Broken safety pin in bronchus - Anaesthetic considerations

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ABSTRACT

Safety pins are not commonly aspirated objects in infants and form only a small fraction of all the metallic foreign body (FB) which accounts for 4.4% of all foreign bodies found in tracheobronchial tree. Bronchoscopy procedure has various complications, in addition to failure to remove FB due to its impaction, especially with metallic pointed objects ending up in open surgical removal. Infant with inhaled foreign body are always a challenge to anaesthetist. We had one such case of broken safety pin impacted in the wall of right bronchus of an infant with failure to remove on repeated attempts at rigid bronchoscopy.

Key words: Anaesthesia, bronchi, foreign body aspiration, infant, thoracotomy

INTRODUCTION

Foreign body (FB) aspiration is common in children, occurring maximum in less than 3 years of age. This emergency condition is an important proportion of accidental deaths. The majority of aspirated objects are organic, nuts and seeds being the most common. The incidence reported for metallic FB aspiration in children is 4.4%. The exact incidence for safety pin aspiration in infants could not be traced. We had a case of inhaled broken safety pin which could not be procured even on repeated attempts at rigid bronchoscopy. The unusual type of inhaled impacted FB demanding prompt anaesthetic management under limited available facilities lead us to report this case.

CASE REPORT

A 1-year-old, 9-kg female infant was brought in emergency with alleged history of inhaled FB. There was history of coughing and dyspnoea immediately following aspiration. Child had tachycardia and tachypnoea with mild respiratory distress on presentation. X-ray chest revealed the presence of a broken safety pin in right main bronchus [Figure 1]. Bronchoscopic removal of FB was planned immediately with written informed parental consent. Monitoring was established with pulse oximetry (SpO2), electrocardiogram (ECG) and noninvasive blood pressure (NIBP).

Child was premedicated with glycopyrrolate (0.1 mg), and induced with i.v. propofol (25 mg) and succinyl choline (15 mg). The airway was handed over to surgeon for rigid bronchoscopy after ventilating with 100% O₂. During the procedure, ventilation was accomplished via manually operated pressure-regulated jet from the
side port of the bronchoscope. Repeated attempts at removal failed. Anticipating the delay in procedure, Propofol infusion was started to maintain the depth of anaesthesia. The surgeon had to withdraw from the right bronchus to prolong attempts repetitively to maintain saturation. Finally, unsuccessful with bronchoscopic removal, considering possible complications, decision for its open surgical removal via right thoracotomy was taken. The airway was secured with a single-lumen uncuffed endotracheal (ET) tube which was passed via cords into the left main bronchus using the traditional tilting of the head to right side method, as facilities for paediatric double lumen tube/fibreoptic/bronchial blockers were not available. The ET tube was then fixed at 13 cm at mouth. Left-sided endobronchial tube position was confirmed by auscultation. The child was taken on controlled ventilation maintaining anaesthesia with sevoflurane in oxygen and atracurium, and i.v. fentanyl administered for added analgesia. SpO2, ECG, NIBP and temperature were monitored. The EtCO2 could not be monitored due to non-functioning of the module. While intubating, the child had an episode of bradycardia (HR 45/min) which responded to i.v. atropine.

During the initial period, till right bronchial incision was closed after procuring the broken safety pin, 100% oxygen was required to maintain oxygen saturation of more than 98%. After the closure of bronchial incision, the tracheal tube was withdrawn up to the carina and ventilation of both the lungs started. Nitrous oxide (60%) in oxygen was then started. Patient was administered 3rd–7th intercostal nerve blocks for post operative analgesia before extubation. The infant recovered well from anaesthesia and was discharged from hospital on the 7th postoperative day.

**DISCUSSION**

The incidence of safety pin aspiration has increased in the recent years with increasing use of safety pins, especially among young women[4] and adolescent girls.[5] Rigid bronchoscopy for removal of FB is the gold standard, though successful removal by flexible bronchoscopy has also been reported.

Suggestive history is important in diagnosis as symptoms and radiological studies may sometimes miss the FB. Radiological imaging in the present case was helpful in both diagnosis and localisation due to the metallic nature of the FB. Emerging diagnostic modalities are thoracic computed tomography (CT) and virtual bronchoscopy, though their cost and limited availability are the precincts for their extensive use.

Various techniques of anaesthesia induction, maintenance and ventilation (spontaneous/assisted/ controlled) have been described in literature with or without the use of neuromuscular blocker depending on personal expertise and experience. The rationale is to ensure adequate depth to avoid coughing, bucking, and movements as airway trauma and rupture are potential fatal complications during rigid bronchoscopy. Of the various techniques, jet ventilation has been shown to decrease the incidence of intraoperative hypoxaemia compared to manual controlled and spontaneous ventilation.[6]

There are limited options for lung isolation in infants [endobronchial tubes and univent (Fuji Systems) of small sizes are unavailable]. Successful use of paediatric double lumen Marraro tube has been documented.[7] As the option of bronchial blocker was not available with us, we went for the endobronchial intubation by passing the tube through the vocal cords then rotating it to make its bevel face right, thereafter rotating the patient’s head to right and advancing it to enter the left bronchus.

**CONCLUSION**

All anaesthetists dealing with foreign bodies in bronchus, especially such ones with sharp edges should get prepared for single lung ventilation and/or thoracotomy during pre-anaesthetic preparation. Single lung ventilation in infants may be accomplished with single-lumen tube.

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