

Foreign Body in Aerodigestive Tract – Prospective Analysis of 200 Cases

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ABSTRACT

Introduction: The inhalation/ingestion of a foreign body (FB) in the aerodigestive tract is a serious health problem that causes significant morbidity and mortality. Present study was conducted to study demographics, various types of foreign body, incidence and predisposing factors of foreign body in the aerodigestive tract. As well as clinical and radiological profile, role of different radiological investigations and potential complications of foreign bodies in aerodigestive tract were studied. **Material and Method:** Study included 200 cases of suspected foreign body in aerodigestive tract coming to outpatient and emergency ward during September 2009 to September 2011. **Results & Conclusions:** The commonest foreign bodies found in our study were coins and betel nut in the food passage and airways respectively. The reason for high incidence of these foreign bodies in our study is due to the fact that these commodities are widely used in this area. Endoscopic removal of foreign bodies in the aerodigestive tract using rigid scopes under general anesthesia has been reported to be a gold standard procedure. Laryngeal foreign bodies are much more common in study population. A thorny foreign body found in the desert area locally called bhurant and botanically called *Cenchrus biflorus* belonging to family poaceae, is only foreign body found in larynx, laryngopharynx and pyriform fossa. Betel Nut was commonest type of tracheobronchial foreign body in this study. This is because of habit of chewing betel nut by majority of the local persons. Close cooperation between anaesthesiologist and otolaryngologist is of particular importance.

KEYWORDS: Aerodigestive tract, Betel nut, Endoscopy, Foreign body.

INTRODUCTION

The inhalation/ingestion of a foreign body (FB) in the aerodigestive tract is a serious health problem that causes significant morbidity and mortality. The problem of foreign body ingestion and aspiration is not new, but significant dilemmas in the diagnosis and treatment of this problem remain despite major advances. The national Safety Council of America (1980) reported that the inhalation of foreign bodies is the leading cause of accidental deaths at home in children younger than 6 years of age. Foreign body aspiration is the cause of death in more than 500 children per year in the United States¹.

Kassay (1960)² had reported that habit of almost every child and some adults of placing small objects in the mouth which may slip into the pharynx, and are inhaled into the lower airways by the airflow of the forced inspiration. Fright, crying, coughing and laughing are accompanied by quick deep inspiration. This type of rapid strong airflow may carry a foreign body throughout the glottis into the trachea and bronchus. In

the review of 100 cases of esophagoscopies for suspected foreign body ingestion, Gonzalez et al³ discovered that impactions were most common in the cervical esophagus (46%), followed by the middle third (18%), pyriform sinus (6%) and distal third of esophagus (2%). Gilyoma et al⁴ found the cricopharyngeal sphincter to be the commonest site of impaction (68.5%) in the food passages.

Most common foreign bodies in air passages reported are peanuts, beans, seeds and other nuts. They have smooth surfaces, which may become slippery in the saliva and get easily aspirated. Areca nut as a common occurrence in tracheo-bronchial tree was first reported by Chhangani⁵ et al in 1970, which was found in 21 out of total 33 patients in their study. Gilyoma et al (2011)⁴ reported that in his study of 98 cases of foreign body in food passage, most common foreign body is coin 72% at cricopharynx.

Since Jackson^{6,7} described endoscopic techniques for the removal of foreign bodies in 1936, this has remained the

safest and most trusted method of treatment. Suffocation resulting from foreign body ingestion and aspiration is the third leading cause of accidental death in children under one year of age, and the fourth leading cause of death in children from ages 1 to 6. Foreign body accidents in the air and food passages occur without discrimination of age, sex or nationality. Difference in the mode of living, customs habits and environment in each country are contributing factors in the nature and frequency of foreign body.^{6,7}

The treatment of choice is endoscopic retrieval under general anesthesia. The procedure should be preceded by the completion of appropriate radiographic and other indicated studies, and careful thought on the part of the endoscopist and endoscopy team. Time invested in preparation and planning will usually yield great rewards with the successful and uncomplicated retrieval of the offending object and speedy recovery of the patient. The foreign bodies in the aerodigestive tract are very frequently encountered in this part of the Rajasthan (Bikaner), which is due to common habit of taking arecanuts, by persons of all age groups. Another common foreign body bhurant (Thorn) being accidentally ingested by persons working in the fields while taking water directly into the mouth. Different site and various types of foreign bodies and different mode of

presentation and various clinical features have been reported in the literature. Therefore, present study was conducted to study demographics, various types of foreign body, incidence and predisposing factors of foreign body in the aerodigestive tract. As well as clinical and radiological profile, role of different radiological investigations and potential complications of foreign bodies in aerodigestive tract were studied.

MATERIAL AND METHOD

The present study was conducted in the department of Otolaryngology and Head Neck Surgery, Sardar Patel Medical College and Associated Group of Hospitals, Bikaner, Rajasthan, India in the period ranging from September 2009 to September 2011. Study included 200 cases of suspected foreign body in aerodigestive tract coming to outpatient and emergency ward during this period. The foreign bodies in the aerodigestive tract was diagnosed clinically and radiologically in the patients having history of aspiration/ingestion of some foreign body accidentally presenting with symptoms and signs suggestive of foreign body aerodigestive tract or presenting themselves as cases of intractable pneumonia resistant to antibiotic therapy or as a cases of chronic unexplained dysphagia. Foreign body in Ear, Nose and Oral Cavity were excluded from this study.

