

Pulmonary aspiration and management with immediate rigid bronchoscopy

S. Sharma, P. Sawant

Department of Paediatric Anaesthesia, BJ Wadia Hospital for Children, Mumbai, India

Corresponding author: S. Sharma, Department of Paediatric Anaesthesia, BJ Wadia Hospital for Children, Mumbai, India.

Email: drsudivyasharma@gmail.com

Key points

Pulmonary aspiration of gastric contents remain a risk in modern anaesthesia, especially with the use of face mask or LMA. We present a case of intraoperative pulmonary aspiration in an infant posted for orchidopexy and its successful management with immediate bronchoscopy guided suction of aspirate along with nebulization, oxygen support, bronchodilators, chest physiotherapy, antibiotics and lateral positioning.

Abstract

Pulmonary aspiration of gastric contents remains a risk in modern anaesthesia. Aspiration is considered to have occurred if any obvious nonrespiratory secretions are suctioned via a tracheal tube, there is chest x-ray evidence of new pathology after an incident and/or there are signs of new wheeze or crackles after an episode of regurgitation or vomiting. The risk factors include emergency cases, obesity, inadequate anaesthesia, inadequate fasting, opioid medication, lithotomy position (increased intra-abdominal pressure), gastrooesophageal reflux, hiatus hernia, tracheal tube problems, difficult intubation/airway management, gastrointestinal pathology (acute and/or chronic), anxiety, trauma, pregnancy, neurological deficit (pathology or sedation), dyspepsia, inadequate reversal, diabetes, sepsis and renal failure. The majority of cases occur with either face mask or LMA anaesthesia. This highlights the importance of adherence to starvation guidelines, risk assessment for aspiration, appropriate use of rapid sequence induction but also of checking suction before the start of each case.

We present a case of intraoperative pulmonary aspiration in an infant posted for orchidopexy and its successful management with immediate bronchoscopy along with supportive measures.

Keywords: aspiration, suction, rigid bronchoscopy, pneumonitis, paediatric

Introduction

Pulmonary aspiration of gastric contents remains a risk in modern anaesthesia. It is a life threatening emergency, which requires prompt action.¹ Prolonged retention of a foreign body leads to formation of granulation tissue, making its extraction even more difficult.² Aspiration is considered to have occurred if any obvious non respiratory secretions are suctioned via a tracheal tube, there is chest x-ray evidence of new pathology after an incident and/or there are signs of new wheeze or crackles after an episode of regurgitation or vomiting.³ Perioperative aspiration is rare in children, occurring in 1 in 1162 children, but is about three times more common than in adults.

Case report

A one year male child was posted for orchidopexy in view of undescended testis. Informed consent was taken, adequate fasting confirmed and child was premedicated with oral midazolam half hour prior to surgery.

In the operation theatre, monitors were attached and general anaesthesia was planned with caudal epidural block. Inj. Fentanyl, inj. Propofol were used for induction. Patient was breathing spontaneously with face mask and was maintained on oxygen, air and halothane mixture.

Intraoperatively end tidal carbon dioxide (EtCO₂) and fraction of inspired carbon dioxide (FiCO₂) were rising, breathing was noisy and laboured, manual ventilation with bag showed resistance. To facilitate better ventilation, laryngeal mask airway (LMA) was inserted, but the child's respiratory pattern didn't improve.

After the surgery, LMA was removed in deep plane of anaesthesia. It was stained with brownish material. Oro-gastric suction also retrieved brownish material. It seemed like tea and biscuit mixture.

The child kept coughing, was tachypneic and dyspneic; could not maintain saturation without oxygen. He was kept in lateral position, nebulized with bronchodilators. The auscultatory findings were bilateral coarse crepts, wheeze and conducted sounds. Aspiration of stomach contents was the likely cause. Chest x-ray indicated right upper lobe collapse (Fig. 1), hence immediate rigid bronchoscopy was planned. Bronchoscopy for removal of aspirated foreign body (FB) is an accepted gold standard.⁴ The child was induced again with fentanyl and propofol and bronchoscopy done using intermittent succinylcholine. Particulate matter was suctioned out (Fig. 2).

The child improved clinically, saturation improved and post bronchoscopy x-ray film showed better picture, collapse resolved, though pneumonitis was present (Fig. 3). Nebulization, oxygen support, bronchodilators, chest physiotherapy, antibiotics, lateral position were compo-

nents of further management which lead to complete recovery of child the following day (Fig. 4).



Figure 1. Post aspiration CXR showing right upper lobe collapse.



Figure 2. Aspirate from Bronchoscopy.



