

## Case Report

# Anaesthetic Management of Near Total Airway Obstruction

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### ABSTRACT

*Foreign body aspiration is a common occurrence in paediatric age group less than 4 years all over the globe.*

*A two and half year old female child weighing 12 kilograms (Kg) was brought to casualty with history of (h/o) foreign body (upper end of broken adult size toothbrush) aspiration while playing. Parents gave h/o noisy breathing, inability of the child to vocalize. On examination patient was drowsy, floppy with drooling of saliva and respiratory distress. There was grunting, inspiratory stridor with intercostal muscle retraction and active accessory muscles of respiration. Respiratory rate was 74/minute (min), pulse rate 124/ min and oxygen saturation (SPO<sub>2</sub>) 85% on room air. On auscultation bilateral crepitations were present. X-ray neck revealed a large oropharyngeal foreign body.*

*Patient was immediately shifted to operation theatre (OT). After intravenous (IV) cannulation atropine 0.2 milligram (mg), hydrocortisone 50mg and fentanyl 20 microgram (µg) was given. A total titrated dose of Inj thiopentone 50 mg slow intravenously (IV) was given for induction and maintenance with oxygen flow rate of 6 litres (L) and halothane 0.6% such that apnoea was avoided. Patient was maintained on spontaneous ventilation since positive pressure ventilation through bag and mask displaced the foreign body causing complete airway obstruction. Neuromuscular blocker was avoided. Direct laryngoscopy was performed and foreign body was retrieved. Child was observed for any complications in paediatric intensive care and discharged later.*

**Short Running Head:** *Management of near total airway obstruction*

**Key words:** *Paediatric age, oropharyngeal foreign body, inspiratory stridor, respiratory distress,*

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#### INTRODUCTION

Foreign body aspiration (FBA) is a common occurrence in paediatric age group less than 4 years all over the globe as they explore their environment orally.<sup>[1]</sup> About two thirds of the cases occur in the age group between 1 to 2 years of age and 68% occurring within first 8 years of life causing nightmares to

parents, Anaesthesiologist and Oto-rhino-laryngologist.<sup>[2,3]</sup>

Statistically, FBA involves the hypopharynx (5%), larynx/trachea (12%) and bronchi (83%). Of bronchial foreign bodies, most (43%) are in the right main-stem, followed by the left main-stem (24%), right segmental bronchi (22%) and left segmental bronchi (11%).<sup>[1,4]</sup> Since the incidence of bronchial foreign body is more common, anaesthetic management during bronchoscopic removal has been well discussed in the literature. The incidence of lodgement of large oropharyngeal foreign body is though less common, it is potentially life threatening and anaesthetic management in such case has been discussed here.

## **CASE REPORT**

A two and half year female child weighing 12 kilograms was brought to casualty with history of (h/o) foreign body (tip of broken tooth brush fig 1) aspiration while playing, six hours back. The child was taken to a couple of nursing homes where foreign body removal was tried out and later referred to our hospital. Parents gave h/o noisy breathing, inability of the child to vocalize. On examination patient was drowsy, floppy with drooling of saliva and respiratory distress. There was grunting, inspiratory stridor with intercostal muscle retraction and active accessory muscles of respiration. Respiratory rate was 74/ minute (min), pulse rate 124/min and oxygen saturation (SPO<sub>2</sub>) 85% on room air. On auscultation there were bilateral crepitations. Roentgenogram of Neck lateral view revealed oropharyngeal foreign body (upper end of tooth brush seen in fig 2).

The patient was in distress and hypoxic as indicated by altered sensorium and flaccidity. Also, since emergency procedures like back blows and finger sweep tried elsewhere had failed, it was decided to shift the patient immediately to major operation theatre (OT) with supplemental oxygen and available investigations (haemoglobin, bleeding time and clotting time). Sedation was avoided in casualty. SPO<sub>2</sub> improved to 92% with supplemental oxygen. If foreign body obstruction is life threatening its removal should take precedence over NPO (nil per oral) guidelines.<sup>[5]</sup> In our case, patient was fasting for eight hours anyway.

