# CLINICAL PROFILE OF AERODIGESTIVE FOREIGN BODIES

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# *CERTIFICATE*

This is to certify that this dissertation entitled **"Clinical Profile of Aerodigestive Foreign Bodies"** presented herewith by **Dr. S. MOHAIDEEN NOUSHADH GANI** to the faculty of Oto-Rhino-Laryngology, The Tamil Nadu Dr. M.G.R. Medical University, Chennai in partial fulfilment of the requirement for the award of M.S. Degree branch IV (ENT) is a bonafide research work carried out by him under my direct supervision and guidance.

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# INDEX

# INTRODUCTION

The problem of foreign bodies in the aerodigestive tract is commonly encountered in day to day ENT practice. The problem of aerodigestive foreign bodies are noted from time immemorial. It is mostly accidental with patient negligence being the major contributing factor. They have to be attended immediately because of grave complications. With the advent of rigid endoscopes and Hopkins telescopes visualization of the aerodigestive tract and removal of foreign bodies have been revolutionized. The gravity of situation calls for extensive study and hence this topic is selected for dissertation work.

# AIM AND HISTORY

**Aim of study:**

The aim of this study is to analyse the types of foreign bodies, the sites of lodgement and methods of removal with special reference to common site of lodgement. The cases which came to ENT OPD at Govt Rajaji hospital, Madurai, from July 2004 to July 2005 form the subject of study.

**History:**

A case of thorn plucked from the throat of a boy by saint Blaise, Bishop of sebaste (200AD) seems the earliest recorded case. Mention of foreign bodies appear in many ancient records. Account of Foreign bodies in tracheo bronchial tree is given by Letterson et al and Kernan et al.

# DEFINITION AND NOMENCLATURE

**Aerodigestive tract:**

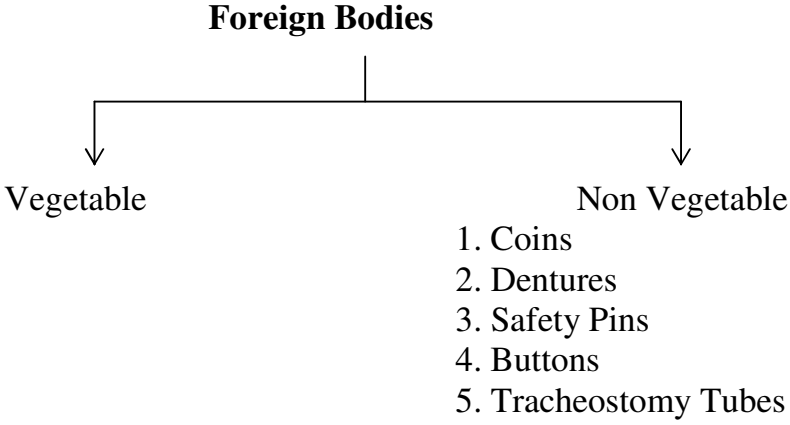
Refers to Air passages from anterior nares including nose, nasopharynx, larynx and tracheo bronchial tree and food passages including oropharynx, hypopharynx and esophagus only.

**Foreign body:**

An object or substance foreign to the place where it is found.

**Classification:**

Foreign bodies are divided into vegetable and non vegetable foreign bodies. Non vegetable foreign bodies include coins, dentures, safety pins, buttons, tracheostomy tubes etc.



# ANATOMY OF AERODIGESTIVE TRACT

**Nasal Cavity:**

The nasal cavity extends from the external nares or nostrils to the posterior choanae, where it becomes continuous with the nasopharynx and is narrower anteriorly than posteriorly. Vertically it extends from the palate to the cribriform plate, being broader at its base than superiorly where it narrows to the olfactory cleft. The nasal cavity is divided in two by a septum. The configuration and dimensions show considerable ethnic variation. Each half has a floor, a roof, a lateral wall and a medial (septal) wall. The floor is concave from side to side, anteroposteriorly flat and almost horizontal. Its anterior three quarters are composed of the palatine process of the maxilla, its posterior one quarter by the horizontal process of the palatine bone. About 12 mm behind the anterior end of the floor is a slight depression in the mucous membrane overlying the incisive canals. This contains the terminal branches of the nasopalatine nerve, the greater palatine artery and a short mucosal canal (Stenson's organ). Occasionally incisor and canine teeth can protrude into the floor of the nasal cavity.

The roof is narrow from side to side, except posteriorly and may be divided into frontonasal, ethmoidal and sphenoidal parts, related to the respective bones. As both frontonasal and sphenoidal parts of the roof slope downwards, the highest part of the nasal cavity relates to the cribriform plate of the ethmoid which is horizontal. This area is covered by olfactory epithelium which spreads down a little distance onto the upper lateral and medial walls of the nasal cavity. The rest of the nasal cavity (with the exception of the nasal vestibule ) is lined by respiratory mucous membrane which is intimately adherent to the underlying periosteum and perichondrium and is continuous with that of the paranasal sinuses, nasolacrimal duct and nasopharynx.

**The pharynx:**

General Description

The pharynx forms the crossroads of the air and food passages. Each major road from the pharynx can be closed by a muscular sphincter. There is a smaller passage each side from the nasal airway, above the nasopharyngeal sphincter, leading to the middle ear; it is the pharyngotympanic or eustachian tube. This tube is normally closed, as is the cricopharyngeal or upper oesophageal sphincter.

The cavity of the pharynx is perhaps best considered as a tube flattened from front to back and with varying widths. Changes in its capacity at different levels in the resting state are best demonstrated by cross- sectional anatomy, which can now be shown by means of computerized tomographic (CT) Scanning. The pharynx extends from the base of the skull to the level of the sixth cervical vertebra, a distance of about 12cm, where it joins the oesophagus at the lower level of the cricoid cartilage. The junction is marked by the circopharyngeus muscle which normally holds the upper oesophageal sphincter closed. The lateral and posterior wall of the pharynx are made up of muscular and fibrous tissue attached to the base of the skull superiorly. The pharynx can be in communication with the air and food passages both anteriorly and inferiorly, as indicated previously. From above downwards, these routes of communication are: the nasal cavities through the posterior nasal apertures; the middle ears through the pharyngotympanic tubes; the mouth through the oro pharyngeal isthmus; the larynx through the glottis; and the oesophagus through its upper cricopharyngeal sphincter.

The subdivisions of the pharynx described below are based on those set out in the TNM system for classification of malignant tumours published by the International Union Against Cancer. Where division differs from the purely anatomical one, this has been noted.

**Nasopharynx (postnasal space):**

The nasopharynx or postnasal space lies behind the nasal cavities and above the soft palate. The anterior wall is formed by the openings into the nasal cavities which allow free communication between the nose and nasopharynx each side of the posterior edge of the nasal septum. Just within these openings lie the posterior ends of the inferior and middle turbinates.

The posterosuperior wall of the nasopharynx extends from the base of the skull, at the superior end of the posterior free edge of the nasal septum, down to the level of the junction of hard and soft palates. Anatomically, this lower level is often considered as being at the free edge of the soft palate. This posterosuperior wall is formed by the anteroinferior surface of the body of the sphenoid bone and basilar part of the occipital bone. These two together are termed the 'basisphenoid'. The bony wall extends as far as the pharyngeal

tubercle, but below this the wall is formed by the pharyngobasilar fascia lying in front of the anterior arch of the atlas. A collection of lymphoid tissue, the nasopharyngeal tonsil, is found in the mucous membrane overlying the basisphenoid. When the nasopharyngeal tonsil is enlarged, it is commonly referred to as 'the adenoids'.

On each lateral wall of the nasopharynx is the pharyngeal opening of the pharyngotympanic tube. It lies about 1 cm behind the posterior end of the inferior turbinate just above the level of the hard palate. The medial end of the cartilage of the tube forms an elevation shaped like a comma, with a shorter anterior limb and a longer posterior one. Behind and above the tubal cartilage lies the pharyngeal recess. This recess passes laterally above the upper edge of the superior constrictor muscle and corresponds to the postion of the sinus of Morgagni. From the Posterior edge of the tubal opening the salpingopharyngeal fold, produced by the underlying salpingopharyngeus muscle, passes downwards and fades out on the lateral pharyngeal wall. A less well-defined fold passes from the anterior edge of the tubal opening on to the upper surface of the soft palate, and is caused by the underlying levator palati muscle.

