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The Role of Tracheostomy in Bronchoscopic Removal of Tracheobronchial Foreign Bodies in Port Harcourt, Nigeria

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Abstract:

Background:

Foreign body (FB) aspiration causing obstruction to the tracheobronchial tree is an ENT emergency.

Removal is usually done by Bronchoscopy. Rigid or telescopic, depending on what is available at the centre. However, successful removal and stable postoperative period may not be achieved without tracheostomy as an additional procedure. Sometimes, thoracotomy and bronchotomy may be done to achieve a successful treatment.

Method

A total of thirty (30) cases were recorded in this study, information retrieved from operating theatre, ENT and surgical wards. Retrieving information recorded, were age, gender, presenting symptoms and type of foreign body recorded. Results of chest x-ray were also relevant and recorded.

Results

Both rigid and the telescope were used in retrieval of foreign bodies in those cases, (30 cases), however, six (6) cases required tracheostomy for successful treatment. The indication of tracheostomy was basically persistent obstructive symptoms despite removal of foreign body.

Conclusion

Tracheostomy is sometimes mandatory in successful bronchoscopic removal of tracheobronchial foreign bodies, especially when the foreign body is vegetative.

Keywords: Tracheostomy, Bronchoscopy, Air way obstruction

1. Introduction

Foreign body (FB) causing airway obstruction is a life threatening condition, world wide¹. This is responsible for many deaths, especially in children below (3) three years of age. The foreign body is usually removed by bronchoscopy in a large number of patients, but in some selected cases additional surgical procedures may have to be introduced for the patient to be completely free from obstruction ^{1, 2}. These additional procedures may be tracheostomy, thoracotomy or bronchotomy as the case demands ^{3, 4, 5}. In this study, tracheostomy was introduced for successful management. The aim of this study is to highlight the important role of tracheostomy in airway management of foreign body extraction from tracheobronchial tree ⁶

2. Method

A total of thirty (30) cases with obstruction to airway from foreign bodies were analysed in this study, between the period, 2012-2019. Information about patients who had foreign body aspiration and bronchoscopy were retrieved from operating theatres, ENT and surgical wards. Relevant data collected were age, gender, presenting symptoms, type of foreign body and site of removal. Plain chest X-ray were done for all the patients. Diagnosis was made on each case based on history, physical examination and radiological findings. Rigid bronchoscope and telescope-bronchoscope were the surgical instruments applied to retrieve foreign bodies. For the patients that we used rigid bronchoscope, face mask, inhalational (Halothane) anesthesia was applied as induction of anesthesia. Intravenous atracurium (0.5mg/kg) was added when the procedure is suspected to be prolonged.

For patients that we used the telescope, endotracheal intubation with oxygen was applied to maintain anesthesia, since the telescope was accommodated with the endotracheal tube through the Rirna glottis.

3. Results

The use of both the telescope and the rigid bronchoscope allowed removal of foreign bodies in about (24) cases, while 6 cases required additional surgical procedure in the form of tracheostomy for successful management.

3.1. Case 1

Eight-month-old male whose history was that his senior sibling while eating groundnut fed the patient (younger one) with some seeds. Patient was subsequently noted to be coughing repeatedly followed by respiratory distress with reduced air entry into the right zone of the lungs. Chest X-ray did not show any remarkable findings. However, with the history of differential air entry, a high index of suspicion demanded a bronchoscopic assessment of the airway. A groundnut cotyledon was subsequently retrieved from the right main bronchus. Remarkable finding was oedematous laryngeal and bronchial passage with marked secretion.

About 24 hours after initial bronchoscopy, child was still in respiratory distress, this time stridulous. Emergency tracheostomy was done with about 3.5mm size portex tube, and repeated suctioning of tube applied. Recovery from respiratory distress was observed a few hours post operatively.

3.2. Case 2

Case 2 was a one year, 8months male who was presented with a one-day history of bouts of cough and later developed respiratory distress. Child was fed with a meal of rice and fish and subsequently developed respiratory distress. Radiograph of lateral neck and chest revealed a line of opacification in the area of right bronchus. Based on above radiological findings, bronchoscopy was done and fish bone retrieved.

However, there was reduction in respiratory distress and a mild form of stridor that necessitated tracheostomy to be done, that allowed mucous secretion to be removed through the tracheostomy tube. Patients had dramatic improvement after the procedure.