Table No.1: Showing age distribution in 200 cases of the foreign body in aerodigestive tract

Age group (Years)	Air Passage		Food Passage		Total	
	No.	%	No.	%	No.	%
Less than 1	9	7.4	2	2.5	11	5.5
1-4	66	54.5	26	32.9	92	46.0
5-12	28	23.1	33	41.8	61	30.5
12-40	7	5.8	5	6.3	12	6.0
>40	11	9.1	13	16.5	24	12.0
Total	121	100	79	100	200	100

Table No. 2: Showing the sex incidence in 200 cases of foreign body in aerodigestive tract

Sex	Air Passage		Food Passage		Total	
	No.	%	No.	%	No.	%
Males	79	65.3	45	57.0	124	62.0
Females	42	34.7	34	43.0	76	38.0
Total	121	100	79	100	200	100

Table No. 3: Showing definite history of foreign body inhalation/ingestion.

Foreign body Inhalation/ Ingestion	Air Passage		Food Passage		Total	
	No.	%	No.	%	No.	%
Present	87	71.9	71	89.9	158	79.0
Absent	34	28.1	8	10.1	42	21.0
Total	121	100	79	100	200	100

Table No. 4: Correlation of site of foreign body and definitive history in Air Passage (n=121)

Definite History	Present		Absent		Total	
	No.	%	No.	%	No.	%
Bronchus & Carina	74	61.2	28	23.1	102	84.3
Larynx	6	5.0	3	2.5	9	7.4
Trachea & Sub Glottic	7	5.8	3	2.5	10	7.4
Total	87	71.9	34	28.1	121	100

Table No. 5: Correlation of site of foreign body and definite history in Food Passage

Definite History	Present		Absent		Total	
	No.	%	No.	%	No.	%
CP	64	81.0	5	6.3	69	87.3
Oesophagus	6	7.6	2	2.5	8	10.1
PPF	1	1.3	1	1.3	2	2.6
Total	71	89.9	8	10.1	79	100

Table No. 6: Showing Time lag (days) in 200 cases of foreign body aerodigestive tract

Time Lag (days)	Air Passage		Food Passage		Total	
	No.	%	No.	%	No.	%
0-1	23	19.0	26	32.9	49	24.5
1-7	56	46.3	37	46.8	93	46.5
8-30	23	19.0	10	1.7	33	16.5
>30	19	15.7	6	7.6	25	12.5
Total	121	100	79	100	200	100

Table No. 7: Showing various symptoms in 200 cases of foreign body aerodigestive tract

Symptoms	Air Passage (n=121)		Food Passage (n=79)		Total
	No.	%	No.	%	No.
Persistent Cough	107	88.4	3	3.8	110
Dyspnoea	102	84.3	2	2.5	104
Fever	49	40.5	19	24.1	68
Hoarseness of Voice	19	15.7	0	-	19
Vomiting	19	15.7	22	27.8	41
Difficulty in Swallowing	2	1.7	73	92.5	75
Pain in Throat	11	9.1	40	50.6	51
Sensation of Foreign body in throat	7	5.8	38	48.1	45
Drooling of Saliva	0	-	17	21.5	17
Food Refusal/weight loss	0	-	10	12.7	10
Surgical Emphysema	9	7.4	0	-	9
Convulsion	6	4.7	0	-	27
Cyanosis	12	9.9	2	2.5	14

Table No. 8: Correlation of symptoms and site of Foreign Body in air passage (n=121)

Symptoms	Bronchus & Carina		Larynx		Trachea & Sub Glottis	
	No	%	No	%	No	%
Persistent Cough (n=107)	96	89.7	5	4.7	6	5.6
Dyspnoea (n=102)	87	85.3	6	5.9	9	8.8
Fever (n=49)	45	91.8	2	4.1	2	4.1
Hoarseness (n=19)	10	52.6	6	31.6	3	15.8
Vomiting (n=19)	17	89.5	1	5.3	1	5.3
Pain in Throat (n=11)	8	72.7	3	27.3	0	-
Surgical Emphysema (n=9)	8	88.9	0	-	1	11.1
Sensation of Foreign body in throat (n=7)	0	-	5	71.4	2	28.6
Convulsion (n=6)	5	83.3	0	-	1	16.7
Difficulty in swallowing (n=2)	1	50.0	1	50.0	0	-

RESULTS AND DISCUSSION

Accidents resulting in the mortality and morbidity from inhalation/ingestion of foreign bodies continue to take a formidable toll of lives each year in almost every part of the country. The reports of foreign body accidents are increasing day by day in medical literature but still there are undoubtedly additional numbers of such tragedies that are neither diagnosed nor reported. An incidence of 0.38% of total patients attending the E.N.T. Outdoor was found in present study. On the contrary, Kim et al⁸ observed low incidence of 0.8% and Gilyoma et al⁶² observed 0.1%. Incidence of foreign bodies in aerodigestive tract varies from place to place and depends upon mode of living, customs, habits, and environment in each country.

