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Frequency of oesophageal foreign bodies ingested by children presenting to the ENT department.

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ABSTRACT... Objective: To determine the frequencies of different esophageal foreign bodies ingested by children presenting to Ayub Teaching Hospital Abbottabad. **Study Design:** Cross-sectional study. **Setting:** Department of Otorhinolaryngology, Ayub Teaching Hospital Abbottabad. **Period:** 2nd July 2020 to 31st December 2022. **Methods:** Following the application of inclusion and exclusion criteria, a total of 168 patients, aged between 6 months and 11 years, presenting with suspected esophageal foreign bodies, were included in the study after obtaining written consent. Socio-demographic information, clinical history, and symptoms were carefully recorded. Diagnostic procedures included neck X-rays, extended to the chest, and abdominal X-rays as necessary. Rigid esophagoscopy, performed under general anesthesia, was utilized to confirm and remove foreign bodies. Subsequently, the nature and type of the extracted foreign bodies were identified and documented using a standardized pro forma. **Results:** The mean age of the patients was 5.63 ± 3.097, ranging from 1 to 11 years. Regarding the gender distribution, 105 (62.5%) were male, and 63 (37.5%) were female. When considering the types of foreign bodies, 129 (76.8%) presented with coins, 12 (7.1%) with metallic objects, 7 (4.2%) with battery cells, and 9 (5.4%) with fruit seeds. Additionally, there were a few cases of chicken bones, fish bones, and safety pins, accounting for 9 (5.4%) in the category of other foreign bodies. **Conclusion:** This study underscores the frequent occurrence of esophageal foreign body ingestion in young children, particularly males under the age of 5, with coins identified as the predominant culprits.

Key words: Aerodigestive Tract, Esophageal Foreign Body, Esophagoscopy, Esophagus, Esophageal Lumen.

INTRODUCTION

Children frequently unintentionally ingest foreign bodies, a common occurrence attributed to their curious nature, which often leads them to put small toys or metallic coins in their mouths. As a result, a substantial number of patients with suspected foreign bodies are children. In certain instances, these objects may travel through the aerodigestive tract, with 80% getting lodged in the esophageal lumen and the remaining 20% in the tracheobronchial system. While the majority of ingested foreign bodies pass through the gastrointestinal system naturally, 10-20% of cases may require rigid or fiberoptic esophagoscopy, and less than 1% may necessitate surgical intervention.[1,2]

The majority of foreign-body ingestions, approximately 80%, occur in infants, toddlers, and children, with the highest frequency observed between 6 months and 3 years. Unlike in adults, over 90% of these cases in children are accidental. Early detection is crucial, often necessitating emergency first aid. Although some ingestions may be witnessed by parents or guardians, approximately 40% go unnoticed. The absence of a witness presents challenges in pinpointing the causative foreign body, as young children may face difficulties in communication, and symptoms may not always be apparent.[3-5]

The typical progression of foreign body (FB) ingestion suggests that 80-90% of foreign bodies will naturally pass through the gastrointestinal tract and be expelled; only 10-20% may require removal through endoscopic procedures, and less than 1% might necessitate surgical intervention. Diagnosis hinges on a heightened level of suspicion, often derived from parental reports of sudden-onset symptoms, observations

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of the child putting an item in their mouth during play, or information provided by the patient themselves, followed by the subsequent onset of symptoms.[6] In a study conducted in the Sultanate of Oman, which included 385 children, findings indicated that coins were the most frequently ingested foreign body, accounting for 41.3%, followed by disc batteries at 12.2%. Urgent esophagogastroduodenoscopy (EGD) was deemed necessary for 16.3% of the cases, involving a total of 63 patients.[1] In a comprehensive 45-year study conducted in the USA, a total of 2637 foreign bodies (FBs) were removed from various anatomical locations, including the pharynx (n=118), esophagus (n=2410), stomach (n=103), and intestines (n=6). The majority of FBs were inorganic (95%), with 89.3% being blunt objects, 9.8% pointed objects, and 0.9% sharp objects. Coins emerged as the most common type of FBs (78.3%), followed by pins and safety pins (3%), jewelry (3%), and chicken or fish bones (2.8%).[6]

Our study marks a pioneering initiative within our local population, seeking to determine the frequencies of different types of foreign bodies ingested by children. This research not only quantifies these occurrences but also establishes vital local evidence. The findings hold significance for planners and practitioners in developing effective interventions to address this issue. Additionally, the results will play a role in increasing awareness among the general public about the prevalence of foreign body ingestion in children.

