

Removal of Large Foreign Body in the Bronchus by an Unusual Method

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Case Report

Abstract : Anaesthesia for bronchoscopy is challenging in paediatric patients as the airways are narrower and desaturation is faster compared to adults. Life threatening intra operative complications may lead to significant morbidity. Organic foreign bodies that are small enough to pass below the level of cricoid cartilage expand due to their hygroscopic nature sufficiently to make their exit through vocal cords impossible. In these circumstances a tracheostomy is needed for removal of F.B. without causing much airway trauma. Cooperation and communication between the surgeon and the anaesthetist is the key to safe and successful outcome in such situation.

Keywords: Bronchoscopy, Children, Foreign body, Tracheostomy.

Introduction

Accidental inhalation of foreign body (F.B.) in the airways of children continues to be a significant cause of morbidity and mortality. ^[1] Rigid bronchoscopy is the main stay of the treatment in these patients. Anaesthesia for bronchoscopy is tricky. Anaesthesiologist has to take quick measures in times of unexpected incidents. We report anaesthetic management for the removal of a large F.B. in the bronchus by an unusual method.

Case Report

A 10 yr. old female came with H/O intermittent cough and breathlessness since 20 days. Her symptoms started with a out of cough while chewing a tamarind seed. Initially, she was treated with medical line of management. But since there was no improvement, she was referred to our hospital for broncoscopy. She was a febrile with pulse rate of 114/ min., Blood pressure 110/70 mm Hg, respiratory rate of 20/min. and oxygen saturation on air of 92%. She had decreased air entry on Rt. Side. Examination of other systems did not reveal any obvious abnormalities. Routine blood investigations like complete haemogram, blood sugar level and renal function tests were normal. X ray chest showed hyperinflation of lung on right side with shift of mediastinum on left side. Foreign body aspiration on right side was suspected. Patient was premeditated with injection (Inj.) Midazolam 0.04mg/kg, Inj. Glycopyrrolate 0.004 mg/kg and Inj. Pentazocine 0.4 mg/kg

intravenously (IV). Induction of anaesthesia was achieved with Propofol 2 mg/kg and Inj. Succinyl choline 1.5 mg/kg. Rigid bronchoscope was introduced after ventilation with bag and mask. Jet ventilation started through the side port of bronchoscope. Anaesthesia was maintained with Inj. Atracurium 0.5 mg/kg (IV) and intermittent boluses of Inj. Propofol 10 mg. A large foreign body (F.B.) was visualised near the carina in right main stem bronchus. Two attempts at F.B. removal were unsuccessful due to large size of the F.B. and slipping of F.B. from the forceps. Because the seed had swollen up, each time the grasped seed would slip at the subglottic level. During the third attempt of removal, the seed slipped down, this time almost completely blocking the air entry to left lung. This resulted in episode of sudden fall in O₂ saturation to 65 -70 %. As the right side air entry was already compromised, the saturation did not improve in spite of continuous jet ventilation. Bronchoscope was removed and endotracheal intubation was done. Improvement in O₂ saturation up to 95% took five minutes in spite of IPPV with 100% O₂ and suctioning. During this period there was hypertension, tachycardia, resistance to ventilation and reduced air entry on both sides. Further attempt at removal of F.B. resulted in a similar episode of desaturation with slow rise of O₂ saturation. As it was not possible to deliver the foreign body through the vocal cords, decision of tracheostomy was taken. Under bronchoscopic guidance, a large forceps was introduced through the stoma and the foreign body was delivered through the stoma. During this period jet ventilation was continued. The size of the foreign body measured after removal was 15mm×15mm×10mm. Inj. Hydrocortisone 50 mg was given intravenously. A tracheostomy tube was inserted and the patient was reversed with inj. Neostigmine and inj. Glycopyrrolate. Because of repeated attempts of rigid bronchoscopy and possible cord oedema, we decided to keep the tracheostomy patent at the end of the procedure. Patient was nebulised and steroid cover was continued in the post operative period to decrease possible subglottic

oedema. Post operative period was uneventful. The tracheostomy tube was removed on fourth post operative day and the patient was discharged on the seventh day.



