Epidemiological Profile of Foreign Body in Upper Aero-digestive Tract in a Peripheral Tertiary-Care Hospital

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ABSTRACT

Introduction:

Congenital deafness in a child is often missed. Several distraction tests have evolved over time to diagnose congenital deafness. Foreign body in upper aero-digestive tract leads to many complications including life-threatening ones to the patients. Its management depends upon type of foreign body and site of lodgement.

Materials and Methods

A descriptive study was conducted from March 2013 to February 2017 to determine the different components of the epidemiological profile of the cases of Foreign body in upper Aero-digestive Tract (UADT) and its management principle. Total 192 patients were selected for this study. These patients underwent different procedures for foreign body removal and post-operative notes were taken for data analysis to note the epidemiological pattern.

Results

A total of 192 patients were included in the study. Epidemiological data were derived and analyzed comprehensively to present the different profiles.

Conclusion

Fish bone was found to be the commonest foreign body in upper aero-digestive tract, followed by coin and meat bone. Foreign bodies are commonly removed by Tilley's forceps followed by Hypopharyngoscopy.

Keywords:

Foreign Bodies; Digestive Tract

Foreign body in upper aero digestive tract is a very common emergency encountered by ENT surgeons all over the world. Apart from nose and ear, pharynx and oesophagus is the next most common site for lodgement of foreign body.[1] Most of the ingested foreign bodies (80-90%) pass spontaneously on crossing lower esophageal sphincter.[2] But few (10-20%) become impacted during its passage through GI tract and requires operative intervention. Less than 1% requires surgery for removal.[3] In cases of sharp foreign bodies, common sites of impaction are palatine tonsil, base of the tongue, pyriform fossa etc. In case of blunt foreign bodies, sites of impaction are cricopharynx, upper one-third (25 cm from incisor teeth) of oesophagus. Beyond oesophagus other sites of obstruction are pylorus, duodenum and duodeno-jejunal flexure.

Blunt or smooth foreign bodies generally do not cause any harm and pass easily. But for sharp foreign bodies like fish bone, meat bone, denture, pin etc penetrate the intestinal wall followed by impending complications. Without treatment, complications like perforation, retropharyngeal and para-pharyngeal abscess formation, obstruction, oesophageal-aortic fistula, trachea-oesophageal fistula may occur. The common symptoms of the foreign bodies retained less than 24 hours are dysphagia, drooling of saliva, vomiting, gagging and anorexia. Respiratory symptoms like cough, stridor and chest pain may arise within minutes of foreign body entry into tracheo-bronchial tree; delayed complications like pneumonia may also occur.

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Radiological localisation of foreign body is an essential part of management. Antero-posterior and lateral X-ray of affected part is the basic radiological investigation performed. Barium studies should be used when there is suspicion of partial obstruction of oesophagus by radiolucent foreign body as complete obstruction of oesophageal lumen by foreign body may lead to aspiration of contrast material.[4] Positive findings on the esophagogram are irregularity in contrast medium column, deviation in expected course of oesophagus. Computed tomography scan and ultrasonography may be used as a tool for diagnosing radiolucent foreign body. Here we are presenting a study on different foreign bodies in upper aero-digestive tract admitted in our institution.

Materials and Methods

An institution based observational, descriptive, cross sectional study was done from March 2013 to February 2017 among 192 patients admitted in ENT inpatient department with definitive history of foreign body ingestion/inhalation; dysphagia/odynophagia following intake of food or radiologically detected foreign body. Cases where the foreign body passed below LES; severe mentally ill patients and infants below the age of 6 months were excluded from the study. The study aimed to determine the frequency of different types of foreign body along with their site of lodgement and the methods used for the removal of the same.

After admission, detailed history taking and clinical examination was done in every case. Soft tissue X-ray of neck (AP and lateral view) examination was done in almost every case to confirm the position of foreign body and whether it has passed through the oesophagus into the stomach. Apart from this, routine haemogram, X-ray chest, ECG was done for pre-anaesthetic fitness. After fitness clearance obtained from anaesthetist patients were taken to operation theatre for necessary intervention. Sharp foreign bodies like fish bone which were present in palatine tonsil or soft palate were easily removed under local anaesthesia. Two cases of coin which were lodged in cricopharynx were removed by Foley's catheter method. Rest of the patients were put under general anaesthesia and necessary procedures like Hypopharyngoscopy, Rigid Esophagoscopy, Bronchoscopy was done. We had no Flexible Endoscopic facility. So no foreign body was removed by flexible endoscopic procedure.

