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ESOPHAGEAL FOREIGN BODY: A 10-YEAR EXPERIENCE IN A TERTIARY HOSPITAL

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Abstract

Background: Esophageal foreign body is an emergency in Otorhinolaryngology- Head and Neck Surgery (ORL-HNS) field. Although the occurrence is quite frequent, the exact incidence of esophageal foreign bodies is not known. The outcome of the management of esophageal foreign body depends on the foreign bodies and the patients' characteristics, and operator's experience. Data about characteristics of esophageal foreign bodies in Indonesia, especially in Bali, are lacking.

Methods: Data of patients diagnosed with esophageal foreign body from January 2011 to December 2020 were analyzed retrospectively. The characteristics studied included age, sex, chief complaints, types of foreign body, radiological findings, management, foreign body location, and complications.

Results: This study obtained 117 cases as sample, consisting of 58.1% male and 41.9% female. Most cases in this study were found in children (40.2%). The most reported main complaint was feeling something stuck in the throat (41.9%). In most cases (82.9%), foreign body was detected on radiological examinations. Extraction using rigid esophagoscopy was performed in 89.7% cases and surgery in 1.7% cases. The most common foreign body found were coins (30.8%). Foreign body impactionin cervical part of the esophagus occur in 67.5% cases. Most of the cases did not develop any complications (57.3%).

Conclusion: Esophageal foreign body is a prevalent case in our tertiary hospital, especially in children Most of the cases can be managed using rigid esophagoscopy without any complications. Only small number of cases required surgery. Extraction using rigid esophagoscope is still a safe and effective main management for esophageal foreign bodies.

Keywords: Foreign body, esophagus, esophagoscopy, characteristics

INTRODUCTION

The esophageal foreign body is the impaction of foreign body, whether food or not, in the lumen of the esophagus and is an emergency in ORLHNS field. Cases of esophageal foreign bodies can occur at any age but are more common in children. The exact incidence of esophageal foreign bodies is unknown but is estimated to be 13 per 100,000 population [1-3]. Impaction usually occur in the natural narrowing of the esophagus, especially just below the first narrowing or at the level of the cricopharynx. Less often, impaction occur at second narrowing (at the level arch of aorta) and third narrowing (lower esophageal sphincter). Pathological narrowing, such as stricture and esophageal webs, can also cause impaction [2, 4]. Symptoms of esophageal foreign bodies vary depend on the patient's age and foreign bodies' characteristics. Adult patients generally complain of difficulty swallowing, pain when swallowing, discomfort in the throat/neck, and increased salivary production. History taking in patients with younger children and infants is generally more challenging to do because they have not been able to express the complaints. In these cases, hetero anamnesis on parents or caregivers is needed [1, 3]. The diagnosis of esophageal foreign bodies can be made by clinical and supporting examinations. The drinking test is a simple test to assess the presence of a foreign body in the esophagus. Radiological examination, such as plain anterior-posterior (AP) and lateral position x-ray and CT- scan, can immediately show the presence of a foreign body in the esophagus, especially radiopaque foreign bodies. Radiolucent foreign bodies are generally not visible directly, but their presence can be assessed from the appearance of soft tissue around the esophagus [1, 3, 5].

About 80-90% of esophageal foreign bodies can descend to the stomach and excreted without significant incident. The remaining 10-20% cases require endoscopic management, and only about 1% of cases require surgical management. Currently, the main choice for management of esophageal foreign bodies is extraction using rigid esophagostomy, while surgery is performed in cases that are failed or deemed dangerous to be extracted using esophagostomy [1, 3].Complications can be caused by the foreign body itself orthe procedure for extraction. Complications that may occur such as excoriations, lacerations, perforations, infections, abscesses, mediastinitis, and death [6]. The mortality rate in cases of swallowed foreign bodies is very low, but due tothe large number of cases that occur, an estimated 1500- 2750 people die each year in the United States due to ingestion of foreign bodies [4]. Data on the characteristics of cases of esophageal foreign bodies in Indonesia, especially Bali is still lacking. The collected data can be used to develop policies for management of esophageal foreign body and to improve the outcome.