Figure 1: Foreign Body (Tamarind seed)

Discussion

Anaesthesia for rigid bronchoscopy in children is a challenging procedure for anaesthesiologists as the airways in paediatric patients are narrower and desaturation is faster.^[3, 4] Also, the surgeon and the anaesthesiologist have to share the airway posing difficulty in ventilation.^[1] Intra operative complications of bronchoscopy include hypoxaemia, arrhythmias, bronchospasm, severe laryngeal oedema requiring tracheotomy or reintubation, tracheobronchial injury, pneumothorax, pneumomediastinum and rarely cardiac arrest etc. leading to significant morbidity.^[2] Surprisingly in spite of these potentially life threatening complications, the reported mortality rates are quite low (0.42%) because of advances in anaesthesia and endoscopic equipments.^[2,7] Sometimes intraoperative episodes of severe hypoxia demand sudden change in surgical plan as in our case. Difficulty in ventilation leading to hypoxia and tachycardia with hypertension needed immediate tracheostomy.^[3, 4, 5, 6] There are three techniques for ventilation of patient during bronchoscopy. Apnoeic oxygenation with a small catheter alongside of bronchoscope, conventional ventilation through side arm of ventilating bronchoscope and use of venturi jet injector or high frequency jet ventilation.^[1] Use of ventilating bronchoscope is a better method. As we did not have ventilating bronchoscope in our hospital, we used jet ventilation for bronchoscopy. The method of jet ventilation gives FiO_2 of 30% and maximum pressure of 22 cm of H_2O .^[2] This at times is inadequate for maintaining O_2 saturation if one of the lungs is less compliant as it happened in our case. Bronchoscopic time should be limited to 30 min. Thereafter the chances of endobronchial and subglottic oedema greatly increase. Most aspirated F.B.s are organic materials (81%), nuts and seeds being the most common.^[7] Some F.B.s that are small enough to enter through the cricoid cartilage, either produce subglottic oedema or expand (owing to their

hygroscopic nature) sufficiently to make their exit through vocal cords impossible. Sometimes in case of a large F.B., removal may be possible if it is crushable. In our case, though the seed had swollen up, it was hard and non crushable. In these circumstances a tracheostomy is needed for removal of F.B. without causing much airway trauma. Other indications for opening the trachea are the removal of sharply pointed FBs whose points lodge in the subglottis or in the vocal cords and when the FB impacts the subglottic region and provokes an acute obstruction.^[8] After removal of F.B., tracheostomy stoma can be closed and endotracheal tube can be kept in situ till airway oedema subsides. Alternatively, tracheostomy tube is maintained till subglottic oedema subsides.^[7] In our case, because of repeated attempts at removal of F.B., chances of airway oedema were high. Hence we opted for keeping the tracheostomy patent in the post operative period.

Conclusion

Bronchoscopic removal of F. B. through oral route at times may be impossible due to its Large size and may require tracheostomy. Cooperation and communication between the surgeons and anaesthesiologist is the key to safe and successful outcome in these circumstances.

References

1. Kulkarni JV, Bhagat HP. A retrospective study of anaesthetic management of foreign bodies in airway – A two and half year's experience. *Indian journal of Anaesthesia* 2007; 51(6): 501-4
2. Jan Ehrenwerth, Sorin J Brull. In: Joel Kaplan, P D Slinger, editors. *Thoracic anaesthesia* 3rd ed.(2003) Churchill Livingstone. Page 180.
3. M. Ramamani, G. Korula, J Chacko, A large foreign body in the bronchus: Anaesthetic and surgical challenges. *Internet journal of anaesthesiology* TM ISSN:1092-406X
4. Figueiredo R.R, Machado W.S. Foreign body aspiration through tracheotomy. *Bras J otorhinolaryngol* 2005;71(2)234-236
5. Masood A, Shafkat A. *et al.* Removal of foreign body from the trachea: An unusual method. *Indian J otolaryngol Head Neck Surg* 2006, Vol 58(1):80-81
Neil Weir. Anatomy of larynx and tracheobronchial tree. In: Alan G kerr, editors. *Scot Brown's Otolaryngology*. 6th Ed. Vol 6 (1997) Page 312.
6. Fidkowski CW, Zheng H, Firth PG. The anaesthetic considerations of tracheobronchial foreign bodies in children: A literature review of 12,979 cases. *Anesth Analg*. 2010 Oct; 111(4): 1016-25.
7. Fraqa JC, Pires AF, Komlos M, Takamatu EE, Camargo LG, Contelli FH. Bronchoscopic removal of foreign body from airway through tracheotomy or tracheostomy. *J Pediatr (Rio J)*. 2003 Jul-Aug; 79(4): 369-72.