Based on above data, statistical analysis regarding types of foreign bodies according to age, sex, site of lodgement and procedure of removal has been performed.

Result

Total 192 patients were selected for this study. Ages of the patients ranging from 8 months to 84 years were included. Most common age group is 0-5 years (26.56%), followed by 6-10 years (11.97%). Incidence in age groups ranging from 11 to 30 years was found to be similar (interval of 5 years). (Fig. 1) Among 192 patients, 104 patients were males (54.16%) remainder females (45.83%).

Among all foreign bodies in upper aero-digestive tract, most common is fish bone-84 patients (43.75%). Apart from fish bone others include coin- 35 (18.23%), meat bone- 35 (18.23%), denture- 14(7.29%). Less common foreign bodies are meat bolus- 4 (2.08%), foreign body in bronchus- 5 (2.60%), button-type battery- 3 (1.56%). Least common things like cotton thread, rubber cover of TV jack, pen cap, tooth brush, ear ring (Fig. 2), hair pin, plastic cap together constitute the group 'others'-12 (6.25%) (Fig. 3).

In case of fish bone, majority were in palatine tonsil. Out of 35 patients who ingested coins, in 23 (65.71%) patients it was impacted in cricopharynx, remainder-12 (34.29%) were in upper third of esophagus. Meat bones commonly lodged in cricopharynx-10 cases (28.57%), followed by upper third of esophagus-17 (48.57%) and least in middle third-8 (22.85%). Among 14 cases of denture, 9 cases (64.29%) were in cricopharynx, 2 (14.28%) in upper third of esophagus, 3 (21.43%) in middle third. There are 5 cases (2.60%) of foreign body in bronchus-2 cases (40%) of pea in right bronchus, 2 cases (40%) of groundnut in left bronchus and 1 case (20%) of groundnut lodged at carina. (Table I)

Fish bones were removed with Tilley's forceps. In cases of fish bone lodged in the base of the tongue,

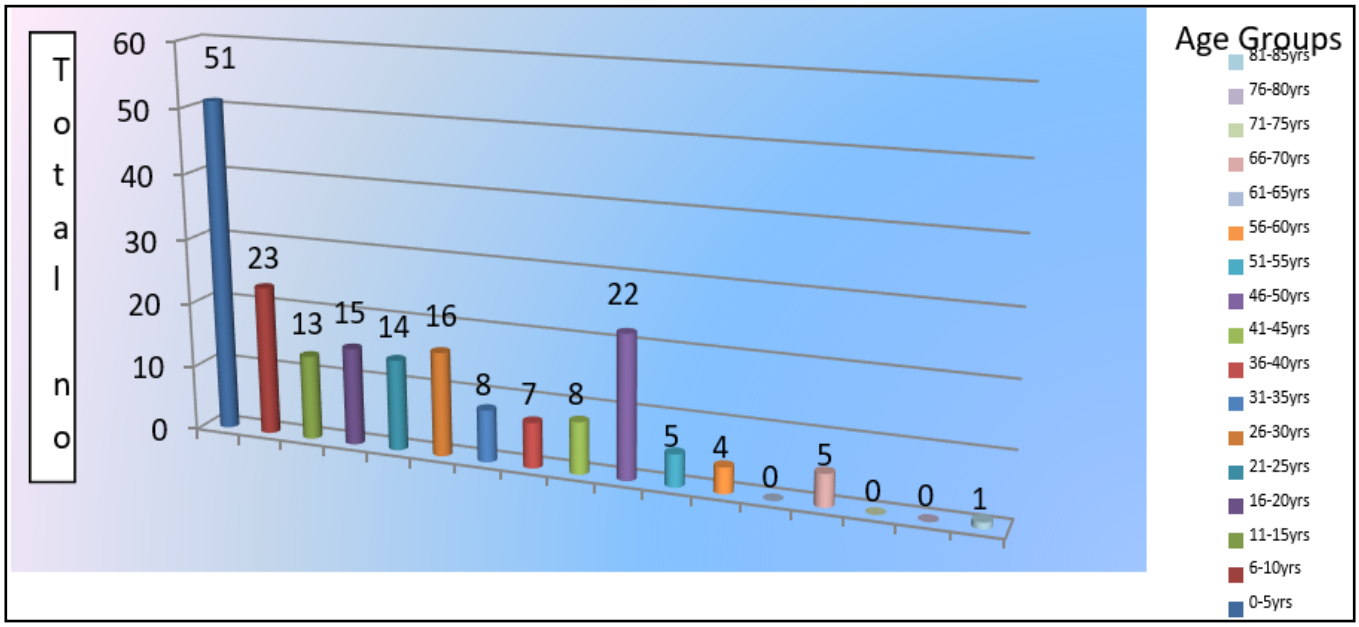

Fig. 1. Distribution of patients by age (N=192)

vallecula or pyriform fossa, direct laryngoscopy was performed. In majority of cases of impacted coin (65.71%) and denture (64.29%) hypopharyngoscopy was used for removal. Esophagoscopy was used in 34.29% of coin, 71.42% of meat bone and 35.71% cases of denture .