In the present study the age of patients ranged from 20 days to 85 years. Peak incidence of foreign body air passage is between age group 1-4 years (54%) and in cases of foreign body food passage peak incidence is between age group 5-12 years (41%). (Table-1) Gilyoma⁴ also observed similar statistics. These figures are much lower than those reported by Hollinger⁹ and Ono¹⁰. Similarly Daniilidis et al¹¹ found in their study that common age group was between 5 months to 5 years. Their figures are notable for a very high incidence of foreign bodies below the age of 2 years. In this age group there is natural propensity of children of gaining knowledge by putting things into the mouth, inability to masticate well and inadequate control of deglutition, besides the habit of crying, shouting, laughing and playing during meals constitute some of the predisposing factors.^{11,12} The tendency of parents to thump or spank their children for acts of naughtiness at feeding time also seems to be contributory.¹³

In the present study male outnumbered the females, the ratio being 1.63:1. (Table-2) Out of 200 cases of foreign bodies in aerodigestive tract 62% were males and 37% were females. Ono¹⁰ reported that 56% were males while 44% were females. The earlier series have also shown male predominance with a male to female ratio of 1.4:1.^{14,15} The preponderance of male in the present study has been attributed to their aggressive nature. Daniilidis et al¹¹ found no difference of frequency in adult patients.

In the present series of 200 cases of foreign bodies in aerodigestive tract, a history of aspiration/ingestion of foreign body was present in 79% of cases while no history was elicited in 21% cases. Gilyoma et al⁴ found that 72% of patients gave definite history of foreign body ingestion/inhalation in cases of foreign body aerodigestive tract. It has been reported that a positive history of foreign body aspiration/ingestion cannot be obtained in 3-27% of patients.⁸ In nearly one third of children aspirating/foreign bodies, the actual event is not witnessed.¹⁴ In food passage 90% of cases presented with definite history of foreign body ingestion. In

foreign body cricopharynx, positive history was given by 81% of cases. In foreign body oesophagus 6 out of 8 cases gave history of ingestion of foreign body and rest were having complaints of chronic dysphagia. In a series of 225 patients of Rothmann and Boeckman¹⁶ 85% of cases had a history of definitive event. In Banerjee's study¹³, 73.1% children were brought with a definite history of foreign body inhalation/ingestion. (Table-3,5) In 49 cases (25%) the time elapsed between the inhalation of foreign body and arrival to the hospital was less than 24 hours. Within these 49 cases 23 cases (19%) were of air passage as compared to 26 cases (33%) of foreign body food passage. (Table-6) Hence we observed that cases of foreign body food passage seek medical attention earlier than case of foreign body air passage. Kim et al⁸ found a time lapse of 24 hours in 45% of cases. Daniilidis et al¹¹ reported low figures (30%) for time lag of 24 hours. Lakhkar et al¹⁷ reported that 70% presented within 48 hours and rest between one week to one month. Parental negligence, misdiagnosis, lack of suspicion or even undue procrastination on the part of fellow professionals contribute significantly to the delay.¹¹

In the present series in cases of foreign body air passage commonest symptoms were persistent cough (88%), dyspnoea (84%) while in cases of food passage most common symptom were difficulty in swallowing (92%), pain in throat (40%) and foreign body sensation in throat (38%). (Table 7-9) In cases of foreign body air passage Kim et al⁸ also observed cough to be common symptoms in 59% of cases followed by wheezing in 57% of the cases, but in the present series it was not so common and seen only in 39% of cases of foreign body air passage. Sreenath and Mahendrakar¹⁸ also reported wheezing as most common symptom of the foreign body (56%) in air passage. Second common symptom in their series was cough (50%). Symptoms of foreign body depend upon the size, site of lodgment, duration of lodgment, nature of foreign body and amount of obstruction produced. Elhassani (1988)¹⁹ mentioned that initial symptoms of foreign body inhalation are choking, gagging and coughing while the child is eating or holding an object in the mouth. Later manifestations depend on the nature of the foreign body, its size, site, its effect on the lung distal to it, and the stage at which the patient is seen. Non vegetative foreign bodies present with few symptoms and signs for weeks or months until they become obstructive causing emphysema or atelectasis. Vegetative foreign bodies, on the other hand whether obstructive or not, tend to cause early reaction and chemical bronchitis, with fever and chest infection.

