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ABSTRACT

Objective: To evaluate the pattern and outcome of management of retained oesophageal foreign bodies in children.

Design: Retrospective study.

Setting: Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, January 1991 to December 2000.

Subjects: One hundred and eight paediatric patients, aged 0 - 14 years managed for retained oesophageal foreign bodies.

Intervention: The foreign bodies were removed endoscopically, using either a larynoscope or a rigid oesophagoscope, under general anaesthesia.

Results: There were 108 patients, with a mean age of 3.0 ± 0.8 years and age range of 23 days to 14 years. The male to female ratio was 1.5: 1. Sixty four (59.3%) patients were within 1-5 year age group. Coins constituted 79.6% of the retained foreign bodies. Over 90% of patients presented within the first four days of the incidence. The dominant complaints were drooling of saliva in 37 (40.2%) and difficulty in swallowing in 35 (38.1%) patients. The commonest sites of the foreign body retention were the upper third of oesophagus 52(48.2%) and the hypopharynx 36(33.3%). The main complications following the foreign body removal were oesophageal perforations 4(3.7%) and lacerations 16(15%).

Conclusion: Retained oesophageal foreign body is a common childhood health hazard. Early diagnosis and prompt skillful removal are necessary for a satisfactory outcome.

INTRODUCTION

Ingestion of foreign objects is a common health hazard in the paediatric age group(1). Infants and toddlers are particularly vulnerable, as they tend to swallow whatever they can put into their mouths(2,3). Not infrequently, the ingested foreign bodies are retained in the oesophagus, resulting in varying degrees of morbidity and even mortality(2). The tremendous toll upon such injured children and their families can only be reduced by coupling effective prevention and management strategies(4,5). The management of children with retained oesophageal foreign bodies (ROFB) continues to pose challenges, because of its attendant complications. The effective management of ROFB, therefore, requires familiarity and skill in the use of several extraction techniques(6).

The aim of this study was to review the pattern, and our experience in the management, of ROFB in children over the past 10 years at the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria.

MATERIALS AND METHODS

This is a retrospective study of 108 children who were managed for foreign bodies in the oesophagus, from January 1991 to December 2000, at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Nigeria. The records were reviewed for the patients' demographic data, clinical features, x-ray findings, type and site of foreign body impaction, mode of removal of the foreign body and outcome of the management. Foreign body removal was either by direct laryngoscopy or using a rigid oesophagoscope, under general anaesthesia and prophylactic antibiotic cover. The data were stored and analysed on computer, using the Epi-Info software version 6.03.

RESULTS

A total of 142 children were managed for retained oesophageal foreign bodies within the period of this study, but records were available for review in 108 patients. The age and gender distribution of the patients are shown on Table 1. The youngest was 23 days old while the oldest was 14 years old, with a mean of

3.0±0.8 years. The male to female ratio was 1.5: 1. The duration before presentation ranged from one to 60 days after the foreign body ingestion. Sixty four (59.3%) patients presented at the hospital on the day of the accident. Twenty four (22.2%) patients presented on the 2nd day while 4(3.7%) and 8(3.7%) presented on the 3rd and 4th day, respectively, after the incidence. Sixteen (15.0%) patients had no symptoms and were brought solely on account of eye witness of foreign body ingestion. The commonest symptoms were drooling of saliva, regurgitation and painful swallowing. Other symptoms included cough, dyspnoea, hoarseness of voice, and chest pain (Table 2). The drooling of saliva occurred in the younger children while the older children presented mainly with hoarseness of voice, chest pain and painful swallowing. Eight (7.4%) patients had failed attempted removal from peripheral clinics before presentation. These presented with haematemesis, dyspnoea and hoarseness of voice. The commonest site of foreign body retention in the oesophagus was the upper third, 52(48.2%), followed by the hypopharynx, 36(33.3%), and the middle third, 4(3.7%), of the oesophagus, respectively. Coins constituted 79.6% of the objects retained in the oesophagus.