The inferior wall of the nasopharynx is formed by the superior surface of the soft palate. In the midline of this wall, there is an elevation caused by the two uvular muscles on the dorsum of the palate.

**Oropharynx:**

The TNM system, noted previously, describes the oropharynx as extending from the junction of the hard and soft palates to the level of the floor of the valleculae. Anatomical texts describe it is as extending from the lower edge of the soft palate to the tip of the epiglottis or to the laryngeal inlet, in terms of physiology, it is easier to describe the oropharynx as extending from the oropharyngeal isthumus to the level of the floor of the valleculae which is also the level of the hyoid bone. The oropharyngeal isthmus is the boundary between the buccal cavity and the oropharynx and is marked on each side by the palatoglossal fold formed by the underlying palatoglossus muscle passing from the undersurface of the palate to the side of the tongue. The paried palatoglossal muscles together with the horizontal intrinsic tongue musculature form the oropharyngeal sphincter.

The anterior wall of the oropharynx is, at its upper end, in free communication with the buccal cavity. Below this, the glossoepiglottic area is formed by the posterior one-third of the tongue posterior to the circumvallate papillae. At the lower part of this anterior wall are found the paired valleculae. The valleculae are separated from each other in the midline by the median glossoepiglotic fold passing from the base of the tongue to the anterior or lingual surface of the epiglottis, laterally, each is bounded by the lateral glossoepiglottic fold. The TNM system incorporates the anterior or lingual surface of the epiglottis into the oropharynx. The anterior boundary of the lateral wall of the oropharynx is drawn by the palatoglossal fold and underlying palatoglossus muscle described previously. Behind this, from the lower edge of the soft palate, the palatopharyngeal fold passes downwards and a little backwards to the side wall of the pharynx, where it fades away. Like the palatoglossal fold, this is caused by an underlying muscle, the palatopharyngeus, in the triangular space between these two folds lies the palatine or faucial tonsil. The pharyngal surface of the tonsil is oval in shape and demonstrates a variable number of pits or crypts.

The posterior wall of the oropharynx is formed by the constrictor muscles and overlying mucous membrane. The superior wall of the oropharynx is formed by the inferior surface of the soft palate and uvula.

**Hypopharynx (Larygnopharynx):**

The hypopharynx is that part of the pharynx which lies behind the larynx and partly to each side, where it form the pyriform fossae or sinuses. It is continuous above with the oropharynx and below with the oesophagus, at the lower border of the cricoid cartilage, through the cricopharyngeal sphincter.

In the anterior wall of the hypopharynx lies the larynx itself with its oblique inlet. The inlet is bounded anteriorly and superiorly by the upper part of the epiglottis, posteriorly by the elevations of the arytenoid cartilages, and laterally by the aryepiglottic folds. Below the laryngeal inlet, the anterior wall is formed by the posterior surfaces of the paired arytenoid cartilages and the posterior plate of the cricoid cartilage. To each side of the larynx lie the pyriform fossae. They are bounded laterally by the thyroid cartilage and medially by the lateral surface of the aryepiglottice fold, the arytenoid and cricoid cartilages.

They extend from the lateral glossoepiglottic fold to the upper end of the oesophagus. Deep to the mucous membrane of the lateral wall of the pyriform fossa lies the superior laryngeal nerve, where it is accessible for local anaesthesia.

The TNM system describes the posterior wall of this section of the pharynx as extending from the level of the floor of the valleculae to the level of the circoarytenoid joint. This wall is formed by the constrictor muscles and overlying mucous membrane. The region below this, down to the inferior broder of the cricoid cartilage is called the pharyngo-oesophageal junction and is bounded anteriorly by the posterior plate of the cricoid cartilage and encircled by the cricopharyngeus muscle which form the upper oesophageal sphincter.

**The soft palate:**

The soft palate is a mobile, flexible partition between the nasopharyngeal airway and the oropharyngeal food passage, and it can be likened to a set of points on a railway track, movement of which opens one line and closes another. It extends posteriorly from the edge of the hard palate, and laterally it blends with the lateral wall of the oropharynx. The soft palate forms the roof of the oropharynx and the

floor of the nasopharynx. It lies between two sphincters: the nasopharyngeal which pulls the palate up and back to close the nasopharyngeal airway and the oropharyngeal which pulls it down and forwards to close the oropharyngeal isthmus.

**The oesophagus:**

General description

The oesophagus is a muscular tube, about 25 cm in length, connecting the pharynx to the stomach. It extends from the lower border of the cricoid cartilage at the sixth cervical vertebra, where it is continious with the pharynx, to the cardiac orifice of the stomach at the side of the body of the eleventh thoracic vertebra. In passing from the pharynx to the stomach, it traverses the neck and then the superior and posterior parts of the mediastinum before piercing the diaphragm, after which it has a short abdominal course before joining the stomach.

In the newborn infant, the upper limit of the oesophagus is found at the level of the fourth or fifth cervical vertebra and it ends higher, at the level of the ninth thoracic vertebra. At birth, the length of the oesophagus varies between 8 and 10 cm, but by the end of the

first year it has increased to 12 cm. Between the first and fifth years, it reaches a length of 16cm, but growth after this is slow as it measures only 19cm by the fifteenth year.

The diameter of the oesophagus varies according to whether or not a bolus of food or fluid is passing through it. At rest, in the adult, the diameter is about 20mm, but this may increase to as much as 30mm. At birth, the diameter is about 5mm, but this dimension almost doubles in the first year, and by the age of 5 years it has attained a diameter of 15mm. In its course from the pharynx to the stomach, the oesophagus presents an anterioposterior flexure, corresponding to the curvature of the cervical and thoracic parts of the vertebral column. It also presents two gentle curves in the coronal plane. The first begins a little below the commencement of the oesophagus and continues with a deviation to the left through the cervical and upper thoracic parts of its course, until it returns to the midline at the level of the fifth thoracic vertebra. The second coronal curve is formed as the oesophagus bends to the left to cross the descending thoracic aorta, to pierce the diaphargm and then to join the stomach.

The oesophagus is the narrowest region of the alimentary tract, except for the vermiform appendix, and it has three constrictions or indentations in its course. These are found:

1. At 15cm from the upper incisor teeth where the oesophagus commences at the cricopharyngeal sphincter, which is normally closed.
2. At 23 cm from the upper incisor teeth where it is crossed by the aortic arch and left main bronchus.
3. At 40 cm from the upper incisor where it pierces the diaphragm and where the lower 'physiological' oesophageal sphincter is sited.

The wall of the oesophagus has four layers which are from within outwards:

1. Mucous membrane
2. submucosa
3. Muscle coat
4. Outer fibrous layer.

**The Larynx:**

The larynx is situated at the upper end of the trachea it lies opposite the third to sixth cervical vertebrae, in men, while being somewhat higher in women and children. The average length, transverse diameter, and anteroposterior diameter are in the male 44mm, 43mm and 36mm and in the female 36mm, 41mm and 26mm respectively. There is little difference in the size of the larynx in boys and girls until after puberty when the anteroposterior diameter in the male almost doubles.

The skeletal framework of the larynx is formed of cartilages, which are connected by ligaments and membranes and are moved in relation to one another by both intrinsic and extrinsic muscles. It is lined with mucous membrane which is continuous above and behind with that of the pharynx and below with that of the trachea.

The infantile larynx is both absolutely and relatively smaller than the larynx of the adult. The lumen is therefore disproportionately narrower. It is more funnel shaped and its narrowest part is at the junction of the subglottic larynx with the trachea. A very slight swelling of the lax mucosa in this area may thus produce a very serious obstruction to breathing. The laryngeal cartilages are much

softer in infant and therefore collapse more easily in forced inspiratory efforts. The infantile larynx starts high up under the tongue and with the development assumes an increasingly lower position.