In the present study in 79 cases of foreign body of food passage, most common symptoms is difficulty in swallowing (92%) followed by pain in throat (51%) and sensation of foreign body in throat (48%). Other common symptoms were vomiting (27%), drooling of

saliva (22%) and fever. Food refusal/weight loss is seen in 13% of cases. Other authors corroborated like similar results. Brooks²⁰ found most common symptom in adults was foreign body sensation and dysphasia whereas in children most common symptom was refusal to take feed. Nandi and Ong²¹ found pain or discomfort followed foreign body sensation as the most common symptom. (Table 7-9)

In the present study common signs of foreign body in the airways were decreased air entry (71% cases), restricted chest movements (37% cases), indrawing of the chest wall (50% cases), tracheal shift (25% cases), ronchi and crepitations (22% cases). Cyanosis was rare (3cases) as whole and encountered more commonly in tracheal foreign bodies. (Table 10,11) Kim et al⁸ reported most common sign to be decreased air entry in 60% of the cases. The signs next in frequency reported were ronchi

(38%) wheezing (17%) and stridor (13%). In the cases of laryngeal foreign bodies common signs encountered were dyspnoea and wheezing, while in cases of tracheal foreign body stridor and wheezing were the commonest sign. In cases of foreign body food passage a detailed examination by a good illumination was conducted. The oral cavity, oropharynx are examined for any tears or lacera, any bad teeth, absence of teeth or dentures. On indirect laryngoscopy the most important sign was that for retained secretions i.e. pooling of saliva in the pyriform recesses. It was seen in 13 patients out of 79 i.e. 16.4%. Majority of these cases were of oesophageal foreign body causing complete obstruction of oesophageal lumen show that even salivary secretion could not pass through. This pooling of retained secretion was also considered the single most important sign by Giordano in his series.

Table No. 9: Correlation of symptoms with site of Foreign Body in food passage (n=79)

Symptoms	CP		Oesophagus		PPF	
	No	%	No	%	No	%
Difficulty in swallowing (n=73)	66	90.4	7	9.6	0	-
Pain in Throat (n=40)	31	77.5	7	17.5	2	5.0
Sensation of Foreign body in throat (n=38)	34	89.4	2	5.3	2	5.3
Vomiting (n=22)	19	86.4	3	13.6	0	-
Fever (n=19)	13	68.4	5	26.3	1	5.3
Drooling of Saliva (n=17)	15	88.2	2	11.8	0	-
Food Refusal/weight loss (n=10)	10	100.0	0	-	0	-
Cough (n=3)	3	100	0	-	0	-
Dyspnoea (n=2)	2	100	0	-	0	-

Table No. 10: Correlation of clinical findings and site of foreign body aerodigestive tract (n=200)

Clinical Findings		Air Passage						Food Passage					
		Bronchus & Carina		Larynx		Trachea & Sub Glottis		CP		Oesophagus		PPF	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Tracheal Shift	Central	72	59.5	9	7.4	10	8.3	69	87.9	8	10.1	2	2.5
	Left	13	10.7	0	-	0	-	0	-	0	-	0	-
	Right	17	14.0	0	-	0	-	0	-	0	-	0	-
Indrawing of Chest Wall	Present	50	41.3	4	3.3	6	5.0	0	-	0	-	0	-
	Absent	52	43.0	5	4.1	4	3.3	69	87.3	8	10.1	2	2.5
Movement of Chest	Decreased	43	35.5	1	0.8	1	0.8	0	-	0	-	0	-
	Normal	59	48.8	8	6.6	9	7.4	69	87.3	8	10.1	2	2.5
Percussion Note	Decrease Left	5	4.1	0	-	0	-	0	-	0	-	0	-
	Decrease Right	5	4.1	0	-	0	-	0	-	0	-	0	-
	Normal	92	76.0	9	7.4	10	8.3	69	87.3	8	10.1	2	2.5
Audible Slap/Palpatory Thud	Present	0	-	0	-	7	5.8	0	-	0	-	0	-
	Absent	102	84.3	9	7.4	10	8.3	69	87.3	8	10.1	2	2.5
Indirect Laryngoscopy	Foreign Body Seen	0	-	4	3.3	1	0.8	0	-	0	-	2	2.5
	Foreign Body not seen/done	102	84.3	5	4.1	9	7.4	69	87.3	8	10.1	2	2.5
Pooling of retained secretion in pyriform fossa	Present	0	-	0	-	0	-	6	7.6	7	8.9	0	-
	Absent/Not done	102	84.3	9	7.4	10	8.3	63	79.7	1	1.3	2	2.5

Table No. 11: Correlation of clinical signs and site of foreign body in air passage (n=121)

Clinical Signs		Air Passage					
		Broncus and Carina		Larynx		Trachea & Sub Glottis	
		No.	%	No.	%	No.	%
Air entry in Lungs	Decrease Bilateral	0	-	2	1.6	7	5.8
	Decrease Left	24	19.8	0	-	0	-
	Decrease Right	53	43.8	0	-	0	-
Wheeze	Normal	25	20.7	7	5.8	3	2.5
	Present	32	26.5	0	-	7	5.8
Rhonchi & Crepitation	Absent	70	57.9	9	7.4	3	2.5
	Present	25	20.7	1	0.8	1	0.8
Surgical Emphysema	Absent	77	63.6	8	6.6	9	7.4
	Present	9	7.4	0	-	0	-
Stridor	Absent	93	76.9	9	7.4	10	8.3
	Present	11	9.1	7	5.8	5	4.1
	Absent	91	75.2	2	0.8	5	4.1