Informed high risk consent was taken and parents were explained about the complications involved. Intravenous (IV) line was secured. Patient was immediately shifted to OT. Electrocardiogram (5 lead), Capnography (connected to side port of mask-showing 20 %) and Pulse-oximeter were connected. After IV cannulation atropine 0.2 milligram (mg), hydrocortisone 50mg and fentanyl 20 microgram (µg) was given. A total titrated dose of Inj thiopentone 50 mg slow IV was given for induction and maintenance with oxygen flow rate of 6 litres (L) and halothane 0.6% such that apnoea was avoided. After induction, bag and mask ventilation was performed to check the air entry. The size, location and lodgement of the foreign body were such that positive pressure ventilation displaced it further leading to complete obstruction of laryngeal inlet. So neuromuscular blocker was avoided and spontaneous ventilation was maintained. Option for surgical airway access (cricothyrotomy), if necessary was taken into consideration. Direct

laryngoscopy was performed after ensuring adequate depth of anaesthesia lest lighter planes would lead to agitation causing airway injury, perforation by sharp broken end or laryngospasm/ bronchospasm. Foreign body (Fig. 2) was carefully retrieved with Magill forceps and airway examined for bleeders/oedema. There was no stridor and bilateral air entry improved. SPO2 improved to 100%. Patient was observed in recovery for 30 min with supplemental oxygen and then shifted to paediatric ICU for observation.

## **DISCUSSION**

Airway obstruction due to foreign body in a child is suggested by sudden onset, with no other features of illness while the child is eating or playing. Delayed presentations with smaller FBA lower down in the respiratory tract have also been reported with chronic cough, wheeze, recurrent fever, pneumonia, croup, bronchiectasis and failure to thrive.<sup>[1,6]</sup>

Severe partial or total upper airway obstruction is potentially life threatening needing immediate intervention to prevent hypoxia and its sequelae. Children who present in distress with a sudden onset of stridor, prolonged inspiratory phase, head bobbing, and excessive drooling are more likely to have foreign bodies partially obstructing the supraglottic area and proximal oesophagus.<sup>[2]</sup>

Initial radiographic studies should include standard antero-posterior and lateral chest radiographs. Only approximately 6% to 15% of aspirated foreign bodies are radiopaque, however, and approximately 15% of radiopaque foreign bodies are initially seen on radiograph<sup>[2]</sup>

In suspected cases of aspirated foreign bodies, where standard radiographic studies are normal or in case of complications CT and MRI scan can be helpful.

In this case, upper end of the tooth brush was seen in oropharynx causing near total obstruction above laryngeal inlet and upper end of oesophagus. It was faintly radio-opaque compared to adjacent soft tissues and less dense than teeth.

Atropine and corticosteroids decrease secretions and prevent airway oedema. Also atropine being a vagolytic prevents vagal stimulation that can occur during airway manipulation especially during hypoxia.<sup>[7]</sup>

In case of near total airway obstruction air entry and gas exchange being hampered as suggested by hypoxia, inhalational induction may take a longer time. Also maintenance of adequate depth is difficult. A combination of inhalational agent with intravenous agent and opioid was used to hasten the induction, maintain depth and also obtund airway reflexes. In one retrospective analysis ketamine was found to be used successfully without any complications.<sup>[8]</sup> In one more study propofol and sevoflurane was compared and they found sevoflurane had better results in terms of induction and recovery.<sup>[9]</sup> In a prospective study it was concluded that propofol was associated with significantly greater incidence of adverse respiratory events than thiopentone.<sup>[10]</sup> Sevoflurane if available will be ideal as halothane at higher concentration during hypoxia may lead to arrhythmias. After induction, in such large foreign bodies located in the upper airway, it is better to ventilate the

**Fig. 1: X-ray showing foreign body in oropharynx**

patient with bag and mask to rule out CAN NOT VENTILATE CAN NOT INTUBATE situation before giving muscle relaxant. Airway access by surgical means will be a better option if bag and mask ventilation is not possible.

## **CONCLUSION**

The morbidity and mortality due to hypoxia and airway injuries in foreign body airway obstruction is a traumatizing experience not only for the parents but also for the treating doctors.

Management depends on the location

**Fig. 2: Extracted FB (upper end of toothbrush)**

of foreign body, severity of obstruction and clinical presentation. Each child mandates individualization of the anaesthetic technique to fit the clinical situation and necessitates meticulous planning. In near total airway obstruction, though sole inhalational anaesthesia is the anaesthetic technique of choice, a combination of inhalational agent with intravenous anaesthetic and opioid was successfully used in our case to hasten induction, maintain depth and obtund airway reflexes.

In conclusion, earlier the intervention in these cases lesser the morbidity and mortality.

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<b>Source of Support: Nil    Conflict of Interest: Nil</b>
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