The interior of the larynx

The cavity of the larynx extends from the pharynx at the laryngeal inlet to the beginning of the lumen of the trachea at the lower border of the cricoid cartilage and is divided by the vestibular and vocal folds into three compartments. The superior vestibule is above the vestibular folds, the ventricle or sinus of the larynx lies between the vestibular and vocal folds, and the subglottic space extends from the vocal folds to the lower border of the cricoid cartilage. The fissure between the vestibular folds is called the rima vestibuli and that between the vocal folds is the rima glottidis or glottis. The paraglottic and pre-epiglottic spaces, which are of importance in the spread of tumours, lie within the larynx.

**Trachea:**

The trachea is cartilaginous and membranous tube about 10-11 cm in length which extends from its attachment to the lower end of the

cricoid cartilage at the level of the sixth cervical vertebra, to its termination at the bifurcation at the level of the upper border of the fifth thoracic vertebra, or more easily the second costal cartilage or the manubriosternal angle. The bifurcation moves upwards during the act of swallowing, and downwards and forwards during inspiration, often to the level of the sixth thoracic vertebra. The trachea lies mainly in the median plane, although the bifurcation is usually a little to the right of the midline. The diameter of the air passages increases appreciably during inspiration, and decreases during expiration.

In the child, the trachea is smaller, more deeply placed and more mobile than in the adult, and the bifurcation is at a higher level until the age of 10-11 years.

The trachea is D- shaped in cross-section, with incomplete cartilaginous rings anteriorly and laterally,and a straight membranous wall posteriorly. The rings of the trachea can easily be seen endoscopically in out line beneath the mucosa, as they cause a slight elevation and pallor of the mucosa. The transverse diameter is greater than the anteroposterior.

**The Main Bronchi And Branches:**

In the adult, the trachea bifurcates into the right and left main bronchi at the level of the second costal cartilage. The main bronchi are separated at their origin by a narrow ridge which in view of its resemblance to the keel of an upturned boat is called the carina. The carina always contains cartilage although the actual dividing ridge is frequently membranous.

**Right main Bronchus:**

The definition of the extent of the right main bronchus is that portion from the tracheal bifurcation to the orifices of the right middle lobe bronchus and the apical segment of the right lower lobe. The right main bronchus is about 5 cm in length. It is wider, shorter and more vertical than the left main bronchus. It has a posterior membranous wall and a series of cartilage rings which although smaller in size are very similar in structure to those of the trachea. The average angle made by the right main bronchus to the trachea is 25-30°. The coronal diameter of the right main bronchus is about 17 ± 4mm in men and about 15 ± 4mm in women. The corresponding diameter on the left side is 2-3mm less. The right pulmonary artery is

at first below and in front of the right main bronchus and the azygos vein arches over it. The right upper lobe bronchus is given off 2.5 cm along the course of the main bronchus which on entering the hilum of the lung divides into a middle and lower lobe bronchus.

**Right upper lobe bronchus:**

The right upper lobe bronchus arises from the right lateral aspect of the parent bronchus about 12-20 mm from the carina. It runs superolaterally to enter the hilum of lung. It is about 1cm in length and divides into 3 segmental bronchi which supply the apical, posterior and anterior segments of the upper lobe. All these can be seen bronchoscopically with a right angle telescope or a fibreoptic bronchoscope. The sub division has a remarkably constant pattern. The most notable of the few variations that are seen is that of an apical segment supplied by tracheal bronchus which arises from the right lateral aspect of the trachea just above the carina. Its chief clinical importance is that of the confusion it may cause during the resection of a lung, in the case for example, of carcinoma. The apical segmental bronchus passes upwards. After about 1 cm, it divides into apical and anterior sub segmental branches. The posterior segmental bronchus

serves the posterior inferior part of the superior lobe of the lung and runs backwards and somewhat upwards. It divides into lateral and anterior sub segmental bronchi. The anterior segmental bronchus runs antero inferiorly to supply the rest of the superior lobe. After a short distance it divides into lateral and anterior sub segmental branches.

**Right middle lobe Bronchus:**

The right middle lobe bronchus arises about 2.5cm beyond the origin of the right upper lobe bronchus from the anterior aspect of the bronchus. It is directed forwards, downwards and laterally, and after a short distance divides into lateral and medial sub segments.

**Right Lower Lobe Bronchus:**

The right lower lobe bronchus is the continuation of the principal stem beyond the origin of the middle lobe bronchus. It supplies five segments of the lung. The apical segmental bronchus arises from the posterior aspect of the termination of the right main bronchus. Its orifice is opposite to and only a short distance lower than that of the right middle lobe. It subsequently divides into medial,

superior and lateral branches, the former two usually arising from a common stem.

In over 50% of the right lungs, a subapical segmental bronchus arises from the posterior surface of the right lower lobe bronchus between 1 and 3 cm below the apical segmental bronchus. This is distributed to the region of lung between the apical and posterior basal segments.

The medial basal segmental bronchus has a higher point of origin than the other basal bronchi. It runs inferomedially parallel to the right border of the heart. The lower lobe bronchus then divides into an anterior basal segmental bronchus which descends anteriorly, and a trunk which divides into lateral and posterior basal segments.

**Left main bronchus:**

The left main bronchus is 5.5 cm long and because it supplies the smaller lung, is narrower than the right main bronchus. In order to reach the hilum of the lung, the main bronchus has to extend laterally beneath the aortic arch. Its angle to the trachea averages 45°.The bronchus crosses anterior to the oesophagus, thoracic duct and descending aorta: The left pulmonary artery lies at first anterior and

then superior to it. At the level of the sixth thoracic vertebre, its enters the hilum of the lung and divides into the upper and lower lobe bronchus.

**Left upper lobe bronchus:**

The left upper lobe bronchus arises from the anterolateral aspect of the parent bronchus about 5.5 cm from the carina. It curves laterally for a short distance and then divides into two bronchi, which correspond to the branches of the right main bronchus to both apical and middle lobes of the right lung. They are both distributed to the apical lobe of the left lung, which does not possess a separate middle lobe. The cranial division ascends for about 10mm before giving of an anterior segmental bronchus. It then continues upwards for a further 1cm as the apico posterior segmental bronchus which subsequently subdivides into apical and posterior branches. The caudal division descends anterolaterally to be distributed to the anteroinferior part of the superior lobe of the left lung. This part of the lung is called the lingular area. The lingular bronchus divides into superior and inferior lingular segmental bronchi.

**Left Lower Lobe Bronchus:**

The left lower lobe is smaller than the right. The apical segmental bronchus takes it origin posteriorly from the left lower lobe bronchus about 1 cm below the upper lobe orifice. The inferior lobe bronchus continues for a further 1-2 cm before dividing into two stems, an anteromedian and a posterolateral stem. The medial basal segmental bronchus arises in common with the anterior basal segmental bronchus from the former, the lateral basal segmental bronchus arises in common with the posterior basal segmental bronchus from the later.

There has not always been recognition of the medial basal segmental bronchus on the left side because of the common origin with the anterior basal segment. However, in 10% of lungs it arises independently from the lower lobe bronchus, and in all cases it supplies a territory similar to its opposite number on the right side. A sub apical segmental bronchus arises from the posterior surface of the left lower lobe bronchus in as many as 30% of lungs.

**Broncho pulmonary segments:**

The lung is divided functionally into a series of broncho pulmonary segments, each with its own blood supply from the pulmonary artery. Each segment is surrounded by connective tissue, continuous with that of the visceral plura and forms a separate respiratory unit of the lung. Lung resection surgery, postural drainage and chest radiology are based on the detailed anatomy of these segments.

