Perioperative Strategies to Reduce Respiratory Adverse Events in Children with Asthma or Obstructive Sleep Apnea Undergoing Non-Cardiac Surgery

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INTRODUCTION

Children with asthma or obstructive sleep apnea (OSA) undergoing general anesthesia face elevated risk of perioperative respiratory adverse events (PRAEs). Professional society guidance remains variable, creating inconsistent clinical practice.

This review synthesizes guidelines and systematic reviews from 2015-2025 to identify strategies that reduce respiratory complications.

HYPOTHESIS

Targeted preoperative assessment, opioid-sparing anesthesia, and structured postoperative monitoring would reduce respiratory risk.

METHODS

- Followed PRISMA guidelines
- PubMed & MEDLINE searched: 2015-2025
- Eligible: children <18 yrs with asthma or OSA, non-cardiac surgery under general anesthesia/deep sedation
- Two independent reviewers screened & extracted data
- 21 guidelines + 10 systematic reviews met inclusion criteria

PRIMARY OUTCOMES

Laryngospasm, bronchospasm, desaturation, apnea, unplanned ventilation

SECONDARY OUTCOMES

Unplanned admission, ICU transfer, PACU respiratory events, postop opioid use

RESULTS

RISK FACTORS FOR PRAEs

- Severe OSA
- Poorly Controlled Asthma
- Young Age
- Obesity
- Craniofacial Comorbidities
- Neuromuscular Comorbidities

Pre-operative strategies

- Use of short-acting bronchodilators pre-induction
- Optimization of asthma control
- Structured airway risk stratification
- Postponement of anesthesia after URI in high-risk children

Intra-operative strategies

- Opioid-sparing multimodal analgesia
- Avoidance of codeine-containing analgesics
- Careful titration of anesthetic depth
- Use of cuffed endotracheal tubes or laryngeal mask airway (LMA)

Post-operative strategies

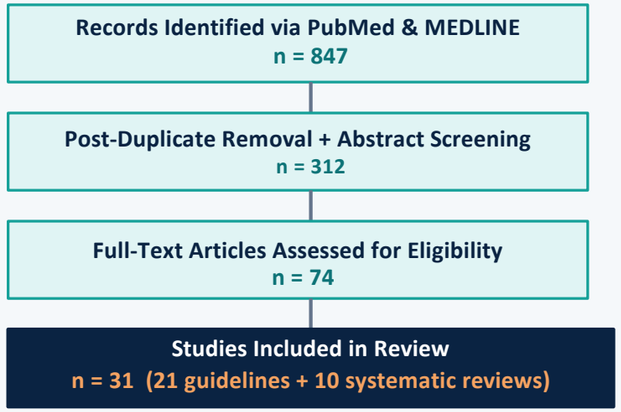
Mild/Moderate OSA

- Early use of CPAP/BiPAP
- Same-day discharge for mild/moderate OSA who maintained stable in PACU

Severe OSA/Significant Comorbidities

- Early use of CPAP/BiPAP
- Continuous pulse oximetry
- Selective overnight admission

PRISMA



DISCUSSION

Structured perioperative assessment and opioid-sparing management reduce respiratory complications in children with asthma or OSA. Consistency across guidelines underscores individualized risk stratification and targeted monitoring. Evidence for asthma management was more limited than for OSA.

CONCLUSIONS

- Targeted perioperative assessment reduces PRAEs
- Asthma optimization improves surgical safety
- Opioid-sparing strategies benefit both asthma & OSA patients
- Additional pediatric asthma-focused research is needed