



CASE REPORT

Anaesthesia for a Child with Bronchial Impacted Foreign Body: A Case Report

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Abstract

Children often have a habit of inhaling or swallowing small objects around them. At the age of 8-9 months infant develop good pincer grasp, they start picking up things around them. We present a 8 month old male child with an impacted tracheal foreign body since 2 weeks, due to delay in the diagnosis. Removal of foreign body was difficult with rigid bronchoscopy inserted through the oral cavity. Bronchoscopy procedure has various complications, and it is more so in the impacted foreign body case. Infant who has inhaled a foreign body always pose a challenge to the anaesthetist. Certain cases where it is difficult to remove the foreign body with bronchoscope, removal through tracheostomy incision is indicated.

Keywords:

- Foreign Body
- Bronchoscopy
- Bronchospasm
- Bradycardia
- Anesthesia

Introduction

Foreign body aspiration is very common in children, it occurs in higher rate in children less than 3 years of age. Cases of tracheobronchial foreign body aspiration are often seen emergency cases of childhood, any delays in diagnosis and treatment do result in serious morbidity and mortality [6]. This emergency condition is an important proportion of accidental deaths [1]. The majority of aspirated objects are organic, nuts and seeds being the most common [2]. The exact incidence of aspiration of bead in a child could not be traced. We had a case of swallowed broken bead which was deeply impacted in the wall of right bronchus which could not be removed with repeated attempts with rigid bronchoscope through oral cavity. The deeply impacted foreign body in the bronchus required

tracheostomy for the removal. The adequate anaesthetic management for the same lead us to report this case.

Case Report

A 8 month old, 7 kg male infant was brought in with history of cough, cold, fever. Child had tachycardia and tachypnoea with mild respiratory distress. Child suffered an episode of bronchospasm for which i.v. bronchodilators were given and the child was immediately shifted to PICU for further management. Patient suffered another episode of bronchospasm and bradycardia for which patient was intubated and electively ventilated for 1 day.

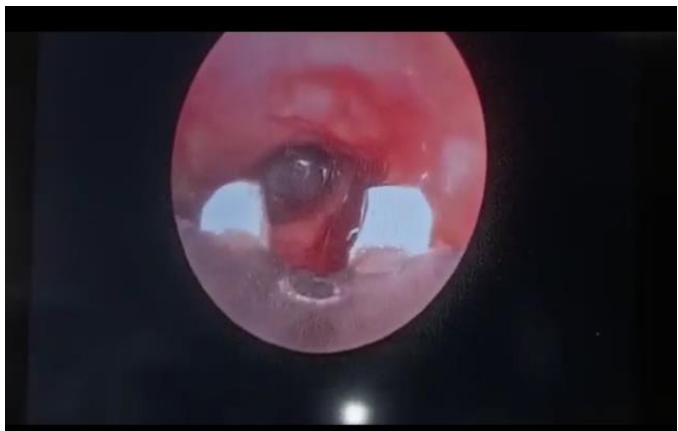


Figure 1

Extubation was done after the vital condition of the patient stabilised. Post extubation infusion of inj. Ketamine and inj. MgSO₄ was started. Following these episodes, a CT chest (P+C) + virtual bronchoscopy was done which revealed presence of 4 x 6 x 3.7mm sized soft tissue density in the trachea at the level of thyroid gland likely suggestive of a foreign body. The delay in the diagnosis lead to life threatening complications in the infant. Bronchoscopic

removal of the foreign body was planned after taking written informed parental consent for the procedure and consent for emergency tracheostomy. Monitors were attached including pulse oximetry (SpO₂), electrocardiogram (ECG), and non-invasive blood pressure (NIBP).