Discussion

Impaction of foreign body in esophagus leads to edema of mucosa and esophageal wall becomes weakened.[5] Sometimes esophageal peristalsis is not able to remove the esophageal foreign body. Long standing retention of esophageal foreign body may lead to perforation. So it should be removed as early as possible.

Fig. 2. Ear ring in Hypopharynx

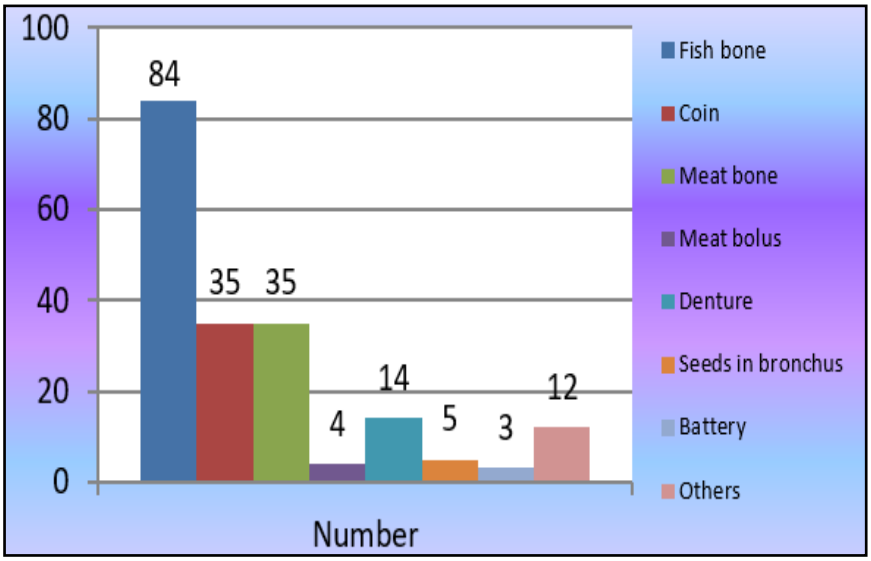

Fig. 3. Distribution of patients by type of foreign body (N=192)

Table I: Distribution of patients by site of impaction in aero-digestive tract (N=192)

ANATOMICAL SITE	NUMBER OF PATIENTS	PERCENTAGE
A. Foreign Body in Digestive Tract		
Tonsil	**43**	**22.4**
Base of tongue	**23**	**11.98**
Vallecula	**8**	**4.17**
Pyriform Fossa	**10**	**5.2**
Cricopharynx	**56**	**29.16**
Upper third of esophagus	**34**	**17.7**
Middle third of esophagus	**13**	**6.77**
B. Foreign Body in Airway Tract		
Bronchus	**5**	**2.6**

Many methods of foreign body removal have been developed like bougie, Foley's catheter, carbonated fluid or Papain, glucagon therapy, hypopharyngoscopy and esophagoscopy. Amongst these, hypopharyngoscopy and rigid esophagoscopy remain the most useful methods.

In our study, most patients belonged to 0-5 years of age(51 cases-25.56%). But in the study by Raza Muhammad et.al[6] 55% patients fall in this age group of 0-5 years. Ram Badan Sing et.al,[7] in their study showed that 62.9% of patients fall in the age group of 0-5 years. Most of the studies show pediatric age group is most commonly affected by foreign body in upper aerodigestive tract compare to other age group. This can be explained by explorative nature of children.

In this study there were 54.16% males and 45.83% females with M:F ratio 1.22:1. In the study of Sing et.al, the M:F ratio is 1.4:1 and in the study of Raza Muhammad et.al[6,7] the ratio of M:F is (1.32:1). Other relevant studies also support male preponderance. As most of the foreign bodies occur in children, and as male children are overactive than female, this probably explain the male preponderance.