3.3. Case 3

Case 3 was a two year old female child that had a meal of groundnut. Parent said it was observed that a few minutes after the groundnut meal, she developed a repeated episode of cough and subsequent respiratory distress. There was no loss of voice and chest X-ray revealed collapsed right lungs. Patient had bronchoscopy and followed by tracheostomy as the respiratory distress did not completely disappear and lots of secretions were noted in the region of oropharynx.

3.4. Case 4

Case 4 was a two year old child who presented with a sudden episode of cough and respiratory distress. There was no obvious history of foreign body ingestion or vegetative seed ingestion. Examination revealed a child with severe respiratory distress, with subcostal recession and stridulous breathing. Emergency tracheostomy was planned, but while on theatre bed in readiness for the procedure, endotracheal intubation was passed, this was at the anesthetist discretion since the airway was severely compromised. Tracheostomy was subsequently done. Bronchoscopy was later performed and part of groundnut seed retrieved at the sub glottis compartment. Patient was later weaned off the tracheostomy tube.

3.5. Case 5

This case was observed in a 3 year old male with a clear history of having aspirated foreign body while eating groundnut. Child presented with respiratory distress with subcostal recession and differential air entry on the right lungs. Few crepitations were also noticed at the same right zone of the lung. Patient was preoperatively assessed and bronchoscopy was performed. Chest X-ray was not remarkable. Bronchoscopy revealed integrated groundnut with multiple particles of the groundnut seed. Post operatively weaning was done and response was good.

3.6. Case 6

Two year old boy presented with a history of cough and breathlessness. Positive history of groundnut meal prior to cough was also noted. Examination revealed a child with stridulous breathing and subcostal recession. Air entry reduced in both lung fields. Lateral soft tissue X-ray of the neck revealed opaque shadow at the subglottic region of the laryngo-tracheal region. Emergency tracheostomy was done followed by tracheobronchoscopy. Cotyledons of groundnuts retrieved at the subglottic region. Patient was weaned off the tracheostomy tube a week later post operatively.

4. Discussion

Foreign body (FB) aspiration is a life threatening clinical condition requiring immediate intervention¹. Sometimes it can be abandoned due to difficulty encountered during the procedure. This may call for open surgery in the form of thoracotomy/bronchotomy^{2,3}. Sometimes, tracheostomy can be added to surgery for successful removal of the foreign body in the tracheobronchial tree. In the demonstrated six (6) series, tracheostomy made it possible for all the patients to recover without further complication^{3,4}. In this study four of the cases involved aspiration of a vegetative (groundnut) material. There is a special problem following aspiration of the above seed. Peanuts (groundnuts) produce acidic oil, linoleic acid, palmitic acid as well as arachidonic acid which are known to be secreted by them especially on disintegrating and in contact with water or with body fluid. These cause intense reaction along the air passage, thereby releasing lots of mucous secretions. Subsequently there is obstruction to air and severe respiratory distress.

Therefore this calls for tracheostomy which aids in the intra operative draining of the air passage by the use of suction machines and appropriate draining tubes. Mortalities are sometimes observed when this important procedure (tracheostomy) is neglected.

Singh JK et al, in their 342 cases of foreign body aspiration reported four (4) cases that tracheostomy was introduced for successful management^{11,12}. In this study, the 6th case involved lodgment of the groundnut cotyledon in the

subglottic region of the airway. Inflammatory reactions extended to the Rima glottis and the arytenoid, with severe respiratory distress. Tracheostomy was initially done before bronchoscopic examination was done to remove foreign bodies^{13, 14, 15}. Impacted foreign bodies cause both mechanical effects, chemical reactions as noted in groundnuts, causing bronchiectasis, pneumonia, lung collapse and lung abscess^{16, 17}. Another area of consideration, thereby requiring tracheostomy is injury to the airway during the procedure. Airway injury leading to bleeding and inflammation cause further obstruction postoperatively. Tracheostomy done in the immediate postoperative period will save further obstruction from inflammatory fluid and blood^{17,18}. The case of fish bone as a vegetable foreign body required immediate tracheostomy due to the pool of mucous secretion encountered in the process of bronchoscopy. Most impacted vegetable foreign bodies provoke so much mucous secretions in the airway attracting the application of tracheostomy to avoid mucus obstruction in the postoperative period^{18,19,20}.

In these series, case 2 involved fish bone lodged in the right main bronchus. Removal was followed by mucus secretions and persistent airway obstruction. Tracheostomy aided proper drainage of the airway through suctioning from the tracheostomy tube^{19,20}.