The infant was premedicated with inj.Glycopyrrolate 35mcg i.v., inj.Ondansetron 0.56mg, inj.Ketamine 10 mg, inj.Fentanyl 7 mcg and induced with inj.Propofol 14 mg and Succinylcholine 14 mg. Patient was ventilated with 100% O₂ for 3 mins then handed over to the surgeons for rigid bronchoscopy. During the procedure, patient was ventilated via manually operated pressure-regulated jet from the ventilating port of the bronchoscope with 100% oxygen. Repeated attempts at removal failed with the rigid bronchoscope inserted through the oral cavity. Maintenance of anaesthesia was done using inj.Atracurium and Sevoflurane. Following the unsuccessful attempt with the rigid bronchoscope through oral cavity, decision of removing it through tracheostomy lumen was taken. Tracheostomy was done under local infiltration and a tube of 3.5mm was inserted into the trachea. Inj.PCM 50mg given for additional analgesia. After ventilating the patient with 100% oxygen for 3 mins through the tracheostomy, patient was handed over to the surgeons. An attempt was made to remove the foreign body through the tracheostomy lumen. Intraoperative anaesthesia was maintained with 100% oxygen and sevoflurane through the ventilating port of the rigid bronchoscope. High flow oxygen @ 15 Litres through nasal prongs was given throughout the procedure, which prevented any episode of hypoxaemia. The foreign body was removed successfully after multiple attempts through the tracheostomy lumen. Patient was then reversed after spontaneous efforts were resumed. The infant was shifted to ward on oxygen support at @ 6L/min. Post-operative vitals were stable. Tracheostomy tube was removed on post-operative day 5, and the stoma was closed. The infant was discharged on post-operative day 10.

Discussion

The foreign body aspiration can be a life threatening emergency in children. Presentation of FB aspiration is a triad of coughing, choking and wheeze [7]. An aspirated solid foreign body may dislodge further below in respiratory tract. The lodgement of foreign body occurs more commonly in the right bronchus than the left and less often in larynx and trachea [8], this is because the right main bronchus is more vertical and is having larger diameter. If the object is large enough to cause nearly complete obstruction of the lumen, bronchospasm may occur. The diagnosis of a tracheobronchial foreign body requires a high index of suspicion and early management to prevent morbidity and mortality due to delayed or inappropriate diagnosis [3,4]. Suggestive history and associated symptoms are important for early diagnosis. Radiological correlation is vital for confirmation of the diagnosis. X-ray chest may be normal in many cases. Most common x-ray finding is unilateral emphysema or hyperinflation particularly if FB is located in bronchus [9]. High degree of suspicion and thoracic computed tomography (CT) helped in the diagnosis in this case. Virtual bronchoscopy is a recent advance, which is effective but an expensive technique. Various methods of anaesthesia technique of 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 of the anaesthesia provider [5]. It is necessary to achieve adequate depth to prevent coughing, bucking

and movements as trauma to the airway is potential fatal risk during rigid bronchoscopy. Jet ventilation with intermittent apnoea technique prevents hypoxaemia. Muscle relaxation, if necessary can be achieved by using succinylcholine by bolus or intermittent doses or non-depolarising relaxants; shorter acting agents (eg. mivacurium or atracurium) may be used, to avoid prolonged neuromuscular blockade at the end of a short duration bronchoscopy. Use of muscle relaxation requires controlled ventilation, prevents coughing, trauma and facilitates removal of foreign bodies through the vocal cords. In our study succinylcholine was used for the muscle relaxation. A variety of ventilator techniques can be used during rigid bronchoscopy, following hyperventilation with 100% oxygen for denitrogenation and to lower PaCO₂. Oxygen can be delivered at high flow rates (10-15 litre/min) by apnoeic oxygenation without actually ventilating the patient. Even though satisfactory oxygenation can be achieved for long periods, apnoea should not be exceeded beyond 5 minutes because of carbon dioxide accumulation [10].

Ventilating bronchoscope: Patient is ventilated through side port of bronchoscope with oxygen through a tubing. Chest movements can be observed, high FiO₂ is required to ventilate patient. If saturation falls, the bronchoscope can be withdrawn into the trachea and patient is ventilated with 100% oxygen. Repeated bronchoscopic attempts may lead to laryngeal oedema and needs deeper plane of anaesthesia [11].

Indications of tracheostomy for removal of foreign body are- subglottic foreign body of long duration, impacted foreign body, sharp subglottic foreign body and large foreign body [12]. In our case the long duration and impaction of foreign body in right bronchus required removal through tracheostomy.

High flow nasal oxygen provides evident advantage. Further research needs to be done on the use of high flow nasal oxygen during such cases.

Conclusion

All anaesthesia providers dealing with such cases of impacted foreign body should be prepared for emergency tracheostomy and well informed consent should be obtained preoperatively. Use of high flow nasal oxygen for prevention of hypoxaemia should be encouraged.

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Conflict of Interest: None

Ethical Consideration: None

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