**Clinical significance of bronchopulmonary segments:**

The right main bronchus is more nearly in line with the trachea than is the left. It is easier, therefore, for inhaled foreign bodies or fluids, such as gastric contents, to enter the right rather than the left bronchial tree. If the patient is lying on his side, such material enters the lateral subsegments of the anterior and posterior segments of the lobe. They are thus a frequent site for the development of inhalational pneumonitis, segmental collapse or of a lung abscess.

If the patient is supine then the apical segmental bronchus, which arises from the posterior aspect of the right or left lower lobe bronchi, is the most likely part of the lung for aspirated material to

collect. It was formerly, also, a not uncommon site for a tubercular cavity.

When inhaled, foreign bodies may, according to their size, obstruct either a main lobe, segmental or smaller bronchus.

# AETIOLOGY

Chevalier Jackson et al summarized following six factors.

**I. Personal factors**

1.Age –Common in children.

2.Sex -Male common.

3.Occupation

**II. Failure of normal protective mechanism**

1. Sleep

2. Alcoholism

3. Epilepsy

4. Unconciousness

**III. Physical factors**

1. Emotional

2.Panic, Jumping, Swimming etc.

**IV. Carelessness in form of**

1.Putting inedible substance in mouth.

2.Hasty eating, drinking.

3.Playing while eating.

4.Giving Paenut candy to children in whom molars have not erupted.

# INCIDENCE

The maximum incidence of inhalation of foreign bodies occurs between the age of 1 and 3 years. The most common cause of accidental death in the home, in children under 6 years of age, is the inhalation of a foreign body. The peak incidence of inhalation of foreign bodies in early childhood is of course related to the fact that children have a habit of putting objects into their mouths to determine their texture and taste, and to chew on when teething. It is extremely important, therefore, where possible to keep objects which might be inhaled, out of the reach of small children. Boys are more likely to inhale foreign bodies than girls by almost 2:1. The reasons for this are not clear.

A minority of these objects impact in the larynx: Foreign bodies lodge in the larynx if they are too large to pass through or if they are of an irregular shape or have sharp edges which can catch on the laryngeal mucosa. Egg shells and fragments of glass or plastic are not infrequent offenders.

# PATHOLOGY

Due to various number of foreign bodies encountered, the local tissue response varies and can be broadly classified as

**1. Inert metals:**

High carat gold is inert and when ingested cause mechanical obstruction only, producing very minimal tissue reaction.

**2. Reacting metals:**

Metallic foreign body that is rough and especially composed of steel cause local tissue reaction by injury and also due to constant soakage in mucosal secretion, the metals cause rusting and local corrosion producing severe mucosal inflammation. When the foreign body causes only partial obstruction of the lumen of bronchi, it will act as a valve letting in air during inspiration but preventing expiration causing emphysema. If the lumen is totally obstructed the distal portion of lung collapses causing atelectasis. If the obstruction is still unrelieved the atelectatic segment gets infected and form lung abscess.

### 3. Vegetable Foreign Bodies:

In cases of vegetable foreign bodies, due to presence of organic contents the local tissue reaction is severe and rapid. More over due to imbibition of water the foreign body swells and hence the obstruction which was earlier partial, developes into total occlusion. This is facilitated by local tissue reaction.

### 4. Esophageal Foreign Bodies:

Foreign bodies are adjusted by oesophageal movements to a position least likely to cause trauma If any foreign body becomes impacted, there will be an erosion of the epithelium with building of fibrous tissue. Spontaneous perforation can occur. If there is a super added infection, the ulcer extends and forms fistula with neighbouring structures.

# CLINICAL FEATURES

**Nasal Foreign Bodies:**

These generally give rise to a unilateral foetid discharge, usually mucopurulent and sometimes bloodstained. There is frequently unilateral nasal obstruction and there may be pain, epistaxis, and sneezing. A few foreign bodies are inert and cause either no symptoms, or solely a unilateral nasal obstruction if sufficiently large. The presence of a radiopaque foreign body may be identified on occasions as an incidental finding on a child's dental X-ray.

Examination of the nose shows reddened congested mucosa, mucopus, and sometimes granulations, ulceration, and necrosis. The foreign body may or may not be visible, depending on its size and nature, and on the degree of surrounding edema.

**Tracheo bronchial foreign bodies:**

A general examination of the child is essential. Respiratory distress or cyanosis demands immediate action; special care should be

taken during the induction of anaesthesia in these patients since the foreign body may change position and completely obstruct the airway.

Inhaled foreign bodies are more common in children with upper respiratory tract infections, caused presumably by mouth breathing and the presence of a cough – inhalation of food particles may easily occur with the sharp intake of breath which follows a cough.

If there is a change in the child's cry or if the cry becomes hoarse or stridulous, a laryngeal foreign body should be suspected. Excessive salivation may also occur.

In the first few hours after aspiration the signs in the chest are due to changes in air flow through the tracheobronchial tree. These changes may be detected with a stethoscope on auscultation of the chest. An audible click may be heard due to movement of the foreign body up and down the trachea, a fluttering noise may also be detected due to rapid oscillation of the object in the air stream in the trachea or bronchi. A unilateral expiratory wheeze and reduced air entry may indicate a foreign body in the bronchus.

Obstructive emphysema may be detected by mediastinal shifts, but is most easily detected radiologically. If the foreign body is not removed within 24 hours pneumonic signs supervene. The severity of

these signs will depend on the reaction of the bronchial mucosa and the size of the foreign body. If the foreign body is of vegetable origin an intense inflammatory reaction of the bronchial mucosa occurs, ultimately with the production of granulation tissue. The mucosal swelling and inflammatory exudate may then obstruct the bronchial lumen, causing atelectiasis of the distal lung. A lung abcess may supervene but this takes several months. The presence of florid granulation tissue around the inhaled foreign body may also cause haemoptysis.

If the foreign body is made of ferrous metal or it has a particularly rough surface, some bronchial irritation will occur, but the process of bronchial occlusion will take much longer.

If the foreign body is inert and has a smooth surface, very little mucosal reaction takes place and pneumonic changes may never supervene.

Sometimes foreign bodies from right bronchus might be coughed up and may reenter the left bronchus.

**Oesophageal foreign bodies:**

The normal oesophagus has four anatomical sites of narrowing which are preferential locations for the impaction of such objects: the cricopharyngeus muscle; the aortic arch; the left main bronchus; and the lower oesophageal sphincter. It is the large and angulated objects such as coins and safety pins which are most commonly trapped in the proximal oesophagus, although overall the cervical oesophagus is the commonest site of foreign body impaction. The common symptoms of esophageal foreign bodies are partial or total dysphagia, excessive salivation, foreign body sensation in the throat and pain. Oesophageal pain is more likely to be referred proximally than distally and, therefore, discomfort in the xiphisternal area is more reliable than is a sensation in the suprasternal notch.

# INVESTIGATIONS

**Radiological findings:**

X-ray examination of the patient must be performed and should include all the structures from the nasopharynx to the tuberosities of the ischia, otherwise a foreign body may be overlooked

X-rays should be taken with the neck extended with anteroposterior and lateral views. Anteroposterior views in expiration and inspiration should be taken, although these views are sometimes difficult to obtain in very young children. A lateral chest X-ray completes the examination.

Screening may also help, but standard X-rays are usually sufficient. Computerized tomographic studies may help to show a foreign body not seen with conventional studies. Isotope scans will demonstrate changes in ventilation and perfusion of lung tissues. These more sophisticated radiographic techniques are rarely necessary in obvious cases of inhaled foreign bodies. They should not be ordered if they delay the definitive endoscopic assessment of the patient.

A lateral view for a foreign body should always be taken. Not only may this reveal some foreign bodies which might otherwise be missed but on occasion a child may have ingested two foreign bodies, one smaller than the other which is tucked out of sight on the anteroposterior neck / chest radiograph. Objects such as wood, aluminium, glass, plastics, meat and as indicated, dental plates may not be visible without the use of contrast solutions. One helpful sign on the lateral cervical soft tissue film is the presence of a prevertebral gas shadow above an impacted foreign body in the upper oesophagus. This is not frequently overlooked by accident and emergency department staff who presumably are more intent on seeking out evidence of the foreign body itself. Where the history is clear, it is probably not wise to carry out a barium swallow because endoscopy will be complicated by the obscuring presence of the barium.

