

Case Report

Anaesthetic Management of Subglottic Foreign Body

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Abstract

Subglottic foreign bodies pose an anaesthetic challenge in view of their impending or existing airway obstruction requiring urgent rigid bronchoscopy and removal. Here, we present the case of a nine year old boy who had aspirated a whistle. The clinical signs, diagnosis and management of a subglottic foreign body are discussed.

Keywords: Foreign body; Subglottic

Key messages: Subglottic foreign bodies need rigid bronchoscopy and removal. The anaesthetic management is discussed.

Introduction

Subglottic foreign bodies pose an anaesthetic challenge. They constitute about 8% of all tracheobronchial foreign bodies [1]. Subglottic foreign bodies need urgent management as their mere presence in that area indicates their large size or adherence to the laryngotracheal wall. They may be removed by direct laryngoscopy, rigid bronchoscopy or tracheotomy.

Case

A nine year old boy weighing 18 kg presented for rigid bronchoscopy and Foreign Body (FB) removal. He had aspirated a whistle 8 days earlier following which he developed a cough that had subsided after a day. His only complaint was hoarseness of voice since the FB aspiration. He was being treated for FB of the digestive tract and was referred to a tertiary care centre when he had a violent bout of cough and expelled a portion of the FB. On examination he had no respiratory distress or stridor. There was a mild whistling sound during expiration on auscultation over the trachea. His respiratory rate was 16/min and room air SpO₂ was 99%. Careful examination of the radiograph of neck and chest showed no abnormality.

The child arrived in the operating room with an intravenous line *in situ* where standard monitors including ECG, SpO₂ and NIBP were

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applied. He was premedicated with intravenous dexamethasone 2 mg, hydrocortisone 40 mg, glycopyrrolate 0.1 mg and fentanyl 40 µg. Anaesthesia was induced intravenously with propofol 80 mg in aliquots of 20 mg and an infusion of propofol was started at 8 mg/kg/hour. He was allowed to breathe 100% O₂ through a face mask using a Jackson Rees circuit. His heart rate was 110 per minute, blood pressure 84/56 mmHg and saturation 98%. Direct laryngoscopy was done and the vocal cords sprayed with 10 mg of 2% xylocaine. Injection lidocaine 20 mg was given intravenously to reduce the response to intubation and after 60 seconds, the child was positioned with a shoulder roll and direct laryngoscopy was done by the pediatric surgeon who identified a subglottic FB. It was a hollow plastic tube facing end on. Spontaneous ventilation was maintained throughout the procedure and 100% O₂ was insufflated using an open circuit. The child did not cough or buck. The surgeon grasped the FB circumferentially using an optical forceps but was unsuccessful in retrieving the FB as the entire assembly was too large to negotiate the glottis. Inadequate relaxation of the cords was suggested as a possible cause for the difficulty. A rigid bronchoscope was inserted and the FB was maneuvered into the right bronchus. After ensuring the effectiveness of ventilation through the ventilating port of the bronchoscope, neuromuscular blockade was achieved with atracurium 10 mg intravenously and the propofol infusion was stepped down to 6 mg/kg/hour. Two minutes later, another attempt at FB retrieval was made but this was also futile. The vitals remained stable with a heart rate of 120/min, BP 96/60 mmHg and saturation 98-100%. Keeping all equipment ready for tracheotomy, a third attempt was made and this time the rim of the cylindrical FB was held between the limbs of the optical forceps (alligator) and it was successfully removed in total. Examination of the FB (Figure 1) showed that it consisted of two plastic tubes placed coaxially within each other and both had been removed together. A check bronchoscopy was done to identify any retained piece. The rigid bronchoscope was removed and the trachea intubated with 4.5 mm internal diameter cuffed endotracheal tube to enable mechanical ventilation and tracheobronchial suctioning. The child showed signs of spontaneous respiratory efforts around 20 minutes later. Neuromuscular blockade was reversed and trachea was extubated after giving intravenous lidocaine 20 mg to prevent laryngospasm. Post extubation, he had severe cough and mild bronchospasm, both of which were managed with budesonide nebulisation. The child was awake and alert with a respiratory rate of 24/min, heart rate 120/min and SpO₂ 98-100% on oxygen therapy. The child also received epinephrine nebulisation. His dysphonia improved and he was discharged the next day.