METHODS

The cross sectional study was conducted from July 2022 to December 2022 in the Department of Otorhinolaryngology at Ayub Teaching Hospital, Abbottabad, a tertiary care hospital.

The sample size of 168 was determined using WHO software, with a confidence level of 95%, an anticipated proportion of foreign bodies (fish and chicken bones) at 2.8%[6], and an absolute precision of 2.5%. Consecutive non-probability sampling was employed for participant selection.

Inclusion and Exclusion Criteria

Children of both genders, aged 6 months to 11 years, presenting with suspected esophageal foreign bodies were included. Exclusion criteria comprised children with foreign bodies in the oral cavity or pharynx, caustic material ingestion, bleeding tendencies, hemodynamic instability, and those whose parents did not provide consent.

Data Collection Procedure

Upon obtaining approval from RTMC CPSP (Ref No: CPSP/REU/ENT-2019-010-1146) and the institutional ethical committee, children with suspected esophageal foreign bodies were included in the study after written informed consent. Socio-demographic variables, clinical history, and symptoms were recorded. Diagnostic procedures included plain neck X-rays followed by chest and abdominal X-rays when necessary. Rigid oesophagoscopy, performed in the operating room under general anesthesia, confirmed and removed foreign bodies. After removal, the nature and type of the foreign body were ascertained and recorded in a pro forma.

Data Analysis

The analysis utilized SPSS 21.0, presenting age as mean ± standard deviation (SD). Categorical variables, such as the presence of oesophageal foreign bodies, gender, residence (rural or urban), and type and nature of foreign bodies, were conveyed in frequencies and percentages. Stratified analyses, based on age, gender, residence, and nature of foreign bodies, were conducted, and post-stratification Chi-square tests were applied to assess associations, adopting a significance level of ≤ 0.05. The results were visually represented through tables and graphs, offering a comprehensive depiction of relationships and frequencies within the dataset.

RESULTS

The study was conducted at the ENT unit of Ayub Teaching Hospital Abbottabad, a total sample of 168 patients was calculated to determine the frequencies of different esophageal foreign bodies ingested by children. The mean age of the patients was 5.63 ±3.097 ranging from 1 to 11 years of age, out of 168 patients.

The results from Table-I reveal a comprehensive profile of children presenting to the ENT department with esophageal foreign bodies. A majority of cases were male (62.5%), and the majority of patients were below 5 years of age (57.1%). Rural areas accounted for a slightly higher proportion of cases (53%) compared to urban areas (47%). Symptomatically, a significant number of patients exhibited drooling of saliva (92.9%), vomiting (77.4%), dysphagia (99.4%), and neck/throat/chest pain (98.2%). The prevalence of esophageal foreign bodies was notably high (98.8%), with inorganic materials (92.3%) being more common than organic ones (6.5%). Coins (76.8%) emerged as the predominant foreign body type, followed by metallic objects (7.1%) and fruit seeds (5.4%). These findings underscore the gender and age-specific trends, symptomatology, and types of foreign bodies in this pediatric population, offering valuable insights for clinical management and preventive strategies.

		Frequency (%)
Gender	Male	105 (62.5**%)**
	Female	63 (37.5%)
Age group	Below 5 years	96 (57.1%)
	5 years and above	72 (42.9%)
Residence	Rural	89 (53%)
	Urban	79 (47%)
Symptoms of drooling of saliva	Yes	156 (92.9%)
	No	12 (7.1%)
Symptoms of vomiting	Yes	130 (77.4%)
	No	38 (22.6%)
Symptoms of dysphagia	Yes	167 (99.4%)
	No	1 (0.6%)
	No	3 (1.8%)
Symptoms of neck, throat, or chest pain	Yes	165 (98.2%)
	No	3 (1.8%)
Symptoms of cough	Yes	134 (79.8%)
	No	34 (20.2%)
Esophageal foreign body	Positive	166 (98.8%)
	Negative	2 (1.2%)
Nature of the foreign body	Organic	11 (6.5%)
	Inorganic	155 (92.3%)
	Not applicable	2 (1.2%)
Types of foreign body	Battery cell	7 (4.2%)
	Coin	129 (76.8%)
	Fruit seed	9 (5.4%)
	Metallic object	12 (7.1%)
	No FB	2 (1.2%)
	Other	9 (5.4%)

Table-I. Frequency distribution of demographic and clinical characteristics

Table-II reveals insights into the distribution of demographic and clinical characteristics based on gender among children presenting with esophageal foreign bodies. In terms of residence, a potential trend is observed with a higher proportion of males from rural areas. However, the p-value of 0.162 suggests a non-significant difference. The occurrence of esophageal foreign bodies does not show a significant gender-based difference (p-value = 0.611). Regarding the nature of foreign bodies, while 57.7% of males had inorganic foreign bodies compared to 34.5% of females, the p-value is 0.932, indicating no significant gender-related variation. Similarly, the types of foreign bodies ingested, such as coins, showed no significant gender-based difference (p-value = 0.55). These findings collectively suggest a general similarity in the demographic and clinical characteristics of esophageal foreign bodies between male and female children in the studied population.