MATERIAL AND METHODS STUDY DESIGN AND SAMPLE

This research is a retrospective descriptive study using secondary data from the medical records of patients diagnosed with esophageal foreign bodies at Prof. I.G.N.G. Ngoerah General Hospital Denpasar from January 2011- December 2020. The characteristics studied in this study included age, sex, chief complaint, type of foreign body, radiological findings, management, foreign body location, and complications. The study population were all patients diagnosed with esophageal foreign bodies in January 2011- December 2020. The inclusion criteria were all patients diagnosed with esophageal foreign bodies. Exclusion criteria were patients diagnosed with esophageal foreign bodies with incomplete medical record data. Each patient's medical record that met the sample criteria was included in the data analysis.

Data Collection

Data collection was carried out in 1-9 August 2022 by obtaining identities of esophageal foreign body patients from January 2011-December 2020 that recorded in register of the ORL-HNS Department. The characteristics studied obtained from medical report of each patient in Prof.
I.G.N.G. Ngoerah General Hospital Medical Record Unit.

Statistical Analysis

The data obtained in this study was processed using the Statistical Product and Service Solution (SPSS) program. The statistical analysis design used was univariate analysis which aimed to describe the age, sex, chief complaint, type of foreign body, radiological findings, management, location of foreign body, and complications of esophageal foreign body cases. The results of data processing are displayed in the form of tables and narratives.

RESULTS

A total of 147 esopageal foreign bodies cases obtained from our register, but only 117 cases met the study sample criteria. These sample consisted of 68 (58, 1%) males and 49 (41, 9%) females. Highest samples was seen in age group of 5-10 years old which were 24.8%, as shown in Table 1.

Table 1: Distribution by age group of 117 esophageal foreign bodypatients.

Age Group	Frequency (n)	Percentage (%)

0-1	3	2.5
2- 4	14	12.0
5-10	29	24.8
11-20	1	0.9
21-30	7	6.0
31-40	6	5.1
41-50	18	15.4
51-59	15	12.8
≥ 60	24	20.5
Total	117	100

Chief complaints reported by patients were feeling something stuck in the throat (41.9%), sore throat (33.3%), dysphagia (16.2%), odynophagia (7.7%), and vomitting (0.9%). Foreign bodies were detected using radiological examination in 97 cases (82.9%). The location of foreign body based on radiological examination were mostly at cervical region of esophagus (69.2%), while the remaining cases are at thoracal region (13.7%) and undetected(17.1%). Extraction using esophagoscopy was performed in 105 cases (89.7%) and surgery was only performed in 2 cases (1.7%) (Table 2). Five cases (4.3%) underwent more than once esophagoscopy and another 5 cases (4.3%) were extracted using Magill forceps.

Table 2: Management of esophageal foreign bodies in 117 patients

Management	Frequency (n)	Percentage (%)
Esophagoscopy	105	89.7
Magill forceps	5	4.3
Esophagoscopy >1	5	4.3
Esophagotomy with cervicotomy approach	2	1.7
Total	117	100

There were 62 (52.9%) organic foreign bodies and 55 (47.1%) inorganic foreign bodies extracted. Locations of theforeign bodies found during the procedures were at cervical part of the esophagus in 99 cases (84.6%), at the thoracal part in 17 cases (14.5%), and at the abdominal part 1 cases (0.9%). Most of the foreign bodies extracted were coins (30.8%) and followed by bone fragments (29.9%) (Table 3).

Table 3: Objects Distribution of foreign bodies by group of age in117 esophageal foreign bodies patients