Discussion

The whistle was found to be the most common non organic and second most common tracheobronchial FB [1]. Symptoms of a subglottic FB include cough which might subside after sometime due to fatigue and adaptation [2]. Stridor and dysphonia are classical symptoms of a laryngotracheal FB. A witnessed choking episode is the most reliable sign of a tracheobronchial FB requiring urgent investigation and management [3]. Clinical examination and roentgenogram of the neck and chest are the investigations required.

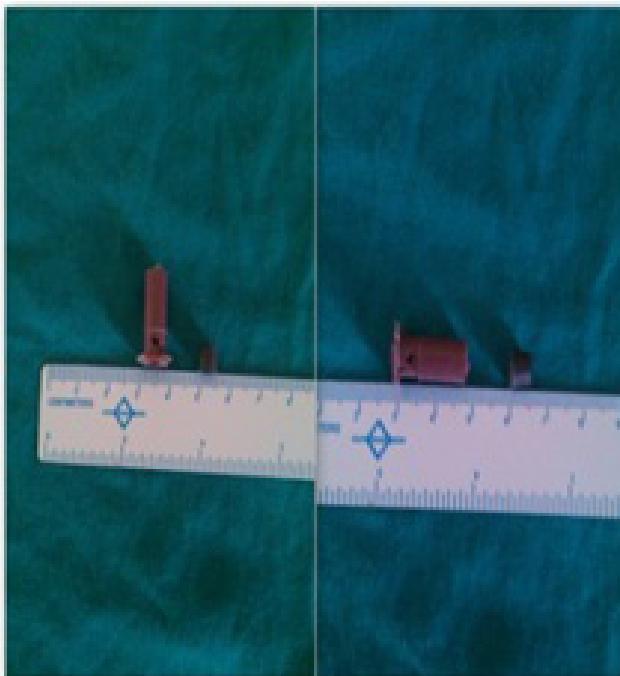


Figure 1: Whistle - the subglottic foreign body.

Plastic laryngeal FB often have a delayed diagnosis in view of their radiolucency and late onset obstructive emphysema [3]. Delayed detection and management >7 days results in greater morbidity including mucosal edema, bleeding and granuloma [4]. In this patient the only symptom was dysphonia since the choking episode. It did not cause any respiratory distress as its hollow cylindrical disposition mimicked an endotracheal tube and allowed inspiration and expiration through its lumen. Other types of foreign bodies may exert a ball valve effect causing bilateral hyperinflation of the chest [5].

Some patients with a large FB causing respiratory distress may require urgent tracheostomy to relieve airway obstruction [6]. Tracheostomy may also be required to remove subglottic FB larger than the laryngeal inlet to avoid vocal cord injury, sharp objects whose retrieval may lacerate the cords and long standing FB with granulation tissue that may bleed [7].

FB which is clearly visible on direct laryngoscopy, smaller than the glottic chink and not adherent may be removed atraumatically using a Magill's forceps or optical forceps [8]. Khan et al., described 220 cases of whistle as a foreign body of which 15% were laryngotracheal, and all were successfully removed by rigid bronchoscopy [9].

It is essential to maintain spontaneous ventilation in all cases of suspected subglottic FB as loss of spontaneous ventilation may prove fatal in the event of total airway obstruction. Neuromuscular

blockade may be established once it has been confirmed that ventilation through the ventilating port of the bronchoscope is possible either with the FB *in situ* or after it has been pushed distally into the right bronchus. Controlled ventilation reduces the anaesthetic requirement, improves ventilation, and decreases coughing or bucking during the procedure [10].

It is helpful to know the construction of non animate foreign bodies like whistle which may consist of three parts as in this case. The third bit was a transparent portion which had been coughed out the earlier day. It is necessary to carefully fit the pieces externally to see if they have been removed completely. Transparent plastic or glass pieces are more likely to be missed if not specifically looked for [6].

In conclusion, it may be said that subglottic foreign bodies require urgent bronchoscopy. Preparation for emergent tracheotomy needs to be ready before starting the case and spontaneous ventilation should not be abolished until effective ventilation through the ventilating bronchoscope is confirmed.

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