Table 1

Age and sex distribution among children with retained oesophageal foreign bodies (n = 108)

Cohort (Years)	Gender		Total(%)
	Male(%)	Female (%)	
0-11 months	4 (3.7)	8 (7.4)	12 (11.1)
1-5	40 (37.1)	24 (22.2)	64 (59.3)
6-10	12 (11.1)	8 (7.4)	20 (18.5)
11-15	8 (7.4)	4 (3.7)	12 (11.1)
Total	64 (59.3)	44 (40.7)	108 (100.0)

Male:Female = 1.5:1.

Table 2

Presentation in children with retained oesophageal foreign bodies (n = 108)

Complaint	Number	(%)
Drooling of saliva	37	34.0
Regurgitation	18	17.0
Painful swallowing	17	16.0
Cough	8	7.0
Dyspnoea	8	7.0
Hoarse voice	3	3.0
Chest pain	1	1.0
No symptoms	16	15.0
Total	108	100.0

Other foreign bodies retained included bottle caps, fish bone and safety pins (Table 3). Thirty six (33.3%) patients were managed as day cases, when the removal

was straightforward; otherwise the patients were admitted for varying lengths of time, either for observation or for treatment of complications. The longest post retrieval hospital stay was 13 days (Table 4). Twelve (11.1%) patients had failed removal of the foreign bodies at first attempt in this centre. Subsequent removal was effected at a later day. Twenty (18.5%) patients developed complications. These were haemorrhage 16(15%), perforation 4(3.7%) and aspiration pneumonitis 3(2.8%). The perforations were managed with antibiotics and by prompt thoracostomy tube drainage in under water seal system. None of the patients required thoracostomy. No patient in this series died.

Table 3

Types of foreign bodies retained in the oesophagus (n = 108)

Object	Number	(%)
Coins	86	79.6
Bottle caps	8	7.4
Fish bone	7	6.5
Safety pin	4	3.7
Earring	2	1.8
Key	1	1.0
Total	108	(100.0)

Table 4

Length of hospital stay after removal or retained oesophageal foreign bodies (n = 108)

Days	Number	(%)
Day cases	36	33.3
1	8	7.4
2	32	29.7
3	12	11.1
5	8	7.4
6	4	3.7
8	4	3.7
13	4	3.7
Total	108	100.0

DISCUSSION

Retention of foreign bodies in the oesophagus is a common occurrence in children(7). Majority, 40 (37.1%), of our patients were aged one to five years. This finding compares well with those reported from other parts of the world (1,3,8). The high incidence in this cohort could be attributed to the high levels of ignorance and adventure that mark this age group. Infants and toddlers, while playing and crawling in this 'oral phase', swallow whatever objects they can put in their mouth.

Sixty four (59.3%) of our patients presented on the day of the foreign body ingestion. It can be alluded to that most patients would present early when foreign

bodies get stuck in their oesophagus. Our experience shows that early presentation is commoner with the very young children, and when there are more serious symptoms of respiratory embarrassment and swallowing difficulties, thus compelling the frightened patients or parents to seek medical attention.

Late presentations are common(2,4). Four (3.7%) of our patients presented about two months after swallowing foreign bodies. Adeyemo *et al* reported late presentation of nine months in their series(2). The problems of chronic foreign body retention in the oesophagus include oesophageal obstruction from a large inflammatory mass(9), and persistent pain from local mucosal erosion or complete erosion through the wall of the oesophagus with mediastinitis(1).

The dominant complaints in our patients were drooling of saliva and regurgitation of feeds in the very young children (from inability to swallow) and painful swallowing in the older age group. Respiratory symptoms included dyspnoea and persistent cough, with varying degrees of respiratory embarrassment. Respiratory distress due to retained oesophageal foreign body is well documented(10-14). The respiratory symptoms are usually caused by the foreign bodies in the proximal and middle thirds of the oesophagus, which cause dilatation of the upper oesophagus or direct compression of the thin, membranous trachea, which lies immediately anterior to this portion of the oesophagus(1).