Types of foreign bodies	Frequency by group of age (n/%)			Total
	Children (< 18 y.o)	Adults (19-<60 y.o)	Elderly (> 60 y.o)	
Organic				
Bone fragment	4/3.4	23/19.7	8/6.8	35/29.9
Meat/ cartilage	-	8/6.8	9/7.7	17/14.5
Bone and meat	-	4/3.4	3/2.5	7/5.9
Fish bone	-	2/1.7	1/0.9	3/2.6
Inorganic				
Coin	36/30.8	-	-	36/30.8
Denture	-	6/5.1	1/0.9	7/5.9
Bamboo fiber/ flake	2/1.7	2/1.7	2/1.7	6/5.0
Dental probe needle	-	1/0.9	-	1/0.9
SIM card	1/0.9	-	-	1/0.9
Bolt	1/0.9	-	-	1/0.9
Button battery	1/0.9	-	-	1/0.9
Earring	1/0.9	-	-	1/0.9
Star-shaped pin	1/0.9	-	-	1/0.9
Total	47/40.2	46/39.3	24/20.5	117/100

There were 67 cases (57.3%) that did not develop any complications. Most of the complications were excoriations in 31 cases (26.4%) and can be categorized as minor complications. The more serious complications were esophageal ulcer/ suppuration in 4 cases (3.4%), retro- pharyngeal abscess in 1 cases (0.9%), and corrosive esophagitis in 1 cases (0.9%) (Table 4).

Table 4: Complications in 117 esophageal foreign body patients

Complications	Frequency (n)	Percentage (%)
No complication	67	57.3
Excoriation	31	26.4
Edema	13	11.1
Esophageal ulcer/suppuration	4	3.4
Retropharyngeal abscess	1	0.9
Corrosive esophagitis	1	0.9
Total	117	100

DISCUSSION

Esophageal foreign body is is often encountered in daily clinical practice. This study obtained 147 cases within aspan of 10 years, but only 117 cases included in the study. Athanassiadi *et al* [7] reported 400 cases of esophageal foreign bodies within 26 years, while Zuleika and Ghanie [8] reported 43 cases within 3 years. Most cases of esophageal foreign bodies in this study were found in children (40.2%).

Similar results were also reported by Patel and Sharma [9], Zuleika and Ghanie [8], and Orji *et al* [10]. However, Athanassiadi *et al* [7] reported cases of esophageal foreign bodies in the pediatric population of only 7% in their study with 400 samples.

The high number of esophageal foreign bodies cases in children is related to their behavior, anatomy and physiology. Children are explorative, very curious, and, in some period, have tendency to put objects into the mouth. The relatively small size of the esophagus in children also increases the risk of foreign bodies impacted in the esophagus. Immature swallowing coordination, developing chewing capacity, and relatively high respiratory rate are also associated with the occurrence of esophageal foreign bodies. Mental retardation, swallowing reflex disorders, congenital abnormalities, and postsurgical effect on structures involved in swallowing process can also increase the risk of esophageal foreign bodies in children. Meanwhile, in healthy adults, esophageal foreign bodies generally occur accidentally. Some risk factor identified in adults include old age, edentulous, psychiatric disorders, mental retardation, and alcohol intoxication. Old age is associated with loss of teeth, reduced oropharyngeal sensitivity, use of dentures, and degenerative diseases that can affect swallowing function, which may contribute toesophageal foreign bodies [8, 11, 12].

Male sex was found to dominate the number of esophageal foreign bodies cases by 58.1%. Similar results were also reported by Athanassiadi *et al* [7], Patel and Sharma [9], Orji *et al* [10], and Aiolfi *et al* [12]. The male predominance in esophageal foreign bodies cases may be caused by male behavior that are more active, exploratory, and has high curiosity, especially in children [9].

The most reported main complaint in this study was feeling something stuck in the throat in 41.9% cases. Zuleika and Ghanie [8] also reported the most reported main complaint was feeling something stuck in the throat in 86.4% cases. Orji *et al* [10] reported that the most common main complaint was pain on swallowing (76%). Athanassiadi *et al* [7] reported that the patients' main complaints were difficulty of swallowing, acute pain, and increased salivary production. The differences of the main complaints are related to the type and characteristics of the ingested foreign body.

Radiological examination has an important role in diagnosing and planning therapy for esophageal foreign body. Anterior posterior and lateral cervical plain radiographs are a cheap and quick examination for the initial assessment of cases with suspected esophageal foreign bodies. Abnormal radiopaque features in the esophagus are considered the most significant radiological features for the presence of esophageal foreign bodies, but there are other radiological findings that may be signs of a foreign body, such as air column or air trapping in the esophagus, loss of cervical vertebral lordosis, and increase of thickness of C6 prevertebral soft tissue [13].