Figure 3. CXR Post bronchoscopic suctioning of aspirate.

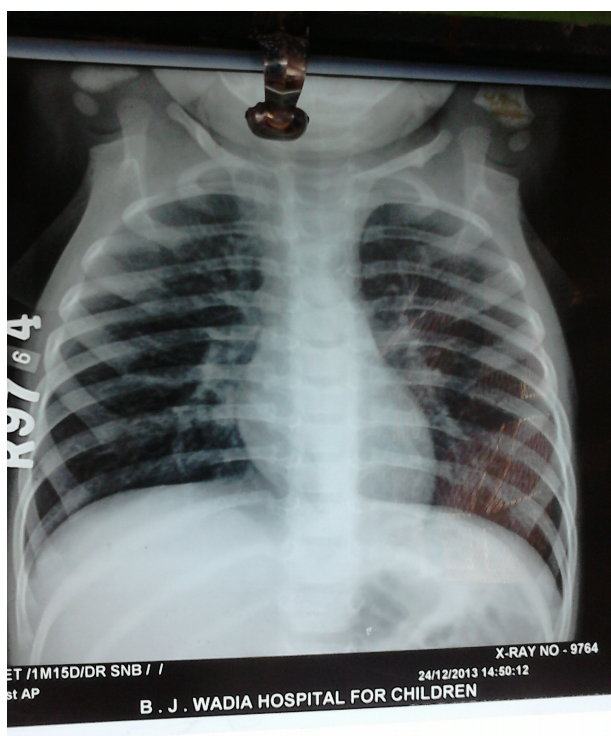


Figure 4. CXR on day 2 showing improvement in lung fields.

Discussion

The risk factors of aspiration include emergency cases, obesity, inadequate anaesthesia, inadequate fasting, opioid medication, lithotomy position (increased intra-abdominal pressure), gastro-oesophageal reflux, hiatus hernia, tracheal tube problems, difficult intubation/airway management, gastrointestinal pathology (acute and/or chronic), anxiety, trauma, pregnancy, neurological deficit (pathology or sedation), dyspepsia, inadequate reversal, diabetes, sepsis and renal failure.² The majority of cases occur with either face mask or LMA anaesthesia. While the majority of incidents occur at induction of anaesthesia, a significant proportion presented during the maintenance and recovery periods. After aspiration, the course and prognosis is influenced by age, sex, ASA status, co-morbidities, type of anaesthetic, evidence of active vomiting or passive regurgitation, type of material aspirated, when the incident occurred, anti-aspiration prophylaxis, fasting status, effects of aspiration, type of airway in use, anaesthetic management after the incident, factors promoting and reducing severity of incident and potential alleviating measures taken.

Ours was a case of unanticipated aspiration. The cause could be unreliable history of fasting, inadequate anaesthesia, unprotected airway, anxiety, delayed gastric emptying, perioperative regurgitation or vomiting, etc. It is a complex interplay between patient's risk factors, anaesthetic technique and surgical procedure.

Conclusions

Despite advances in anaesthesia, aspiration still remains a problem as fasting guidelines are being relaxed to allow patients free access to fluids closer to the induction of anaesthesia. Surgical procedures which have previously mandated airway protection (tonsillectomy, laparoscopy) are now being undertaken with LMA.^{5,6} This highlights the importance of adherence to starvation guidelines, risk assessment for aspiration, appropriate

use of rapid sequence induction but also of checking suction before the start of each case.

References

1. Bist SS, Varshney S, Kumar R, Saxena RK. Neglected bronchial foreign body in an adult. *JK Sci* 2006;8:222-4.
2. Goyal S, Lyngdoh NM, Goyal A, Shunyu NB, Dey S, Yunus M. Impacted foreign body bronchus: Role of percussion in removal. *Indian J Anaesth* 2013;57:630-1.
3. Kluger, M. T. and Short, T. G. (1999), Aspiration during anaesthesia: a review of 133 cases from the Australian Anaesthetic Incident Monitoring Study (AIMS). *Anaesthesia*, 54:19–26.
4. Lerra S, Raj R, Aggarwal S, Saini VK, Nagarkar NM. A long standing foreign body in bronchus in an adult. A diagnostic dilemma. *JK Sci* 2011;13:27-8.
5. Kallar S & Everett LL. Potential risks and preventative measures for pulmonary aspiration: new concepts in preoperative fasting guidelines. *Anesthesia and Analgesia* 1993;54:171–82.
6. Bapat P & Verghese C. Laryngeal mask airway and the incidence of regurgitation during gynaecological laparoscopies. *Anesthesia and Analgesia* 1997;54:139–43.