X rays for suspected foreign bodies of the nose should include para nasal sinus water's view and skull lateral view including nasopharynx.

# MANAGEMENT

**Nasal Foreign bodies:**

If the foreign body is easily seen, and the patient is a cooperative child, it is usually easy to remove the object through the anterior nares, either with no anaesthetic, or after spraying with a local anaesthetic solution such as 4% lignocaine and 1/1000 adrenaline.

However, it cannot be too strongly emphasized that unskilled attempts to remove the foreign body in the accident and emergency department by personnel without appropriate training may result in disaster. The foreign body may be displaced backwards and may even reach the nasopharynx with risk of inhalation. Marked epistaxis may occur or a docile child may become terrified and require a general anaesthetic which might otherwise have been avoided.

The patient is placed in the usual upright position for routine otolaryngological examination and the nasal fossa illuminated with a head mirror or headlight. It is important that the light source should be very bright. A suitable size speculum, probe, hook, forceps, and suction should be available. The nasal speculum is inserted, and the

hook passed beyond the object and the tip rotated to rest just posterior to the object. The object is then gently drawn forwards and removed completely, or brought almost to the nasal vestibule and then removed with forceps. This technique should be used whenever there is a risk of displacing the object backwards into the nasopharynx, as with spherical objects such as beads. Rough semi- impacted objects such as bits of paper, sponge and objects placed very nearer to the vestibule, can be removed directly with forceps.

A general anaesthetic will be required in the following circumstances :

1. If the patient is uncooperative or very apprehensive.
2. If there is likely to be troublesome bleeding, for instance if the foreign body is firmly embedded in granulation tissue.
3. If the foreign body is posteriorly placed with a risk of pushing it back into the nasopharynx.
4. If a foreign body is strongly suspected but cannot be found.

If foreign bodies were not visualised by conventional examination, then endoscopic examination of the nose is warranted, either under local or general anesthetic. It offers panoramic view of

nasal cavities and nasopharynx, and ensures 100% success in removing the foreign body.

**Rigid endoscopy:**

Preparation of the patient - Pre operative procedures

The Procedure is carefully explained to the patient. Consent should include warnings about possible trauma to lips and teeth. A chest radiograph and any contrast studies or scans should be obtained and carefully examined pre operatively: the surgeon is often better placed to put the films into clinical context than the radiologist, however good the latter may be.

Positioning

The patient is placed supine on the operating table. For oesophagoscopy, the head is placed on negus head rest on the upper hinged area of the table, with the head initially flexed slightly. As the procedure progresses, the table and head area are extended until the patient is in the classical "sword swallowing" position. For bronchoscopy, the head is initially placed on a head ring or pillow, which is removed after the bronchoscope has passed through the

cords. Draping the body is unnecessary for these procedures and restricts observation of respiratory movements

Anaesthesia

Rigid endoscopy (Bronchoscopy and Oesophagoscopy) is usually done under general anaesthetic.

**Direct laryngoscopy:**

Suitable laryngoscopes for routine purposes are the Negus, Jackson and Storz varieties. For microlaryngoscopy, the Royal National, Throat, Nose and Ear Hospital variant is useful, while that designed by Benjamin is more suited to children. The Deo-Pilling modification is helpful for those with difficult teeth and jaws. In any case, the laryngoscope chosen should be the largest that will comfortably fit the individual patient. The number of accessory instruments employed should be restricted to the minimum compatible with achieving adequate biopsy and manipulation, and should be those with which the surgeon is most comfortable.

The laryngoscope is inserted until its tip lies a few millimetres above the anterior commissure. En route, the uvula, epiglottis and

arytenoids are noted. The use of "BURP" on the thyroid cartilage by an assistant facilitates the view in many patients. If it is still not possible to view the anterior commissure satisfactorily, the straight-sided, broad tipped anterior commissure laryngoscope is used.

In the past, the latter instrument has also been advocated to obtain views into the ventricles and subglottis, but the advent of Hopkins rods enables us to perform a far more satisfactory examination of these regions. In addition, there is a subglottiscope available if detailed examination and biopsy of the subglottis and upper trachea is required. For lesions slightly further down, a tracheoscope may be used, but a better view may be obtained with a Storz bronchoscope.

**Oesophagoscopy:**

The oesophagoscope is held between the finger and thumb of the dominant hand like a pen, and at no stage should even firm pressure be required to negotiate the lumen. If the endoscope will not pass in this way, then either it is not being directed correctly, or there is a patholgoical obstruction. In either case, continued pressure may result in perforation.

Introduction is with the head initially slightly flexed, and the instrument facing backwards and onwards. The head is then extended and the endoscope brought round in an arc until its tip lies behind the anaesthetic tube and epiglottis. It is then passed behind or to the right of the larynx. Negotiating the cricopharyngeus is an important step, and is aided by further extension, temporary deflation of the endotracheal tube cuff and external advancement of the larynx by an assistant. These manoeuvres are particularly important where osteophytes compress the lumen. At all times, steady pressure should be maintained and any sudden advances avoided.

Throughout the procedure the lumen must be kept in the middle of the field of view, and suction used to maintain vision. Further restrictions occur at 23-35 cm and 38-40cm. It is often easier to observe the lumen on withdrawl of the instrument rather than on passage, so this part of the procedure should be performed deliberately and slowly.

Complications of oesophagoscopy

Perforation of the oesophagus

The overall perforation rate from simple diagnostic rigid oesophagoscopy is in the order of 1% (as incidentally is mortality). In one series of 50 oesophageal perfortations. 52% were Iatrogenic. Perfortation was more common in the thoracic oesophagus (54%), as it is more commonly associated with attempted dilatation on strictures than simple diagnostic endoscopy.

Diagnosis is based on clinical findings, a plain chest radiograph which may show free gas in the mediastinum, contrast studies, and flexible endoscopy. The presence of postoperative pain, especially if radiating to the back and shoulders and requiring more than simple analgesia, should alert the surgeon to the possibility of a perforation. Other features are surgical emphysema, pyrexia and dysphagia. Diatrizoate contrast studies are particularly useful in diagnosing perforations of the cervical oesophagus, while flexible endoscopy appears equally useful for thoracic injury.

Oesophageal perforation is an emergency with significant morbidity and mortality. Minor leaks in the neck are fortunately the majority of those seen after purely diagnositc oesophagoscopy. If only

a small leak is detected, conservative treatment with the passage of a nasogastric tube and administration of antibiotics is advocated. For anything larger, and in any case in an unwell patient, exploration of the neck with the insertion of a neck drain should be performed.

Intrathoracic leaks require thoracotomy, and in these patients, particularly if associated with a pre existing carcinoma, resection and reconstruction are probably required. There is significantly increased mortality for thoracic tears if there is a delay of more than 24 hours before thoracotomy. Referral should therefore be as soon as the diagnosis has been made. The mortality for cervical and thoracic tears is about 5% and 50% respectively.

**Pharyngoscopy:**

As mentioned above, both contrast studies and the flexible oesophagoscope are notoriously poor at diagnosing lesions of the pharynx and postcricoid region. These may be adequately viewed with the rigid oesophagoscope as above, but the best view is obtained with the traditional Negus pharyngoscope. This is passed as for a laryngoscope, but placed into each pyriform fossa, laryngopharynx and postcricoid region in turn.

**Rigid bronchoscopy:**

The older, hollow Negus instruments have been superseded by instruments using Hopkins rod facilities for increased visualization, such as those manufactured by Storz. In adults, 7 or 8 mm gauges are used with telescopes of 0°, 30° or 90°. For most purposes, however, the 0° telescope suffices, and is easier to interpret. The choice of the size of the bronchoscope in infants and children is discussed elsewhere. Side ports are used for introducing anaesthetic gas, and channels exist for suction, biopsy or manipulation.