Zuleika and Ghanie [8] found 74.4% of cases of esophageal foreign bodies detected by radiological examination. Patel and Sharma [9] found that 83.3% of esophageal foreign bodies were detected by radiological examination. Orji *et al* [10] conducted radiological examinations in 81% of 131 cases of esophageal foreign bodies and found as many as 53.7% cases had positive findings. Most esophageal foreign bodies (82.9% cases) in this study were detected by radiological examination. A total of 69.2% foreign bodies visualized in the cervical part of esophagus and 13.7% in the thoracic part of esophagus. There were 17.1% cases that had negative findings. Radiolucent foreign bodies can give false negative results which will complicate the diagnosis and treatment of esophageal foreign bodies [9]. The presence of specific symptoms and history of foreign bodies ingestion warrant for esophagoscopy.

The choice of management for esophageal foreign bodies depends on patient age and condition, size and type of the foreign bodies, duration and location of impaction, and operator's experience. Extraction using rigid esophagoscopy is a method that has been used since the 1800s, and still the main choice for management of esophageal foreign bodies. The success rate was reported at 94-100%. Currently, rigid esophagoscopy is performed under general anesthesia to provide maximum results. Some advantages of rigid esophagoscopy include able to provide wider visualization, can be performed while maintaining airway patency, and extractions can be performed without pulling out the esophagoscope if the foreign body can pass through the lumen of the esophagoscope, making less effort for reinsertion [7, 9, 12]. Flexible esophagoscopy is a relatively new method used for extraction of esophageal foreign bodies. This method can be performed without general anesthesia in selected patients, although its effectiveness is limited for sharp and long foreign bodies that impacted in the upper esophagus. Surgery reported needed only in 1- 3.4% cases. These surgical approaches include trans cervical or trans thoracal esophagostomy. Currently, minimally invasive surgery methods allow extraction with athoracoscopic approach in certain cases [7, 9, 12].

In this study, extraction using rigid esophagoscopy was performed in 89.7% cases. There were 4.3% of cases that underwent more than once rigid esophagoscopy for extraction because the foreign bodies were not found or had difficulties during the first attempt. Esophagostomy was performed in 1.7% of cases. We didn't have any experience using flexible esophagoscope for esophageal foreign body extraction. These results are in conjunction to previous reports. Athanassiadi *et al* [7] reported that 85.7% of foreign bodies were extracted by esophagoscopy, 3% required surgery, and 14.3% were managed using other methods such as flexible esophagoscopy, Foley catheters, and bouginage. All cases of esophageal foreign bodies reported by Patel and Sharma [9] were successfully extracted using rigid esophagoscopy. Orji *et al* [10] reported that 85.6% of esophageal foreign bodies extracted using rigid esophagoscopy, 3.4% using Magill Forceps, and 11% underwent surgery. Of all cases extracted using esophagoscopy in their report, there were 15% of cases that require more than once esophagoscopy.

Foreign bodies extracted in this study were mostly coins (30.8%), followed by bone

fragments (29.9%). Patel and Sharma [9] found that the most common types of foreign bodies in children were coins (33.33%) and in adult were dentures (25%). Orji *et al* [10] reported that the three most common types of foreign bodies were coins (34.75%), bone fragments (25.42%), and dentures (16.95%). Zuleika and Ghanie [8] reported that the most types of foreign objects were coins (44.1%) and dentures (25.2%).

The type of esophageal foreign bodies is related to the patient's age. In the pediatric population, most foreign bodies are coins and toy parts, whereas in adults, bone fragments are more common. Other than age, the type of foreign body ingested is also related to the environmental conditions, cooking methods, and the way people eat. Fish bones are one of the most common foreign bodies found in areas with high fish consumption or in coastal areas [14]. Bali is an archipelago with quite abundant fish production, but the results of this study only found 2.6% of cases with fish bone foreign bodies. Bone fragments, which are the second most common type of foreign body, come from animals such as cows, pigs and chickens. This is possibly related to the cooking method of the Balinese people, the location of this research, which mixes pieces of meat and bones. Some Balinese people also often sip soup containing meat and bones directly from the bowl, which can increase the risk of swallowing bone fragments. In the other hand, most Indonesian, including Balinese, eats using hands. This way, people are more perceive to the content of their food andcan avoid ingesting unwanted objects. Correlation between ways of eating and cooking methods with the esophageal foreign bodies need further studies.