5. References

- i. Black RE, Johnson DG and MATLAK ME. Bronchoscopic removal of aspirated foreign bodies in children. *J pediatr Emerg care* 1988; 4:102-6.
- ii. MEGHJEE SP and THOMAS E. images in machine. Foreign body aspiration. *Post grad med J* 1998, 74: 703.
- iii. STEEN KH and ZIMMERMANNT. Tracheobronchial aspiration of foreign bodies in children: a study of 94 cases. *Laryngoscope* 1990; 100:525-30.
- iv. BLACK RE, CHOI KJ, SYME WC et al. Bronchoscopic removal of aspirated foreign bodies in children. *Am J surg* 1984, 31:937-941.
- v. Role of tracheostomy in the management of foreign body airway obstruction in children.
- vi. JK Singh, V Vasudevan, N Bharadwaj, Singapore med 2009 KL Narasinhham Singapore Med J50(9), 871-4, 2009
- vii. Adesunkanmi ARK. Inhaled tracheobronchial foreign bodies: A Review, *Niger j.Surg.*1994:4:34-38.
- viii. Farrel PT. Rigid bronchoscopy for foreign body removal anesthesia and ventilation. *Paediatric Anesthesia* 2004; 14:84-9 10.1046/j.1460-9592.2003.01194 [pubmed] [Cross Ref] [Google Scholar].
- ix. Ramirez-Figueroa TL, Gochicoa-Rangel LG, Ramirez-san Juan DH, et al. Foreign body removal by flexible fiberoptic bronchoscopy in infants and children, *pediatric pulmonology* 2005; 40:392-7.10.1002/ppul.2022422 [pub med] [Cross Ref] [Google Scholar].
- x. Zaupap, Saxena AK, Barounig A, et al management strategies in foreign body aspiration.
- xi. *Indian J pediatr* 2009; 76:157-61. 10.1007/5120998-008-0231-2. [pub med] [Cross Ref] [Google Scholar].
- xii. Hus, Dong HL, Sun Yy, et al. Anesthesia with Sevoflurane and remifentanyl under spontaneous respiration assisted with high frequency jet ventilation for tracheobronchial foreign body removal in 586 children. *Paediatric anesth* 2012; 22: 1100-4 [pub med] [Google Scholar].
- xiii. Liao R, LIJY, LIUGY. Comparison of Sevoflurane volatile induction/maintenance anesthesia and propofol-remifentanyl total intravenous anesthesia for rigid bronchoscopy under spontaneous breathing for tracheal/bronchial foreign body removal in children. *Eurj Anesthesia* 22010;227:30-4. 10.1097/EJA, obo13e32833d699ad [pub med] [Cross Ref] [Google scholar].
- xiv. Zur KB, Litman RS. Pediatric airway foreign body retrieval. Surgical and anesthetic perspective. *Paediatric Anesth.*2009;109-117.
- xv. Bahaloo F, Veyckemans F, Francis C, Bietlot MP, Rodenstein DO. Tracheobronchial foreign bodies; presentation and management in children and adults. *Chest* 1999; 115:1357-62.
- xvi. Ulku R, Onen A, Onat S, Ozoelik C. the value of surgical approaches for aspirated pen caps. *J pediatr Surg* 2005; 40: 1780-3.
- xvii. Zhijun C, Fugao Z, Niankai Z, Jingjing C. therapeutic experience from 1428 patients with pediatric tracheobronchial foreign body. *J pediatr Surg* 2008; 43: 718-21.
- xviii. Marks SC, Marsh BR, Dudgeon DL, indications for open surgical removal of airway foreign bodies. *Ann Otol Rhinol Laryngol* 1993; 102:690-4.
- xix. Robinson PJ, Laryngeal foreign bodies in children: first stop before the right main bronchus. *J paediatric Child Health* 2003; 39: 477-9.
- xx. Phillip J Bresnihan M, Christmas tree in the larynx. *Paediatr Anaesth* 2004; 14:1016-20.
- xxi. Swensson EE, Rah KH, KIM MC, Brooks JW, Salzberg AM. Extraction of large tracheal foreign bodies through a tracheostoma under bronchoscopic control. *Ann Thorac Surg* 1985; 39:251-3.
- xxii. Fraga JC, Neto AM, Seitz E, Schopf L. Bronchoscopy and tracheostomy removal of bronchial foreign body. *Pediatr Surg* 2002; 37:1239-40.