Risk factors that predispose to oesophageal foreign bodies include oesophageal anomalies and previous repair of tracheo-oesophageal fistula(15), neurological impairment and psychosis(1). However, majority of children with foreign bodies in the oesophagus, usually have no history of previous oesophageal diseases, as was the case in this study.

Radiography plays a vital role in the diagnosis of foreign bodies in the oesophagus. Plain radiograph detected all the ingested objects in our series since they were all radio-opaque. It has been suggested that about 10% of children with foreign bodies in the oesophagus have no symptoms at the time of presentation(16). Fifteen per cent in our series had no symptoms at presentation. This percentage is high enough to warrant radiological surveillance of all patients with clinical suspicion of foreign body ingestion. In the oesophagus, coins lie flat so that their full diameter is seen on a plain postero-anterior view; in the respiratory tract they lie in the sagittal plane, so that only their narrow side on a postero-anterior film is seen(1). A negative x-rays result does not exclude foreign body retention for radio-lucent objects like rubber toys, wood, bolus of meat, are not easily detectable by plain radiography. In such a situation, barium swallow or ultrasound would be preferred.

The nature of the retained objects in our series is in conformity with reported cases the world over(1,2,17), with coins ranking highest. The preponderance of the coins may be attributed to the free access children have

to coins in our environment, which are usually given as gifts.

On occasions coins are displayed around in most houses, which the children regard as toys. In any of these situations, the children may either swallow the coin deliberately or accidentally while putting the coins in the mouth. Older siblings giving the "new baby" inappropriate object to swallow, is well documented(18). In one of our patients aged 23 days, an older sibling forced a key down his throat. It is estimated that about 20% of all ingested foreign bodies are retained in the oesophagus, presumably because of the relatively weak peristalsis of the oesophageal musculature and lack of room in the chest in small children for distension of the oesophagus(19). Most foreign bodies are retained in the cervical oesophagus, just beneath the cricopharyngeus muscle(4,8); 48% in our series were retained at this level, which is dangerous because of the risk of respiratory embarrassment(9,10,12-14,20,21). This site is particularly noted for weakness of peristalsis. In 36(33.3%) of our patients, the site of arrest was the hypopharynx. These were mainly objects of irregular configuration and coins probably too large to negotiate through the infants' narrow cricopharyngeal sphincter. Other less frequent sites, as shown in our series and in other reports(11,22), includes areas of physiological narrowing vis-à-vis the cardio-oesophageal junction and where the left main bronchus crosses the oesophagus.

All the foreign bodies in our series were extracted by endoscopy, under general anaesthesia, using rigid scopes, according to standard principles(1,6). Rigid oesophagoscope is preferred because the forceps used to grasp the foreign bodies are too large to pass through the flexible endoscopes.

Foreign bodies entrapped in the proximal and middle thirds of the oesophagus are unlikely to pass spontaneously and should be removed at the time of diagnosis(1). In contrast, at least 60% of coins in the distal oesophagus will pass spontaneously(23). A period of waiting in these patients may be justified, allowing some liquids by mouth and examining the stools for the coins. Other authors have suggested that objects impacted in the distal oesophagus can be washed into the stomach by encouraging liberal drinking of fluids(24). Some have advocated the use of bougie, under sedation, to force a smooth foreign body in the distal oesophagus into the stomach(25). Continued lodgement of a foreign body in the oesophagus, increases the risk for respiratory symptoms, aspiration, and oesophageal perforation. Therefore, retained oesophageal foreign bodies should be retrieved early. Removal can be effected endoscopically (if the edges are sharp) or by use of balloon catheter technique (if the edges are smooth and the patient presents within 24 hours of ingestion). This catheter technique is not popular with us because we prefer to remove all objects under direct vision. The

expulsion of the foreign body by sudden application of pressure to the abdomen ("pop" method) is not always successful, is dangerous, and should be avoided. Chronic oesophageal foreign bodies, which are usually embedded in the wall of the oesophagus, are best retrieved via thoracotomy.