Foreign bodies usually impacted at the location of the natural narrowing of the esophagus, which are at the level ofthe cricopharyngeal muscle, the level of the aortic arch, and the lower esophageal sphincter [9]. The location of foreign bodies based on radiological findings and intraoperative findings was mostly found in the cervical part of esophagus, but with different percentages, 69.2% and 84.6% respectively. The difference in location between radiological findings and intraoperative findings can be caused by the position of the foreign body being superimposed on the surrounding organ structures. In addition, there is possibility of foreign bodies migration during the waiting period from the time of radiological evaluation to extraction.

Previous studies also found that most foreign bodies impacted in the cervical part or upper esophagus. This is related to the anatomical and physiological characteristics of the upper esophagus, which includes the upper esophageal sphincter and the transition between striated and smoothmuscle [12]. The cricopharynx, which is composed of striatedmuscles, can produce strong contractions to push the bolus through the upper esophageal sphincter, then the bolus will enter the esophageal segment, which is composed of smooth muscles, with weaker contractions. This will cause the foreign body to be impacted just below the cricopharyngeal muscle [8].

Pathology of the esophagus can also be the cause and location of a foreign object stuck in the esophagus. Pathologies that often cause esophageal foreign bodies include strictures, hiatal hernias, esophageal webs, and Schatzki rings. These pathologies cause abnormal narrowingof the esophageal lumen. In addition, eosinophilic esophagitis has also been reported as a cause of bolus obstruction in up to 16% of the population [12]. This study did not find any pathological conditions that cause esophageal foreign bodies.

Complications in cases of esophageal foreign bodies can arise due to the foreign body itself or due to the procedure. Several factors that are known to increase the risk of complications in cases of esophageal foreign bodies are age
> 60 years, duration of impaction > 24 hours, and sharp foreign bodies [12]. Patel and Sharma [9] found that complications occurred in 8.33% of cases, most of which were lacerations and bleeding. Orji *et al* [10] reported serious complications in 2% cases. These serious

complications were esophageal perforation, mediastinitis, and death. Aiolfi *et al* [12] reported that complications occurred in 17.8% of cases, both due to foreign bodies and due to endoscopic procedures. Perforation caused directly by esophageal foreign bodies was reported in 1.4% cases, while iatrogenic perforation was in 0.3% cases. The mortality rate was 0.85%. In 57.3% cases in this study did not experience any complications. The most common complications found in this study were excoriation in 26.5% cases, which can be said as minor complications. Serious complications were found in 5.2% of cases, which are ulcers/suppuration, retropharyngeal abscess, and corrosive esophagitis. These complications were managed successfully with good results.

CONCLUSION

Esophageal foreign bodies are frequently encountered in daily clinical practice. Most cases were found in children and male. The most common reported main complaint was feeling something being stuck in the throat. Radiological examination is very helpful in establishing the diagnosis, but false negative results can be found, especially in radiolucent foreign bodies. Most foreign bodies were extracted using rigid esophagoscopy, only a small number of cases needed surgery. The most common types of foreign bodies were coins and bone fragments with the most locations in the pars cervicalis esophagus. Most of the cases managed without any complications. Esophagoscopy is still a safe and effective primary modality, while surgery is only needed in small number of cases.

Disclosure

The authors declare that there are no conflicts of interest in this study. This study was approved by The Research Ethics Committee Faculty of Medicine Udayana University (1671/UN14.2.2. Vll.14/LT/2022) and Sanglah General Hospital (LB.02.02/XIV.2.2.2/53094/2022). This study received grant from “Penelitian Dana PNBP Tahun Anggaran 2022 Universitas Udayana”.

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