Table No. 12: Chest X-ray findings in cases of foreign body air passage (n=121)

Findings	Present		Absent	
	No.	%	No.	%
Emphysema (Air Trapping)	43	35.5	78	64.5
Normal	41	33.9	80	66.1
Mediastinal Shift	33	27.2	88	72.8
Obstructive Collapse	26	21.5	95	78.5
Consolidation	20	16.5	101	83.5
Radio-opaque shadow of Foreign Body	5	4.1	116	95.9

Table No. 13: X-ray soft tissue neck AP/Lateral findings in cases of foreign body food passage (n=79)

Characteristics	Present		Absent	
	No.	%	No.	%
Radio-opaque shadow of Foreign Body	60	75.9	19	24.1
Increase Prevertebral shadow	12	15.2	67	84.8
Soft tissue gas in Upper oesophagus	6	7.6	73	92.4

Table No. 14: Site of Foreign body in cases air passage (n=121)

Site of Foreign Body	No.	%
Left Bronchus	33	27.3
Larynx	9	7.4
Right Bronchus	69	57.0
Trachea & Sub Glottis	10	8.3

Table No. 15: Site of Foreign body in food passage (n=79)

Site of Foreign Body	No.	%
Cricopharynx	69	87.3
Oesophagus	8	10.1
Pyriform Fossa	2	2.5

The commonest foreign body of air passage in the Present series was betel nuts (36% cases) because of habit of chewing it by people in this part of Rajasthan.

Other foreign bodies found air passage in the present series are peanuts (23% cases) and gram seeds (8% cases). Table 16,17) Foreign bodies in the airway include almost all substances or parts of the substances with which human beings commonly come in contact, within the limits imposed by the size of the involved passage. Majority of the foreign bodies aspirated are of vegetative origin, of which omnipresent betel nut and pea nut are the most common inhaled foreign bodies.²²

Betel nut as most common inhaled foreign body was also reported by Bansal et al¹²³, Chhangani et al²⁴. In many Asian countries including India, Pakistan and Taiwan, betel nut (Betel nut) is chewed by itself and in various preparations. Reviewing the international literature, it has been found that the most frequently met foreign body are bony substances (19-20%), followed by metal object (10-15%), pits of fruits (14%), coins (11-14%), pins (9-11%) and food particles²⁵. In the present study among 79 cases of foreign body food passage most common foreign body is coin 38(48%) cases followed button battery 9(11.4%) cases and betel nut 7(8%) cases. One interesting point to note that most of these foreign bodies were found in children. In the present study some other uncommon foreign body are metallic foreign body (4 cases) and Bhurant (2 cases) both of these were typically found impacted at pyriform fossa. Some rare foreign bodies are cheeku seed, finger ring, plastic piece, stapler pin and coconut piece.

In adult cases of foreign body food passage common foreign bodies were meat bolus and dental prosthesis (6 cases each) and betel nut (3 cases). Adult who usually hard foreign body impacted in food passage also had some underlying pathology that caused oesophageal lumen to get narrow thus predisposing the individual for impaction of foreign body in food passage.

Gilyoma⁴ found most common foreign body in food passage is coin 72% at cricopharynx. Similarly Brooks²⁰ illustrated that in cases of foreign body of food passage coin (69%) were common in children whereas meat bolus (51%) followed by fish bone (34%) were common as foreign body in food passages of adults.

The site of lodgement of the foreign bodies depends upon the size, shape and surface quality, composition of the patient during the Ingestion/inhalation. Among the cases of foreign body of air passage, most common site of impaction of foreign body are right bronchus (most common) in 68 cases (57%) followed by the left bronchus 33 cases (26%), larynx 9 cases (7%), trachea 10(8.3%) cases and carina 1 case. (Table 14) In a study of 446 cases of foreign bodies Ono¹⁰ reported that the most frequent site of foreign body lodgment in the airway is bronchus (321cases) followed by trachea (74)

and larynx (51). Kim et al⁸ reported 99 (50%) in the right main bronchus, 63 (32%) in the left main bronchus, 6 (3%) in the trachea, 5 (2%) at carina and 14 patients had multiple foreign bodies. It is well known that the site of lodgement of inspired exogenous foreign body in majority of cases is in the right bronchial system. However both, a left sided predominance and an equal distribution have been reported. McGuirt et al (1988)²⁶ found that 65% of caess had foreign body in the right bronchial tree, 31% had in the left bronchial tree, 3.5% in the trachea and 1A in the larynx.

