OBJECTIVE
The objective of this systematic review is to examine current published evidence regarding risk factors for, diagnosis of, and treatment recommendations for NPPE in the postoperative period.

INTRODUCTION

• NPPE often occurs during the removal of the endotracheal tube or supraglottic airway
• Onset of NPPE frequently occurs within minutes of upper airway obstruction with rapid onset of hypoxia and acute pulmonary edema
• While NPPE is a rare complication of anesthesia, it is a true post-anesthesia emergency and requires immediate identification and intervention by the anesthesia provider
• There are currently no sizeable recent clinical studies available in the literature characterizing risk factors, diagnosis, and treatment NPPE during the postoperative period
• No evidence-based clinical guidelines exist for diagnosis and treatment

METHODS

• Inclusion criteria
  • Studies from peer reviewed journal articles published from 2016-2020
  • NPPE after surgical procedure
• Exclusion criteria
  • Older than 5 years
  • Written in a foreign language
  • Pulmonary edema not in postoperative period
  • Nonhuman subjects
• Databases included: ScienceDirect, CINHAL, Ovid, MEDLINE, and PubMed
• Search terms: NPPE and anesthesia
• 220 articles screened; 11 articles reviewed after meeting inclusion criteria

REFERENCES
Available upon request

“Postoperative Negative Pressure Pulmonary Edema (NPPE)"
Roger Brewer
Faculty Advisor: Tamara Carter, DNP, APRN, CRNA

REVIEW OF LITERATURE

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<tr>
<th>Study and Study Type</th>
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CONCLUSIONS

• Patient characteristics
  • Mostly young, healthy, patients with normal preoperative examination
  • Twice as many males than females
  • Often after witnessed laryngospasm or another mechanical occlusion of the upper airway
  • A few cases occurred after sugammadex
• NPPE Presentation
  • Hypoxia; respiratory distress; adventitious lung sounds, mainly crackles and rales; production of pink, frothy sputum; and abnormal chest radiography including CXR and/or CT chest showing evidence of perilatral infiltrates and opacities. Psychomotor agitation. Two cases reported hemoptysis
• Treatments provided for NPPE varied greatly, but mostly focused on supportive care
  • Ensure airway patency usually with positive pressure ventilation via invasive or noninvasive mechanical ventilation
• Amounts of FIO2 required and administered varied
  • Some cases reported treating with steroids, sedation, and/or elevation of head of bed
• Some articles report diuresis and fluid restriction, while others administered IV fluids.
  • The use of bronchodilators was noted in a few of the studies but was reported as not supported by randomized trials
• The use of steroids in NPPE was also reported as controversial and requires further research
• Antibiotics were administered in some cases, although NPPE is not an infectious process

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“The Spirit of God has made me; the breath of the Almighty gives me life”
(Job 33:4, NIV)