Different types of foreign bodies found are Fish bone (43.75%), Coin (18.23%), Meat bone (18.23%), Meat bolus (2.08%), Denture(7.29%), Seeds in Bronchus (2.60%), Button-type battery (1.56%) and others (7.81%).

Fish bone is the commonest foreign body (43.75%) in upper aero digestive tract. This is because in this part of India fish is a part of the natives' daily diet. Study by Santosh Kumar Swain et al.[8] shows that the most common site of fish bone impaction is tonsil (31.6%), followed by base of tongue (20.4%), vallecula (18.4%) and pyriform fossa. But a study by L.C Knight and T.H.J Lesser[9] found that most common site of fish bone impaction is base of the tongue (53%) followed by tonsil (20%). In our study tonsil (51.19%) is the most common site.

Apart from fish bone, coin is the most common foreign body followed by meat bone. In our study, coin was present in 18.23% cases and meat bone in 18.23% cases. In the study by Prof.P.T.Deshmukh,[10] coin was present in 41.37% cases. Coins are seen most commonly

in children below 10 years of age group, because they have a tendency to put everything in the mouth. Coins commonly impacted in the cricopharynx (65.17%) and remainder in upper third of the esophagus (34.28%). Our study corroborate the findings of other studies that cricopharynx is the most common site of foreign body impaction.[11] Some other study also suggests that coin is the most common foreign body in digestive tract.[12] Chicken and mutton bone were present in 35 (18.23%) cases. Among 35 cases, 12 (34.28%) were at the level of cricopharynx, 14 (40%) in upper third of esophagus, 9 (25.71%) in middle third. It is found that most foreign bodies get impacted at the level just below the cricopharynx.

It may be due to strong peristaltic contraction of constrictor muscles of pharynx and weak propelling power of esophageal muscles.[13] We found 4 cases of meat bolus impacted just below cricopharynx or upper third of esophagus. This happen when a large bulk of meat is swallowed without proper chewing, who are aged people or having some kind of stricture in esophagus. There were 14 (7.29%) cases of impacted denture, mostly at the level of cricopharynx(64.29%). These patients were mostly elderly persons who had artificial denture. We received 5 (2.60%) cases of foreign body in airway tract (2 each in right and left and 1 in carina). Among 5 cases, 3 patients were below 10 years of age and 2 cases were above 60 years of age. In adults, foreign body in airway tract mostly get lodged in right bronchus. But in children, this right bronchus preponderance is not found.[14]

In children, left main stem bronchus is closer in size to right mainstream bronchus. The left main stem bronchus does not branch. We found 3 cases (1.56%) of button type batteries (coin-sized lithium batteries). In all cases batteries were removed within 6 hours of hospital admission. There is a common myth that button battery causes injury to esophagus by leaking its alkaline content. But leak usually do not develop, rather an electrical reaction takes place at the anode surface which creates tissue erosion.[15]

Apart from fish bone, among the rest 108 procedures, we performed hypopharyngoscopy in 65 (60.18%) cases, esophagoscopy in 41 (37.96%) cases. In 2 (1.85%) cases, coins were removed by Foley's catheter method. Hypopharyngoscopy was preferred because of its wider view compared to esophagoscopy and very less chance of injury to esophagus and other surrounding structures.

In esophagoscopy, there is always a chance of esophageal perforation, if not performed carefully. We used balloon extraction technique(Using Foley's catheter) for removal of coin in 2 cases where coins were lodged just below cricopharynx. The balloon extraction technique is a safe and effective technique alternative to rigid esophagoscopy for removal of selected esophageal foreign bodies in children.[16] This technique can be performed in an out-patient basis; does not require the use of general anaesthetic agents thereby preventing unnecessary anaesthetic hazards. Also the complications associated with esophagoscopy can be avoided.

Some literatures mentioned that some chemicals like papain and glucagon can be used for removal of meat bolus lodgement case. But risk of using papain is that it can digest the esophageal wall without digesting coins and bones. Glucagon is used to relax lower esophageal sphincter so that foreign body can pass. But glucagon does not relax a stricture or esophageal ring if foreign body is held due to that.

Conclusion

This study demonstrates that foreign body lodged in upper aero digestive tract occurs more commonly in children than adult. Hypopharyngoscopy with forceps removal of foreign body is more useful and safer method than rigid esophagoscopy. As the commonest type of foreign body encountered in children which requires removal under anaesthesia is coin; removal using Foley's catheter provides an alternative approach to the commonly used conventional techniques. In symptomatic patients, it should be diagnosed early and urgent removal should be done to prevent unnecessary complications.

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