The bronchoscope is introduced into the right side of the mouth between thumb and forefinger, held like a pen, with the beak anteriorly. The left hand is used to hold the position of the patient's head, and to keep the patient's lips from being crushed under the instruments. As with other rigid instruments, it is essential not to lever on the teeth. The beak is used to elevate the epiglottis and then advanced to the cords where it is rotated through 90°, so that the beak passes through sideways. At this stage, the pillow or head ring is removed. When it is difficult to pass the bronchoscope the use of the Negus laryngoscope, with its sliding blade removed, may facilitate

access to the larynx. At this point, ventilation via the side arm may be commenced.

Examination of the bronchial tree is accomplished in a systematic manner.

1. Rotating the head to the left, right main and lower lobe (0°), right upper (90°) and right middle (30°) lobe bronchi.
2. Rotating the head to the right, left main and lower lobe (0°), and left upper (90°) lobe bronchi.

Instruments

A complete set of ventilating bronchoscopes with a Hopkins rod lens system, such as that manufactured by Karl Storz is used by many paediatric endoscopists. These instruments, by virute of their superior illumination and optics, which magnify the image nine times, improve the visualization of the foreign body in the infant and young child. The bronchoscopes are equipped with two side channels, one for ventilation and the other for instrumentation and suction.

In children where the Storz bronchoscope or larger can be used then the combined bronchoscope and grasping forceps are especially

helpful in dealing with peanuts and other softer foreign bodies. The endoscopist must make a careful assessment of the forceps space between the foreign body and the bronchial wall so the best position for the insertion of the jaws of the instrument can be determined. The irregular shape of most foreign bodies will allow the forceps to be inserted in the gap between the foreign body and the bronchial wall, thus reducing the risk of pushing it distaly and jamming it in the bronchus.

In neonates and infants where the combined bronchoscope and grasping forceps cannot be used then a set of open tube bronchoscopes of the Negus pattern suckling and infant sizes with a swing-arm magnifier should be available and provides a magnification of 4x. The foreign body may need to be removed with Chevalier Jackson foreign body forceps.

In some centres, Gogarty balloon catheters designed for arterial embolectomy are used particularly in the removal of peanuts. The catheter size 3 or 4 is passed down the side-arm of the storz bronchoscope. The tip of the catheter is passed beyond the foreign body and the ballon is infalted with saline. The telescope is withdrawn approximately 1 cm to allow space for the presenting part of the

peanut to be accommodated within the lumen of the bronchoscope as traction is exerted on the Fogarty catheter. The catheter, bronchoscope and foreign body are removed together.

The Fogarty catheter is also useful for removing foreign bodies with holes, the catheter can be threaded through the hole. Inflated and the foreign body removed. A Dormia basket used by urologists to remove ureteric calculi may also be used in a similar manner.

Before commencing endoscopy the surgeon must be satisfied that all the equipment is in working order. This applies particularly to the jaws of the Jackson forceps - these are made of spring steel which tends to rust and, therefore, may jam in the outer casing of the forceps. Suckers must be checked for patency and also that they are long enough to protrude beyond the end of the bronchoscope.

Bronchoscopes and forceps, suitable in size and shape for the case in hand, are selected. Practice passes of the forceps through the chosen bronchoscope are made, the blades of the forceps are inserted into the bronchoscope and then opened. The emergence of the opened forceps beyond the tip of the bronchoscope is felt rather than seen, because of the lack of stereoscopic vision down the bronchoscope. This manoeuvre is practised, while the patient is being anaesthetized,

until the surgeon is confident that he will know when the tip of the forceps is just protruding beyond the end of the bronchoscope. This is the correct position for grasping the foreign body.

In cases where a particular difficulty is likely to be encountered, e.g. open safety pins or other sharp foreign bodies, the use of a dummy tracheobronchial tree and a duplicate foreign body will enable the surgeon to practice the manoeuvre necessary to remove the foreign body safely. Time spent in practice will be amply rewarded by reducing the time spent during the actual endoscopy.

The actual technique of bronchoscopy is described. Special care must be taken in young children to keep the bronchoscope in line with the trachea to ensure adequate ventilation of the patient. Ventilation may be difficult when the bronchoscope is passed deeply into the obstructed bronchus; adequate ventilation will be maintained if the holes in the side of the bronchoscope remain unobstructed, and directed towards the normal main bronchus.

When the precautions mentioned above are taken, a successful removal of a foreign body can be achieved in the majority of cases.

Following removal:

It is very important after removal of the foreign body, while the child is still anaesthetized, that second look is taken to ensure that a second foreign body has not been overlooked, and to remove any remaining small fragments particularly in the case of peanuts. Pus and mucus can be aspirated from the distal bronchus - speeding the resolution of the atelectasis or pneumonia. It is also important to make sure that all major bronchopulmonary segments including the upper lobe orifices are inspected. If the bronchoscopy is prolonged, or if the bronchoscope was noted to be a tight fit in the subglottic larynx, the use of a systemic corticosteroid, dexa methasone 0.5 mg/kg, is advised to reduced the incidence of laryngeal oedema postoperatively.

Complications of bronchoscopy:

The mortality for bronchoscopy is less than 0.01% and is usually related to massive bleeding. If bleeding does occur, local adrenalin application, pressure or cautery may be applied. Other possible complications are laryngospasm, bronchial rupture, pneumothorax and cardiac arrythmias.

ACUTE FOREIGN BODY AIRWAY OBSTRUCTION : 'cafe coronary':

The object classically a bolus of food 'blotted' in a restaurant, lodges in the larynx or pharynx causing acute respiratory embarrassment. If the airway is not restored, irreversible cerebral ischemia occurs within 6 minutes. Survival is thus often dependent on the actions of passers –by, rather than on trained medical staff attempts to retrieve the foreign material with the fingers are avoided, as they can cause further impaction. However, the Heimlich manoeuvre may be life saving: the rescuer stands behind the subject and places a clinched fist below the xiphisternum. This is followed by a rapid subdiaphagramatic, upwards thrust, producing an artificial cough of someforce. If this step fails, it is necessary to perform cricothyrotomy. Here while one hand steadies the larynx, the groove between the thyroid and cricoid cartilages is sought. A sharp knife is then used to cut horizontally into the airway. Any convenient tube is then placed through into the lumen until the patient can be transferred to a hospital. An alternative temporary airway may also be rapidly created by passing a minimum of three large intravenous cannulae

through the cricothyroid membrane should obstruction occur in a hospital setting.

Alternatives to rigid endoscopy:

Where there is a history of foreign body ingestion, but the patient is asymptomatic, it is sometimes possible to pursue a conservative course. This is particularly the case with asymptomatic coin ingestion in children, where simple serial radiographs may be sufficient to allay parental anxiety. Of course, should dysphagia develop at any stage, endoscopy should be undertaken without delay and in any case where the foreign body fails to pass.

Disimpaction of meat boluses with spasmolytic agents such as hyoscine butylbromide has been reported to be successful in up to two-thirds of patients. (Contraindications to its use are related to is anticholinergic properties and include glaucoma, urinary retention and heart failure. Recently, successful attempts have been made to dislodge boluses with gas-forming agents such as tartaric acid and bicarbonate mixtures. These are yet to be fully evaluated).

The passage of a catheter under radiological control beyond the foreign body, inflation of the ballon and subsequent withdrawal has

been advocated for the removal of coins in children. However, it is a bind procedure, and is far inferior to rigid endoscopy.

Flexible endoscopy may be used for the removal of foreign bodies from the oesophagus, and indeed is often successful. Where rigid endoscopy is contraindicated, it is the method of choice, but in other contexts, rigid instrumentation is superior. An occasional alternative to thoracotomy for the removal of severely impacted foreign bodies is retrograde flexible oesophagoscopy via a surgical gastrostomy.

# METHODS AND MATERIALS

Materials used for this study were patients who attended ENT O.P.D at Government Rajaji Hospital, Madurai from June 2004 to July 2005. A sincere attempt was made to collect relevant information from all cases of foreign bodies in aero digestive tract regarding age, sex, mode of ingestion, duration and method of removal. Foreign bodies were removed in our department with available resources immediately.