Our experience confirms the reports from other centres that mucosal laceration and oesophageal perforation are the usual complications following rigid oesophagoscopy(26,27). However, the perforation rate of 3.7% in our series is at variance with the 0.03 - 0.1 % reported elsewhere(27). This rather high incidence could be as a result of either of two reasons. First, the extractions were quite often effected, or at least attempted by the inexperienced resident doctors who were the first on call.

Secondly, some patients presented for the foreign body removal only after a failed, traumatic attempts in peripheral clinics in the hands of inexperienced operators. It is a common observation that rigid oesophagoscopy does carry a significant incidence of morbidity in inexperienced hands(1).

The diagnosis of oesophageal perforation is suspected with the development of a spiking fever or pain and crepitation in the neck after oesophagoscopy. The demonstration of mediastinal or cervical emphysema on plain radiographs and extravasation of contrast on oesophagogram confirms the diagnosis(28). Treatment consists of intravenous antibiotics and nothing by mouth regimen(29). It has been postulated that most iatrogenic oesophageal perforations are small and well contained(1). Michell *et al* (30) advised that the larger perforations need open drainage and possible closure. In our series, we routinely drained the pleural cavity once perforation had occurred, so as to forestall any untoward outcome.

Most of our patients were lost to follow up. This is not surprising since the problem is not a relapsing type. Less than 30% were followed up for varying lengths of time, ranging from four to six weeks. However, no late complications were noted in these patients. Late complications of impacted oesophageal foreign bodies (e.g. stricture) are uncommon and infrequent in children, unless the foreign body has been neglected or has eroded through the oesophageal wall(1).

In conclusion, foreign body ingestion in children continues to be a common problem and occasionally results in significant morbidity. A high index of suspicion will help in early diagnosis, which together with prompt treatment, will forestall the complications of prolonged retention of a foreign body in the oesophagus. Keeping swallowable objects out of reach of children can drastically reduce this common but avoidable health hazard. The role of public health education and campaign in this regard can be most rewarding.