Table-III presents an analysis of demographic and clinical characteristics based on age groups among children with esophageal foreign bodies. In terms of residence, a higher proportion of cases below 5 years old were from rural areas (31.00%) compared to those 5 years and above (22.00%), with a non-significant p-value of 0.721. The occurrence of esophageal foreign bodies was higher among the younger age group (56.50%) than the older age group (42.30%), although the p-value of 0.675 indicates no significant difference. Regarding the nature of foreign bodies, 53.60% of cases below 5 years had inorganic foreign bodies, while 38.70% of those 5 years and above had the same, with a non-significant p-value of 0.702. Examining specific types of foreign bodies, such as coins, there was a higher incidence in the below 5 years group (43.50%) compared to the 5 years and above group (33.30%), although the p-value of 0.623 suggests no significant age-related difference. Overall, the table indicates some potential trends in the distribution of characteristics based on age groups, but statistical significance is limited, emphasizing the importance of cautious interpretation.

		Male		Female		
		n	%	n	%	P-Value
Residence	Rural	60	35.70%	29	17.30%	0.162
	Urban	45	26.80%	34	20.20%	
Esophageal foreign body	Positive	104	61.90%	62	36.90%	0.611
	Negative	1	0.60%	1	0.60%	
Nature of the foreign body	Organic	7	4.20%	4	2.40%	0.932
	Inorganic	97	57.70%	58	34.50%	
	Not applicable	1	0.60%	1	0.60%	
Types of foreign body	Battery cell	6	3.60%	1	0.60%	0.55
	Coin	80	47.60%	49	29.20%	
	Fruit seed	5	3.00%	4	2.40%	
	Metallic object	9	5.40%	3	1.80%	
	No FB	1	0.60%	1	0.60%	
	Other	4	2.40%	5	3.00%	

Table-II. Distribution of demographic and clinical characteristics by gender

		Below 5 Years		5 Years and Above		
		n	%	n	%	P-Value
Residence	Rural	52	31.00%	37	22.00%	0.721
	Urban	44	26.20%	35	20.80%	
Esophageal foreign body	Positive	95	56.50%	71	42.30%	0.675
	Negative	1	0.60%	1	0.60%	
Nature of the foreign body	Organic	5	3.00%	6	3.60%	0.702
	Inorganic	90	53.60%	65	38.70%	
	Not applicable	1	0.60%	1	0.60%	
Types of foreign body	Battery cell	5	3.00%	2	1.20%	0.623
	Coin	73	43.50%	56	33.30%	
	Fruit seed	6	3.60%	3	1.80%	
	Metallic object	8	4.80%	4	2.40%	
	No FB	1	0.60%	1	0.60%	
	Other	3	1.80%	6	3.60%	

Table-III. Distribution of demographic and clinical characteristics by age group

DISCUSSION

In the domain of pediatric care, the prevalence of esophageal foreign bodies stands out as a notable concern, serving as the central focus of our investigation. This study delves into the frequency of this issue among young patients, examining the underlying predisposing factors contributing to esophageal foreign body impaction. Given the potential complications associated with prolonged retention, our examination underscores the importance of addressing this challenge in pediatric healthcare.

Foreign body ingestion poses a common challenge in children, especially in younger age groups, as emphasized by Wyllie R.[7] The inherent curiosity of children often prompts them to explore the world by putting foreign bodies (FBs) in their mouths and subsequently swallowing them. According to Saki N et al., the majority of these instances result in the foreign bodies passing harmlessly through the gastrointestinal tract.[8] In alignment with various studies, our research reveals a comparable age distribution, with the majority of patients falling under the age of 4 years.[9] In our study, the average age was 5.63 ± 3.097, spanning from 1 to 11 years. This corresponds with the results of a study conducted by Altokhais TI et al., where the mean age ranged from 5 to 12 years, with a similar mean of 4.4 years.[10]