# OBSERVATION

A total of 68 cases of foreign bodies were reported in our O.P.D. of these 49 (72%) were cases of foreign bodies in food passage and 19(28%) were foreign bodies in tracheo bronchial tree.

**FOREIGN BODIES IN FOOD PASSAGE:-**

Of the foreign bodies in food passage(oro pharynx, hypo pharynx and oesophagus) the common site of lodgement was in the crico pharynx.

**I. Site**

| Site | No | Percentage (%) |
|---|---|---|
| Cricopharynx | 39 | 79.59 |
| Oesophagus | 8 | 16.32 |
| Hypo pharynx | 1 | 2 |
| Posterior pharyngeal wall | 1 | 2 |
| | 49 | 100 |

**II. Age**

| Age in years | No | Percentage (%) |
|---|---|---|
| 0-10 | 26 | 53.06 |
| 10-20 | 15 | 30.61 |
| 20-30 | 6 | 12.24 |
| Above 30 | 2 | 4 |
| | 49 | 100 |

Of the foreign bodies ingested the problem was more acute in paediatric age group which accounts for nearly 80% of Cases.

**III. Sex**

The Foreign bodies are also seen more among male children than in female children.

| Sex | No | Percentage (%) |
|---|---|---|
| Male | 30 | 61.22 |
| Female | 19 | 38.77 |
| | 49 | 100 |

## IV. Type

Among the types of Foreign bodies coins, dentures, safety pin, fish bone and miscellaneous, coins were the commonest.

| Type | No | Percentage (%) |
|---|---|---|
| Coins | 37 | 75.55 |
| Denture | 5 | 10.25 |
| Safety pin | 3 | 6.12 |
| Fish bone | 3 | 6.12 |
| Miscellaneous | 1 | 2.04 |
| | 49 | 100 |

## V. Presentation

The symptom of foreign bodies in food passage ranges from absolute dysphagia, partial dysphagia, odynophagia and even asymptamatic

| Symptoms | No | Percentage (%) |
|---|---|---|
| Absolute Dysphagia | 11 | 22.44 |
| Partial Dysphagia | 23 | 46.93 |
| Odynophagia | 8 | 16.32 |
| Asymptamatic | 7 | 14.28 |
| | 49 | 100 |

**FOREIGN BODIES IN RESPIRATORY PASSAGE:-**

Foreign bodies in respiratory passages were less common when compare to those in food passage. The common site of lodgement of foreign bodies were bronchus, nose, larynx and trachea, in descending order.

**I. Site**

| **Site** | **No** | **Percentage (%)** |
|---|---|---|
| Nose | 5 | 26.5 |
| Nasopharynx | 1 | 5.45 |
| Larynx and Trachea | 6 | 31.57 |
| Bronchus | 7 | 36.84 |
| | 19 | 100 |

**II. Age**

Foreign bodies in respiratory passages were more common in 0-10 yrs age group

| **Age** | **No** | **Percentage (%)** |
|---|---|---|
| 0-10 | 11 | 57.89 |
| 10-20 | 5 | 26.31 |
| 20-30 | 2 | 10.52 |
| Above 30 | 1 | 5.2 |
| | 19 | 100 |

**III. Sex**

Foreign bodies in respiratory passages are slightly more common in male than in female.

| Sex | No | Percentage (%) |
|---|---|---|
| Male | 11 | 57.89 |
| Female | 8 | 42.10 |
| | 19 | 100 |

**IV. Type of foreign bodies**

Mostly food particles are seen as foreign bodies in tracheo bronchial tree viz, peanuts, corn etc… followed by metal foreign bodies such as outer flange of fuller's metal tracheostomy tube

| Type | No | Percentage (%) |
|---|---|---|
| Seed | 12 | 63.15 |
| Metals | 5 | 26.13 |
| Miscellaneous | 2 | 10.52 |
| | 19 | 100 |

## V. Symptoms

Symptoms range from mild respiratory distress to frank chocking

| Symptoms | No | Percentage (%) |
|---|---|---|
| Dyspnea | 5 | 26.31 |
| LRI | 6 | 31.57 |
| Chocking | 3 | 15.78 |
| Cough | 5 | 26.31 |
| | 19 | 100 |

## VI. Procedure

Foreign bodies were removed by various procedures such as nasal endoscopy, laryngoscopy, and Bronchoscopy.

| Procedure | No | Percentage (%) |
|---|---|---|
| Nasal endoscopy | 3 | 15.78 |
| Laryngoscopy | 2 | 10.52 |
| Bronchoscopy | 12 | 63.15 |
| OP Removal | 2 | 10.52 |
| | 19 | 100 |

# DISCUSSION

A sincere attempt has been made in this study of foreign bodies of aerodigestive tract. A total of sixty eight cases has been studied.

Incidence:

Of the total number of sixty light cases, forty nine had foreign bodies in digestive tract and the remaining nineteen had it in respiratory passage.

Location:

In the digestive tract the common site is cricopharynx followed by upper oesophagus. In the respiratory passage the common site is the bronchus especially the right main bronchus followed by nose and naso pharynx.

Age:

0-10 yrs children were found to be susceptible to foreign bodies.

Sex:

Males have a slight edge over females.

Type:

In the food passage the common type is coin followed by denture and other metalic bodies. In the respiratory passage it is seeds such as peanuts, corn followed by metallic bodies.

Aetiology:

The common cause for the occurrence of foreign bodies is children's habit of keeping inedible particles in mouth and playing or laughing or crying while eating, that is mainly accidental.

History:

Usually the patients or their attenders give history of ingesting foreign bodies. Some time in children foreign bodies may remain asymptomatic when it is unnoticed by their parents or attenders. Sometimes the history of ingestion is recalled after foreign body removal.

Clinical features:

Digestive tract:

The symptoms are less dramatic. usually there is dysphagia either absolute or partial or there might be odynophagia. In a significant proportion they are asymptomatic.

In respiratory passages the symptoms are much more alarming causing sudden choking and coughing in a previously normal child. Presence of unilateral wheeze, persistant lower respiratory infection has also been noted.

In case of tracheal foreign bodies there will be mobile tracheal thud.

Radiology:

Radiological investigations are invaluable in locating the site and nature of foreign body and in planning its removal, since foreign bodies are mobile before impaction. X-ray from skull base to iliac crest, AP view and lateral views are essentials. In all cases X ray from skull base to Iliac crest AP view and Lateral view of neck with chest taken. CT scanning and fluoroscopy to locate foreign bodies were never used.

Management:

Management of laryngotracheo bronchial foreign bodies is more urgent and more demanding. It is more urgent since it causes hypoxia and its consequences. It is more demanding since the surgeon and anaesthetist share the common pathway. With the advent of Hopkins telescope, the management of foreign bodies has been revoultionzed.

In foreign bodies of food passages, since most foreign bodies were at the level of Cricopharynx, they were removed with Laryngoscope under short general anesthetic. Only for foreign bodies in upper Oesophagus, general ananesthesia with Orotracheal intubation, oesophagoscopy was done and foreign bodies removed. Of the 49 cases, 47 were removed. 1 case, a five rupee coin could not be retrieved and hence pushed into stomach which was later expelled via naturalis. One foreign body, a open safety pin in upper esophagus, was removed by cervical esophagotomy.

In foreign bodies of Laryngotracheo bronchial tree bronchoscopy was performed under general anaesthesia and all foreign bodies were removed.

# CONCLUSION

1) The problem of foreign bodies in air and food passage is one of the common and frequently encountered in daily ENT practice.
2) Endoscopic removal of foreign body or visualization of the tract cannot be substituted for by any other methods of examination in history of medicine.
3) The foreign bodies were more commonly seen in children than adults.
4) The common site of lodgement was cricopharynx in food passage and right Main Bronchus in air passage.
5) In almost all cases Endoscopic removal was possible.
6) Paediatricians, Radiologists and Otolaryngologists should always think of vegetable and non-opaque foreign bodies of occult nature in children having sudden obstructive lung pathology until proved otherwise by Bronchoscopy. “All that wheezes is not asthma”.
7) High index of suspicion, early diagnosis and appropriate management considerably decreases morbidity and mortality.