Majority of the foreign bodies pass through the glottis into the trachea, so the larynx is not a common site for the lodgment of the foreign body. The present study also supports this fact as only 7% cases of the laryngeal foreign body are encountered. The only foreign body was a fruit of a grass locally named bhurant and botanically termed as *cenchrus biflorus*. The peculiarity of lodgment of *cenchrus biflorus* in the larynx is because of its being equipped with bristles. Foreign body in the subglottic region are very rare and it may get stick to mucosa during transmission by retrograde impaction of loose foreign bodies by bechic blast. The present study revealed that among bronchial foreign bodies right bronchus is a predominating site of lodgment. This is due to fact that the right bronchus better facilitates the entrance of foreign body because of its greater diameter, lesser angle of deviation of its axis from the tracheal axis, the situation of the carina at the left of the midline of the trachea, the action of the trachealis muscle and greater volume of the air going into the right bronchus with inspiration. On the contrary the study of Daniilidis et al¹¹ and Singh et al²⁷ is notable for dominance of left bronchus for the lodgment of foreign body. Children usually inhale foreign bodies while lying down and hold the foreign body in the right hand and in that position the left bronchus is somehow straightened and greatly dependent.

Among the 79 cases foreign body food passage most common site of impaction of foreign body is cricopharynx 69 cases (87%) followed by oesophagus 8 cases (10%) and pyriform fossa 2 cases (3%). (Table 15) Gilyoma et al⁴ also found that in food passage most common site of impaction of foreign body is cricopharyngeal sphincter 68.5%. Brooks²⁰ found that 69% of foreign bodies were at or near the cricopharynx which was further corroborated by Nandi & Ong²¹ 75.8%. This is because, the strong propulsive pharyngeal muscles force the object at the cricopharynx. Opening but the less active oesophageal muscle cannot push it further as it has comparatively less power which may have been diminished by age. Perhaps the mobile redundant mucosa of this region adds to the hazard. The cricopharyngeal opening also happens to be the narrowest part of the food passage.

Table No. 16: Correlation of type of foreign body and site of foreign body in air passage (n=121)

Type of Foreign Body	Bronchus	Larynx	Trachea & Subglottis	Total	%
Betel Nut	42	0	1	43	35.5
Pea Nut	24	1	3	28	23.1
Gram Seed	10	0	0	10	8.3
Watermelon Seed	8	0	1	9	7.4
Bhurant	0	6	1	7	5.8
Plum Seed	3	0	0	3	2.5
Metallic FB	2	0	1	3	2.5
Pen Cap	1	0	1	2	1.7
Plastic piece	1	0	1	2	1.7
Whistle	2	0	0	2	1.7
Almond	1	0	0	1	0.8
Black Pepper	1	0	0	1	0.8
Castor Seed	1	0	0	1	0.8
Cheeku Seed	1	0	0	1	0.8
Glass Piece	1	0	0	1	0.8
Imli Seed	1	0	0	1	0.8
Cashew	1	0	0	1	0.8
Meat Piece	1	0	0	1	0.8
Tablet Paper	0	1	0	1	0.8
Tooth	1	0	0	1	0.8
Zip Hook	0	1	0	1	0.8

Table No. 17: Correlation of type of foreign body and site of foreign body in food passage (n=79)

Type of Foreign Body	Cricopharynx	Oesophagus	Pyriiform fossa	No.	%
Coin	38	0	0	38	48.1
Button Battery	8	1	0	9	11.4
Betel Nut	6	2		7	8.9
Dental Prosthesis	3	3	0	6	7.6
Meat Bolus	4	1		5	6.3
Bhurant	0	0	2	2	2.5
Cheeku Seed	0	1	0	1	1.3
Finger Ring	1	0	0	1	1.3
Kancha	1	0	0	1	1.3
Open Safety Pin	1	0	0	1	1.3
Plastic	1	0	0	1	1.3
Stapler Pin	1	0	0	1	1.3
Two Coins	1	0	0	1	1.3
Coconut Piece	1	0	0	1	1.3

Table No. 18: Time of endoscopy in 200 cases of foreign body aerodigestive tract

Time of Endoscopy	Air Passage		Food Passage	
	No.	%	No.	%
Emergency (0-1hour)	27	22.3	10	12.7
1-24 hours	94	77.7	69	87.3
Total	121	100	79	100

In cases of foreign body air passage, radiological examination plays a very important role in diagnosing foreign body. In the present study commonest radiographic finding is emphysema (air trapping) 43 cases (36%) followed by Mediastinal shift 33 cases (27%), obstructive collapse 26 cases (22%) and consolidation 20 cases (17%). Radiopaque shadow of

foreign body is seen in 5 cases (4%). In the present study in 41% of cases radiological examination was within in normal limits. (Table 12)

Commonest radiological finding reported by Harboyan and Nassiff²⁸, Kim et al⁸ and Daniilidis et al¹¹ was localized emphysema corresponding to the bronchus lodging the foreign body, associated with deviation of

mediastinum to the opposite side. On the contrary the commonest finding in the present series was obstructive collapse. Other radiological findings in case of the bronchial foreign body are similar with the present observations on comparison with other series.

The emphysema is caused by valve like action of the foreign body, atelectasis due to bronchial obstruction, the pneumonia due to vegetative reactions produced by foreign body. Non-opaque laryngeal and tracheal foreign

bodies do not produce any secondary effect in the lungs and no cases of laryngeal and tracheal foreign body in this series had any significant radiological findings.