REFERENCES

1. Rodgers, B.M. and McGahren, III D.E. Esophagus. In Oldham, K.T. Colombani P.M. and Foglia R.P. (Eds). Surgery of infants and children. Philadelphia. *Lippincott-Raven*. 1997: 1005-1020.
2. Adeyemo, A.O., Odetoyinbo, O. and Akinola, O. Management of oesophageal foreign bodies. *Tropical Doctor* 1986; **16**:168-172.
3. Jackson, C. and Jackson, C.L. Bronchoesophagology. Philadelphia: *WB Saunders*, 1950: 13-33.
4. Harris, B.H., Latchaw, L.A., Murphy, R.E., *et al*. A protocol for paediatric trauma receiving units. *J. Pediatr. Surg.* 1989; **24**:419-422.
5. Stylianos, S. and Harris, B.H. Seatbelt use and patterns of central nervous injury in children. *Pediatr Emerg Care*. 1990; **6**: 4-5.
6. Johnson, D.G. Esophagoscopy and other Diagnostic Techniques. In O'Neill, J.A. Or). Rowe MI Grosfeld JL, *et al*. (Eds) Pediatric Surgery vol. 1. 5th edition. Philadelphia. *Mosby*. 1998; 927-936.
7. Lyons, M.F. and Tsuchida, A.M. Foreign bodies of the gastrointestinal tract. *Med. Clin. North Am.* 1993;**77**:1101.
8. Tucker, G.F. The age incidence of lodgement of single coins in the oesophagus. *Ann Otol Rhinol Laryngol* 1964; **73**:1116-1123.
9. Burton, D.M. and Stith, J.A. Extraluminal esophageal coin erosion in children: case report and review. *Int J Pediatr Otol* 1992; **23**: 187.
10. Glass, W.M. and Goodman, M. Unsuspected foreign bodies in a young child's oesophagus presenting with respiratory symptoms. *Laryngoscope*. 1966; **76**:605-615.
11. Wishaby, A., Khahfa, As, Abdel Fattah S, *et al*. Oesophageal foreign body in a child resulting in repeated asthmatic attacks. *J. Egypt Med. Assoc.* 1968; **51**:213-216.
12. Hoeksman PE, Huizinga E. On foreign bodies and perforations of the oesophagus. *Ann Otol Rhinol Laryngol* 1971; **80**: 36-41.
13. Smith PC, Swischuk LE, Fagan CJ. An elusive and often unsuspected cause of stridor or pneumonia. *Am. J. Roentgenol.* 1974; **120**: 80-89.
14. Jackson, C. and Jackson, C.L. Pulmonary symptoms due to oesophageal disease. *J. Arch. Otolaryngol.* 1933; **18**:731-745.
15. Crysedale WS. Esophageal foreign bodies in children: 15-year review of 484 cases. *Ann. Otol. Rhinol. Laryngol.* 1991; **100**:320.
16. Paul, R.I., Christoffei, K., Binns, H.J. *et al*. Foreign body ingestions in children: risk of complication varies with site of initial health care contact. *Pediatrics* 1993; **91**:121.
17. Adesunke, A.R.K., Oginni, L.M., Oyelami, *et al*. Epidemiology of Childhood injury, *J. Trauma: Injury, Infection and Critical Care.* 1998; **44**: 506-512.
18. Gins, S.L. and Austin, E. Foreign bodies. In Ashcraft KW, Holder TM. (Eds) Pediatric Surgery. 2nd edition. Philadelphia. WB Saunders Co.
19. Nandi, P. and Ong, G.B. Foreign body in the oesophagus: review of 2394 cases. *Brit. J. Surg.* 1978; **65**: 5.
20. Pimpinella, R.J. Airway obstruction due to a foreign body in the oesophagus. *Arch Otolaryngol* 1964; **79**: 606-608.
21. Heller, W.C. and Haughen, R.K. Food aspiration: restaurant rescues. *N. Engl. J. Med.* 1973; **289**: 81-82.
22. Le Roux, B.T. Intrathoracic foreign bodies. *Thorax* 1964; **19**: 203-217.

23. Conners, G.B., Chamberlin, J.M. and Ochsenschlager, D.W. Symptoms and spontaneous passage of oesophageal coins. *Arch. Pediatr. Adolesc. Med.* 1995; **149**:36.
24. Robbins, M.I. and Shortsleeve, M.J. Treatment of acute oesophageal food impaction with glucagons, and effervescent agent, and water. *Am. J. Roentgenol.* 1994; **162**:325.
25. Webb, W.A. Management of foreign bodies of the upper gastrointestinal tract. *Gastroenterology.* 1988; **94**:204.
26. Pasricha, P.J., Fleischer, D.E. and Kalloo, A.N. Endoscopic perforations of the upper digestive tract: a review of their pathogenesis, prevention and management. *Gastroenterology.* 1994; **106**:737.
27. Katz, D. Morbidity and Mortality in Standard and flexible gastrointestinal endoscopy. *Gastrointest Endosc* 1967; **14**:134.
28. Panzini, L., Burrell, M.J. and Traube, M. Instrumental oesophageal perforation. *Am. J. Gastroenterol.* 1994; **89**: 367.
29. Cameron, J.L., Kieffer, R.F., Hendruf, T.F. *et al.* Selective non-operative management of contained intra-thoracic esophageal perforations. *Ann. Thorac. Surg.* 1979; **27**: 404.
30. Michell, Grillo, H.C. and Malt, R.A. Operative and non-operative management of esophageal perforations. *Ann. Surg.* 1981; **94**:57.