In our study, the distribution of gender revealed a prevalence of males, constituting 62.5% (105

patients), compared to 37.5% (63 patients) females. Regarding participants' residence, 53.0% (89 individuals) were from rural areas, while 47.0% (79 individuals) resided in urban areas. The reported symptoms highlighted a substantial occurrence, with 99.4% (167 cases) experiencing dysphagia, 92.9% (156 cases) exhibiting drooling of saliva, 98.2% (165 cases) reporting neck, throat, or chest pain, 79.8% (134 cases) presenting with a cough, and 77.4% (130 cases) showing symptoms of vomiting. These findings align with a diverse range of manifestations globally, reflecting variations influenced by factors such as age, the nature of the ingested object, anatomical site involvement, and duration since ingestion, as observed by Louie JP.[11] Remarkably, drooling of saliva stood out as the most prevalent presenting symptom in our population, followed by vomiting, consistent with observations reported in other studies.[8,9,11,12]

Our study identified a significant occurrence of esophageal foreign bodies, with 98.2% (166 cases) emphasizing their prevalence in the pediatric population. Conversely, only 1.2% (2 cases) had no esophageal foreign body. The majority of patients (92.3%, 155 cases) presented with inorganic foreign bodies, primarily coins, metallic objects, and battery cells. A smaller proportion (6.5%, 11 cases) exhibited organic foreign bodies, potentially associated with food items. Notably, only 1.2% (2 cases) had no esophageal foreign body. The distribution of foreign body types revealed coins as the most prevalent (76.8%, 129 cases), followed by metallic objects (7.1%, 12 cases), safety pins (5.4%, 9 cases), fruit seeds (4.2%, 7 cases), and battery cells (5.4%, 9 cases). Other foreign bodies, such as chicken bones and fish bones, were noted in a few cases. These findings align with Asif M et al.'s study, where coins constituted 56% of encountered foreign bodies.[13]

Differences in the types of ingested foreign bodies (FBs) can be observed among countries due to varied feeding habits, cultural aspects, and sociocultural characteristics. In line with numerous studies, our results demonstrate that coins were the most frequently encountered FB, mirroring a common trend in diverse populations. Coins were identified as the predominant type in our investigation, followed by a diverse array of other FBs. Interestingly, in specific regions, like Eastern populations, fish bones were reported as the most prevalent type of FB ingestion. Furthermore, instances of food bolus as a FB were more common in patients with preexisting esophageal abnormalities, as highlighted in the study by Saki N et al.[8] Multiple studies have consistently reported that esophageal foreign body (FB) impaction is often linked to preexisting esophageal diseases.[14-17]

The gender-stratified analysis based on residence in our study revealed that 60 (35.7%) male patients resided in rural areas, 45 (26.8%) in urban areas, while 29 (17.3%) female patients were from rural and 34 (20.2%) from urban areas, with a statistically insignificant p-value of 0.162. Similarly, our investigation on the frequency distribution of gender concerning esophageal foreign bodies showed 104 (61.9%) male and 62 (36.9%) female patients, with statistically insignificant results at $p=0.611$. These findings align with prior studies by Altokhais TI et al.[10] and Asif M et al.[13], where a higher prevalence of esophageal foreign bodies was observed in males compared to females.

In our study, the gender-stratified analysis of the nature of foreign bodies revealed 7 (4.2%) males with organic and 97 (57.7%) with inorganic foreign bodies, while among females, 4 (2.4%) had organic and 58 (34.5%) had inorganic foreign bodies. The results were not statistically significant with a p-value of 0.932, consistent with the findings of Altokhais TI et al.[10] Additionally, the distribution of gender concerning types of foreign bodies indicated that 6 (3.6%) males had battery cells, 80 (47.6%) had coins, 5 (3.0%) had fruit seeds, and 9 (5.4%) had metallic objects. Other foreign bodies, including chicken bones, fish bones, and safety pins, comprised 4 (2.4%). This association was statistically insignificant at $p=0.550$, aligning with previous studies.[14-17]

Our study shows the characteristics based on age groups, indicating potential trends without achieving statistical significance. The higher

proportion of cases below 5 years old from rural areas and the increased occurrence of esophageal foreign bodies in the younger age group were noteworthy but not statistically significant as reported by Asif M et al.[13] Similarly, the distribution of inorganic foreign bodies and specific types like coins suggests potential age-related differences that warrant further investigation with larger sample sizes to establish statistical significance.

CONCLUSION

The findings highlight the prevalence of esophageal foreign body ingestion, particularly among males and those below 5 years of age. The clinical presentation, characterized by symptoms such as dysphagia, drooling, and vomiting, emphasizes the importance of early detection and intervention. Coins were identified as the most frequently ingested foreign body, predominantly of inorganic nature.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Sundus Ghani	Formulated and design the study was responsible for data collection and wrote the manuscript.	
2	Farzana Batool	Analyzed and interpreted the data and helped in writing the manuscript and data collection.	