In the present study, in 79 cases of foreign body food passage routine PA and lateral chest and neck X-ray were done. Radiopaque shadow of foreign body is seen in 76% of cases other radiological findings are increase prevertebral shadow 15% and soft tissue gas in upper oesophagus 7%.(Table 13)

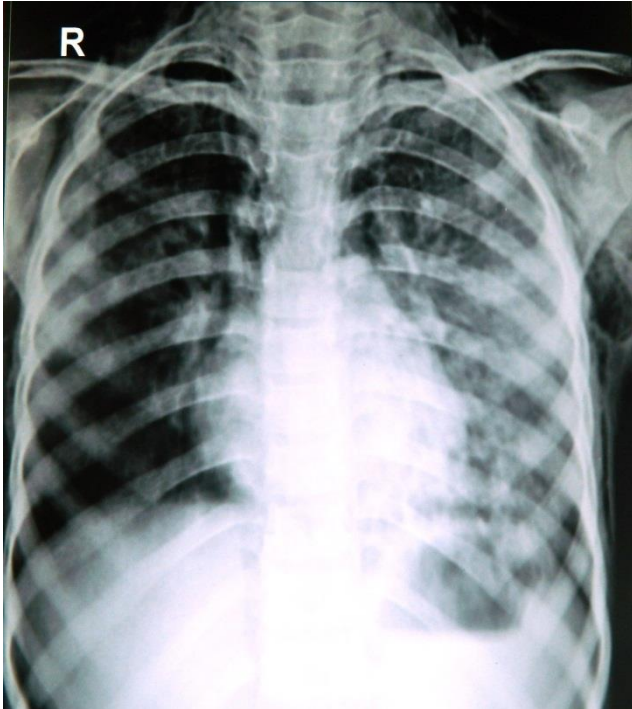


Fig 1: Right obstructive emphysema with subcutaneous emphysema.

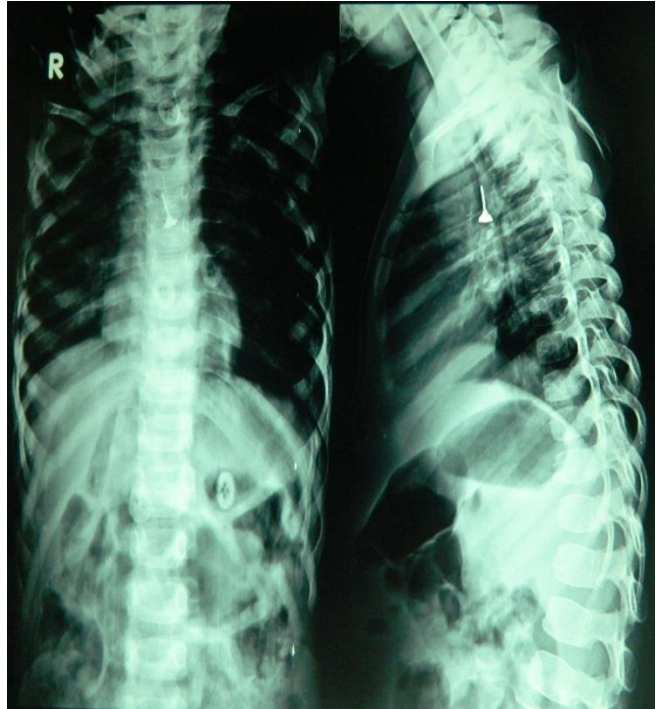


Fig 2: Metallic foreign body (bolt) at the level of carina.

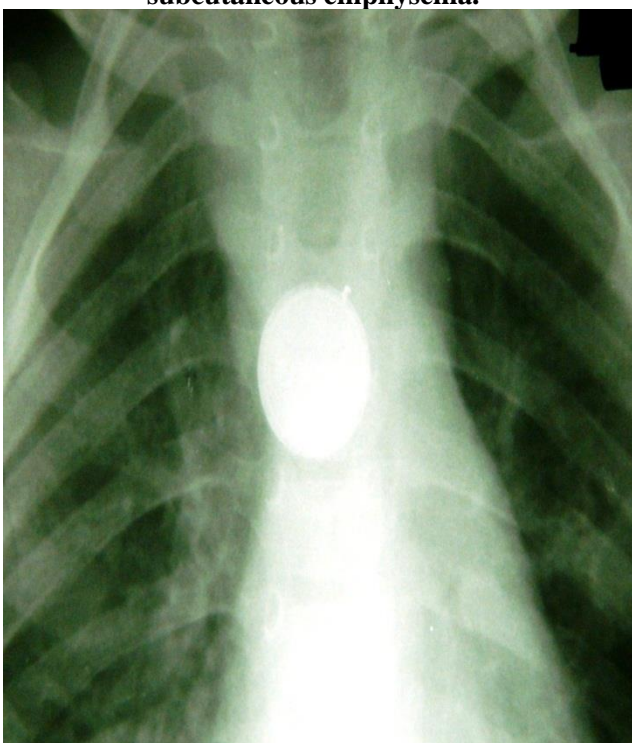


Fig 3: Button battery at cricopharynx with characterstic ' double ring sign'

