International Journal of Medical Anesthesiology

E-ISSN: 2664-3774
P-ISSN: 2664-3766
Impact Factor (RJIF): 5.66
www.anesthesiologypaper.com
IJMA 2026; 9(1): 01-02
Received: 01-10-2025
Accepted: 05-11-2025

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Perioperative bronchospasm during rigid bronchoscopy in an infant with ventricular septal defect: A case report

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DOI: https://www.doi.org/10.33545/26643766.2025.v9.i1a.625

Abstract
Foreign body aspiration is a frequent pediatric emergency requiring urgent airway intervention. Rigid bronchoscopy under general anesthesia is the gold standard for management. However, it may be complicated by perioperative bronchospasm, particularly in infants with airway inflammation and hyperactivity. We report an 11-month-old infant with a small ventricular septal defect (VSD) who developed severe bronchospasm and acute desaturation during rigid bronchoscopy for foreign body removal, successfully managed with prompt airway control and multimodal bronchodilator therapy.

Keywords: Rigid bronchoscopy, pediatric anesthesia, foreign body aspiration, bronchodilator therapy

Introduction
Foreign body aspiration accounts for significant morbidity and mortality in infants and young children [1, 3]. Rigid bronchoscopy remains the definitive diagnostic and therapeutic modality for airway foreign bodies [1]. Airway manipulation, recent aspiration, and inflammation predispose pediatric patients to perioperative bronchospasm [2, 5]. The presence of congenital heart disease, even when hemodynamically insignificant, may further reduce cardiopulmonary reserve and exacerbate hypoxemia during acute airway events [4].

Case Presentation
An 11-month-old female infant weighing 7 kg presented with a history of foreign body inhalation one day prior to admission. The parents reported an acute choking episode followed by persistent cough and respiratory distress.
On examination, the child had decreased air entry on the right side.
Preoperative oxygen saturation was 94% on room air.
The child was a known case of congenital heart disease, diagnosed at 3 months of age with Echocardiography showing a small perimembranous ventricular septal defect measuring 2.5 mm with left-to-right shunt with left atrial and left ventricular dilatation, for which diuretics were initiated at 7 months of age and stopped 10 days prior to surgery as the child was clinically asymptomatic from a cardiac standpoint, with no history of failure to thrive or recurrent respiratory infections.
A repeat echocardiogram on the day of surgery showed a small VSD with insignificant shunt and normal chamber dimensions.

Anesthetic Management
Standard ASA monitoring was applied. Adequate fasting hours were ensured. Premedication with
Inj: Glycopyrollate 70 µg
Inj: Dexamethasone 1 mg
General anesthesia was induced with
Inj. Etomidate 4 mg, in incremental doses to achieve adequate depth of anesthesia
A low dose of Inj. Propofol (10 mg), to blunt sympathetic response
Inj. fentanyl 5 µg, and Inj. Atracurium 4.5 mg.

Etomidate was chosen due to its cardiovascular stability in children with congenital heart disease.
The patient was preoxygenated with 100% oxygen via face mask. Intermittent positive-pressure ventilation was continued until complete neuromuscular paralysis was achieved. High-flow nasal cannula oxygen was employed for apneic oxygenation. The patient was then handed over to the otolaryngology team for rigid bronchoscopy, during which intermittent positive-pressure ventilation was maintained through the side port of the bronchoscope as part of a shared-airway technique. Depth of Anesthesia was maintained using sevoflurane.

Intraoperative Complication
Following airway manipulation for rigid bronchoscopy, the patient developed severe bronchospasm with rapid desaturation to 65%. The procedure was abandoned, and the child was intubated and ventilated with 100% oxygen. Bronchospasm during rigid bronchoscopy is a known complication in pediatric patients, particularly following recent foreign body aspiration [2, 5].

Management included
Inhaled salbutamol and budesonide via the endotracheal tube.
Intravenous Inj. Deriphylline 12mg diluted in 6 ml NS over 10 min
Inj. dexamethasone 2 mg repeated
Inj. hydrocortisone 50 mg- to help mitigate underlying airway inflammation and edema.
Gradual improvement in airway compliance and oxygenation was observed, with oxygen saturation improving to 97% [2, 6].

After stabilization and resolution of bronchospasm, the trachea was extubated, and the patient was handed over to the otolaryngology team for reattempted bronchoscopy. Rigid bronchoscopy was subsequently reattempted. The foreign body was identified as a piece of chicken bone lodged at the carina and abutting the right main bronchus. Retrieval resulted in minor tracheal mucosal trauma, which was managed with adrenaline-soaked cotton pledgets, achieving adequate hemostasis.

Postoperative Course
Following completion of rigid bronchoscopy, a supraglottic airway device was placed and maintained until full reversal of neuromuscular blockade was achieved. The device was removed uneventfully in the operating room. The patient was closely monitored until she was fully conscious, alert, and active. Nebulization with budesonide was administered postoperatively to reduce airway inflammation. No further episodes of bronchospasm or respiratory compromise were observed. The postoperative recovery was uneventful, and the patient was discharged after 48 hours of observation. At the first follow-up visit one week later, the patient remained asymptomatic with no respiratory complaints.

Conclusion
This case highlights the importance of anticipating bronchospasm during rigid bronchoscopy in infants with recent foreign body aspiration. The presence of congenital heart disease may further compromise physiological reserve and result is rapid desaturation in rigid bronchoscopy Early recognition, prompt airway control, and multimodal bronchodilator therapy are crucial for favorable outcomes.

Conflict of Interest: Nil

Funding: Nil

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How to Cite This Article
Manahil S, Shifaat F, Ishaq S. Perioperative bronchospasm during rigid bronchoscopy in an infant with ventricular septal defect: a case report. Int J Med Anesthesiol. 2026;9(1):01-02.