airway hyperreactivity can persist for at least 6 weeks beyond the resolution of clinical symptoms.¹ Airway hyperreactivity is neurally mediated via increased vagal reflex bronchoconstriction and response to tachykinins.

Anesthetic risk

PRAEs are a major cause for perioperative morbidity and are responsible for 27% of perioperative respiratory arrests in children.² PRAE is defined as coughing, breath holding, hypoxemia, laryngospasm, and/or bronchospasm. The incidence of PRAEs is significantly lower when URI symptoms have resolved for at least 2-4 weeks before the procedure.³

Preoperative management

The decision to postpone an elective procedure depends on the severity of URI symptoms, patient risk factors for PRAEs, the nature of the planned procedure, and the medical and practical disadvantages of postponement.

Table 1. Patient and anesthetic factors impacting anesthetic risk and management of a child with a URI

Patient risk factors³	• Wheezing during exercise or wheezing > 3 times in the past 12 months • Nocturnal dry cough • Family history of eczema, allergies, or asthma • Exposure to tobacco smoke
Anesthetic management	<u>Personnel:</u> Children anesthetized by a non-pediatric anesthesia specialist had a 1.7 times increased risk of PRAEs. <u>Anesthetic Technique:</u> • Volatile agents – sevoflurane has the greatest bronchodilator effect⁴; desflurane should not be used due to increased airway reactivity³ • Induction and maintenance with propofol is associated with a significant reduction of PRAEs compared to sevoflurane.⁴ <u>Airway devices:</u> • The risk of respiratory complications is highest with endotracheal tube (ETT) > supraglottic airway (SGA) > face mask.³

Deep vs awake extubation: Awake SGA removal is associated with higher risk of coughing, but there is no difference in the overall incidence of complications when airway device (SGA or ETT) was removed awake or under deep anesthesia.⁵

Other Medications:

- Premedication with inhaled beta-2 adrenergic agonists and M3 muscarinic antagonists significantly decreases PRAEs.¹
- Intravenous (IV) lidocaine administered before extubation significantly reduced the incidence of laryngospasm, but the effect was short-lived (<10 minutes).¹ Topical lidocaine increases desaturation without reducing laryngospasm.¹
- Preoperative benzodiazepine administration is associated with increased PRAEs.³

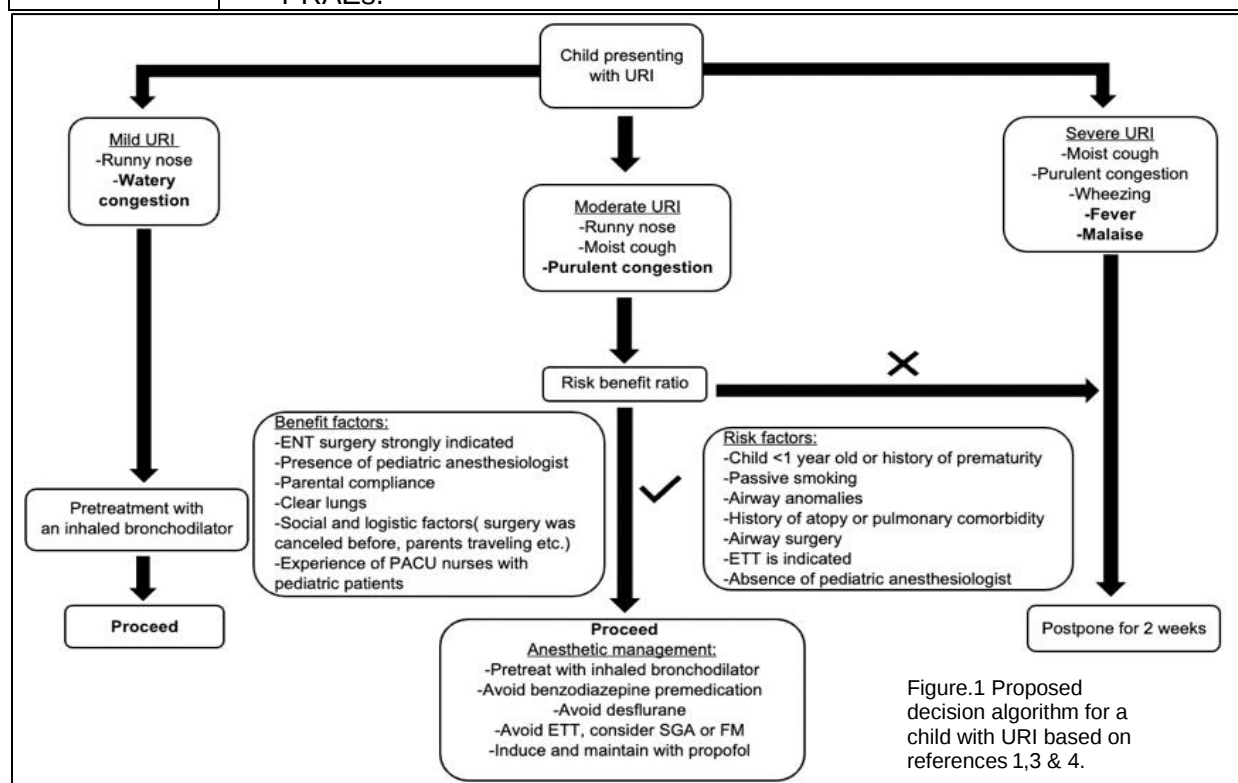


Figure.1 Proposed decision algorithm for a child with URI based on references 1,3 & 4.

References

1. Regli A, Becke K, von Ungern-Sternberg BS. An update on the perioperative management of children with upper respiratory tract infections. *Curr Opin Anaesthesiol.* 2017;30(3):362-7.
2. Bhananker SM, Ramamoorthy C, Geiduschek JM, et al. Anesthesia-related cardiac arrest in children: update from the Pediatric Perioperative Cardiac Arrest Registry. *Anesth Analg.* 2007;105(2):344-50.
3. Von Ungern-Sternberg BS, Boda K, Chambers NA, et al. Risk assessment for respiratory complications in paediatric anaesthesia: a prospective cohort study. *Lancet.* 2010;376(9743):773-783.
4. Ramgolam A, Hall GL, Zhang G, et al. Inhalational versus Intravenous Induction of Anesthesia in Children with a High Risk of Perioperative Respiratory Adverse Events: A Randomized Controlled Trial. *Anesthesiology.* 2018;128(6):1065-74.
5. Tait AR, Malviya S. Anesthesia for the child with an upper respiratory tract infection: still a dilemma? *Anesth Analg.* 2005;100(1):59-65.

Answer: B. Preoperative administration of beta-2 agonists decreases the risk for PRAE. Topical lidocaine, glycopyrrolate, and oxymetazoline do not reduce the risk of PRAEs in children with an active or recent URI (answers A, C, and D). Published: 9/8/23