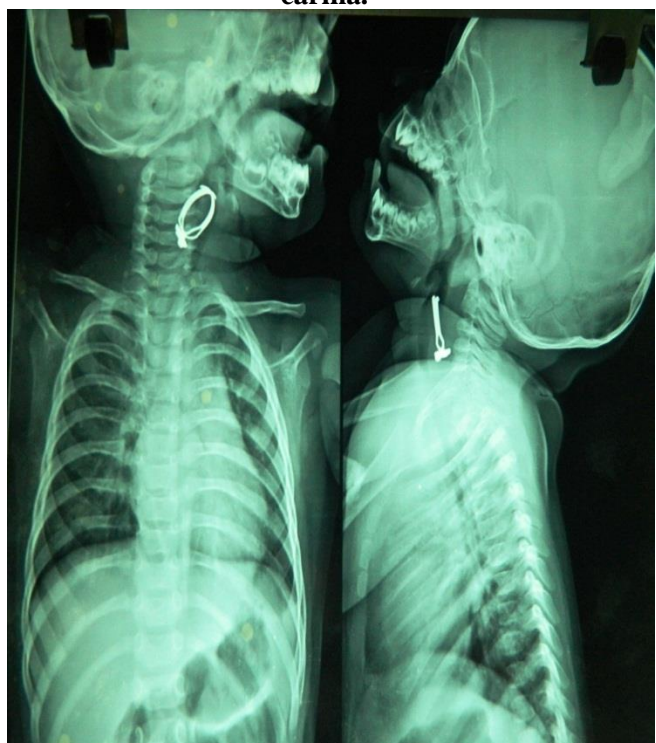


Fig 4: Metallic foreign body (ring) at level of cricopharynx.

Brooks²⁰ found that if the obstruction in oesophagus has occurred becomes of foreign body an air fluid level of soft tissue gas may be seen in oesophageal area may indicate such total oesophageal obstruction even through foreign body itself cannot be visualized by direct X-ray. Removal of foreign body is still a challenge and presents considerable problem both the endoscopist and anaesthetist because of varieties of object aspirated/ingested, maintenance of an adequate air way occur and a quick atraumatic removal of foreign body.²⁹ In the present series, all cases required endoscopy for the removal of the foreign body. No foreign body was expelled out spontaneously. Although the incidence of spontaneous removal of foreign body (2-4% cases) were reported by Bansal et al²³, Lakhkar et al¹⁷.

Management of the foreign body depends upon the site of lodgment of foreign body. The laryngeal foreign bodies are removed without much problem with laryngoscope even in children and as a rule laryngoscopy can be carried without a tracheostomy. Laryngoscopy was performed in 12 cases of laryngeal foreign body and subglottic foreign body under general anaesthesia.

Bronchoscopy was performed in 109 cases of tracheobronchial foreign body. There was a history of foreign body aspiration in 61% of cases while in other 39% of cases bronchoscopy was done for diagnostic purpose and foreign body was visualized and removed. Thus the present study revealed that diagnostic bronchoscopy should be considered valuable when there is a suspicion of foreign body in the airways. Similar observations have also been reported by Daniilidis et al¹¹.

In the present study, rigid bronchoscope was used although some advocated flexible bronchoscope for removal of foreign body from tracheobronchial tree. Rigid bronchoscopy usually requires heavy intravenous sedation or general anesthesia. The rigid bronchoscope has important advantages over the flexible bronchoscope.

The larger diameter of the rigid bronchoscope facilitates the passage of various grasping devices, including a flexible bronchoscope. A better chance of quick, successful extraction and better capabilities of suctioning clotted blood and thick secretions are offered by the rigid bronchoscope. The pediatric flexible bronchoscope lacks a hollow-working channel through which instruments may be inserted or blood and secretions may be aspirated.

In the present study of 200 cases of foreign body aerodigestive, 37 cases (27 cases of air passage and 10 cases of food passage) required an emergency endoscopic removal of foreign body while in rest 163 cases endoscopic removal of foreign body was done within 24 hours and not as an emergency.

CONCLUSION

Foreign bodies in the aerodigestive tract are an important cause of morbidity and mortality in the two extremes of life and pose diagnostic and therapeutic challenges to otorhinolaryngologists. The commonest foreign bodies found in our study were coins and betel nut in the food passage and airways respectively. The reason for high incidence of these foreign bodies in our study is due to the fact that these commodities are widely used in this area. Endoscopic removal of foreign bodies in the aerodigestive tract using rigid scopes under general anesthesia has been reported to be a gold standard procedure. Laryngeal foreign bodies are much more common in study population. A thorny foreign body found in the desert area locally called bhurant and botanically called cenchrus biflorus belonging to family poaceae, is only foreign body found in larynx, laryngopharynx and pyriform fossa. Betel Nut was commonest type of tracheobronchial foreign body in this study. This is because of habit of chewing betel nut by majority of the local persons. Close cooperation between anaesthesiologist and otolaryngologist is of particular importance. Foreign body aspiration/ingestion is a preventable accident. Continued campaign to prevent foreign body accidents is still necessary to the general public and also to the medical professionals.

CONFLICT OF INTEREST: None declared.

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