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# MASTER CHART

| Sl. No. | Name | Age | Sex | IPNO | Foreign Body | Site | Procedure |
|---|---|---|---|---|---|---|---|
| 1. | Alagarsamy | 11 | M | 247872 | Coin | Cricopharynx | DL Scopy |
| 2. | Amudha | 12 | F | 336315 | Coin | Cricopharynx | DL Scopy |
| 3. | Andiammal | 1¾ | F | 101920 | Coin | Cricopharynx | DL Scopy |
| 4. | Andiyappan | 1 | M | 196792 | Coin | Cricopharynx | DL Scopy |
| 5. | Anitha | 14 | F | 237723 | Coin | Cricopharynx | DL Scopy |
| 6. | Annam | 3 | F | 147895 | Seed | Nose | OP removal |
| 7. | Annasamy | 2 ¾ | M | 172892 | Seed | Bronchus | Broncho scopy |
| 8. | Arumugam | 1 ½ | M | 157234 | Seed | Nose | OP removal |
| 9. | Ayyappan | 12 | M | 186782 | Coin | Cricopharynx | DL Scopy |
| 10. | Ayyavoo | 1 | M | 245434 | Coin | Cricopharynx | DL Scopy |
| 11. | Bairavi | 28 | F | 117562 | Tracheostomy Tube | Bronchus | Broncho scopy |
| 12. | Balamurugan | 41 | M | 226311 | Coin | Cricopharynx | DL Scopy |
| 13. | Baluchamy | 12 ½ | M | 235461 | Safety Pin | Trachea | Broncho scopy |
| 14. | Chinnappa | 4 | M | 226530 | Seed | Nose | Endoscopy |
| 15. | Chitra | 4 ½ | F | 249065 | Seed | Nasopharynx | Endoscopy |
| 16. | David | 13½ | M | 272327 | Coin | Cricopharynx | DL Scopy |
| 17. | Deepa | 18 | F | 229528 | Seed | Bronchus | Broncho scopy |
| 18. | Dhanapal | 13 | M | 356514 | Safety Pin | Trachea | Broncho scopy |
| 19. | Elizabeth | 2 | F | 127703 | Miscellanous | Oesophagus | Oesophago scopy |
| 20. | Ellamma | 9 | F | 310568 | Seed | Larynx | Laryngo scopy |
| 21. | Esther Rani | 2¼ | F | 329721 | Fishbone | Cricopharynx | DL Scopy |
| 22. | Eswaran | 7 | M | 223100 | Seed | Bronchus | Broncho scopy |

| Sl. No. | Name | Age | Sex | IPNO | Foreign Body | Site | Procedure |
|---|---|---|---|---|---|---|---|
| 23. | Eswari | 16 | F | 337192 | Coin | Cricopharynx | DL Scopy |
| 24. | Fatima | 35 | F | 732291 | Denture | Cricopharynx | DL Scopy |
| 25. | Fatima | 7 ½ | F | 117890 | Miscellaneous | Bronchus | Broncho scopy |
| 26. | Fazalkhan | 1½ | M | 189871 | Safety pin | Oesophagus | Oesophago scopy |
| 27. | Fyaz | 17 | M | 194673 | Seed | Trachea | Broncho scopy |
| 28. | Ganesan | 8 | M | 134524 | Pin | Bronchus | Broncho scopy |
| 29. | Guruvamma | 4 | F | 102356 | Seed | Nose | Endoscopy |
| 30. | Harish | 14 | M | 107528 | Seed | Nose | Endoscopy |
| 31. | Idayathulah | 24 | M | 285072 | Tracheostomy Tube | Larynx | Laryngo scopy |
| 32. | Jai subramani | 21 | M | 269636 | Coin | Cricopharynx | DL Scopy |
| 33. | Joseph Kennedy | 25 | M | 142991 | Coin | Cricopharynx | DL Scopy |
| 34. | Kaliammal | 18 | F | 173633 | Coin | Cricopharynx | DL Scopy |
| 35. | Kanaga | 20 | F | 297171 | Coin | Cricopharynx | DL Scopy |
| 36. | Kandavel | 15½ | M | 291749 | Denture | Cricopharynx | DL Scopy |
| 37. | Kannamma | 23 | F | 123999 | Denture | Oesophagus | Oesophago scopy |
| 38. | Kannusamy | 2 | M | 203376 | Coin | Post. Pharyngeal Wall | DL Scopy |
| 39. | Kavitha | 3¼ | F | 181931 | Fishbone | Hypopharynx | DL Scopy |
| 40. | Lawrence | 15 | M | 349954 | Coin | Cricopharynx | DL Scopy |
| 41. | Logesh | 16 | M | 345672 | Seed | Bronchus | Broncho scopy |
| 42. | Maheswaran | 2½ | M | 248291 | Coin | Oesophagus | Oesophago scopy |
| 43. | Maruthu Pandi | 16 | M | 342792 | Coin | Cricopharynx | DL Scopy |

| Sl. No. | Name | Age | Sex | IPNO | Foreign Body | Site | Procedure |
|---|---|---|---|---|---|---|---|
| 44. | Mohamed Ali | 16½ | M | 346272 | Coin | Cricopharynx | DL Scopy |
| 45. | Mohana | 29 | F | 211020 | Coin | Cricopharynx | DL Scopy |
| 46. | Muniamma | 32 | F | 238610 | Miscellaneous | Trachea | Broncho scopy |
| 47. | Nagalaxmi | 5 | F | 181534 | Coin | Cricopharynx | DL Scopy |
| 48. | Nagarajan | 3½ | M | 293827 | Coin | Oesophagus | Oesophago scopy |
| 49. | Nandhini | 6 | F | 172670 | Fishbone | Cricopharynx | DL Scopy |
| 50. | Nellusamy | 3 | M | 180874 | Coin | Cricopharynx | DL Scopy |
| 51. | Panchavarnam | 7½ | F | 320792 | Coin | Cricopharynx | DL Scopy |
| 52. | Pandi | 17 | M | 272148 | Safety pin | Oesophagus | Oesophago scopy |
| 53. | Parameswari | 7 | F | 121537 | Safety pin | Oesophagus | Oesophago scopy |
| 54. | Pavithra | 3 | F | 147685 | Coin | Cricopharynx | DL Scopy |
| 55. | Rajalaxmi | 3½ | F | 210076 | Coin | Oesophagus | Oesophago scopy |
| 56. | Rajapandi | 18 | M | 311070 | Coin | Cricopharynx | DL Scopy |
| 57. | Rajkumar | 24 | M | 246132 | Coin | Cricopharynx | DL Scopy |
| 58. | Rakkoo | 4 | F | 117795 | Coin | Cricopharynx | DL Scopy |
| 59. | Rathnasamy | 19 | M | 296927 | Denture | Cricopharynx | DL Scopy |
| 60. | Ravikumar | 27 | M | 298764 | Denture | Cricopharynx | DL Scopy |
| 61. | Salamon | 7 | M | 236721 | Coin | Cricopharynx | DL Scopy |
| 62. | Sandana Krishnan | 20 | M | 289792 | Coin | Cricopharynx | DL Scopy |
| 63. | Sekar | 5 | M | 716623 | Coin | Cricopharynx | DL Scopy |
| 64. | Shankar | 4 | M | 127627 | Coin | Cricopharynx | DL Scopy |
| 65. | Sivaram | 4½ | M | 626681 | Coin | Cricopharynx | DL Scopy |
| 66. | Varadarajan | 5½ | M | 113227 | Coin | Cricopharynx | DL Scopy |
| 67. | Velmurugan | 5½ | M | 238351 | Coin | Cricopharynx | DL Scopy |
| 68. | Vembiyer | 6 | M | 298397 | Coin | Cricopharynx | DL Scopy |