EURASIAN JOURNAL OF EMERGENCY MEDICINE

Emergency Department Experience of Foreign Body Ingestion: An Analysis of 69 Cases in an Academic Hospital in Saudi Arabia

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Cite this article as: Abualenain JT, Jawa HA, Bintaleb YY, Abulkalam MM, Aldini MA, Dafterdar AK, et al. Emergency Department Experience of Foreign Body Ingestion: An Analysis of 69 Cases in an Academic Hospital in Saudi Arabia. Eurasian J Emerg Med. 2018; 17: 3-8.

Abstract

Aim: Foreign body (FB) ingestions represent a challenging clinical problem in the emergency departments (EDs), and 20% of cases undergo an endoscopy. We aimed to report our experience with FB ingestion based on age, sex, type of FB material, comorbidities, and intervention in ED of King Abdulaziz University hospital where an emergency endoscopic service is available.

Materials and Methods: This was a retrospective descriptive study of patients who presented to ED with FB ingestion over a 4-year period (January 2013 to December 2017) and who were managed by either an upper endoscopy or laparotomy.

Results: A total of 130 patients presented with FB to ED; we included 69 patients (53%) who were treated using either endoscopy or laparotomy. The majority of patients had ingested a single FB (97%), with children representing 83% of the patients. The most common age group of FB ingestion was 0–4 years, with a male predominance (57%). The most common type of FB material was metallic in the pediatric patients and food in the adult patients; 45% of the patients were symptomatic. Comorbidities were present only in 13% of the patients. X-ray was performed in 87% of the patients, whereas computed tomography was performed only in 7%. The esophagus (75%) and stomach (13%) were the most common anatomical locations for FB. Upper endoscopy was the most common procedure performed (93%), and it was almost successful in all patients at the first attempt (96%).

Conclusion: FB ingestion is common in children, and approximately half of the patients underwent an emergency endoscopy. The availability of such a service is invaluable in the management of FB ingestion given its high success rate and low complications.

Keywords: Foreign body, ingestion, emergency, endoscopy

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Received: 27.12.2017 • **Accepted:** 29.01.2018

DOI: 10.5152/eajem.2018.70188

Introduction

Foreign body (FB) ingestions, including food bolus impactions, represent a challenging clinical problem in emergency departments (EDs). FB ingestions can be defined as objects that are accidentally or intentionally swallowed and are considered a problem commonly seen in emergency endoscopy (1). These emergencies may carry a significant risk of morbidity and sometimes mortality if not appropriately evaluated and managed in a timely manner when indicated. They also sometimes pose diagnostic and therapeutic challenges (2-5).

Among children, there is an increased tendency to explore and swallow different types of objects, such as coins, buttons, batteries, magnets, or toys. FB ingestion is a problem encountered in pediatric pathology (6), and FBs are mostly radiopaque (7). In adults, FB ingestion occurs more frequently by accident or because of other contributing pathological factors, such as psychiatric disorders, mental retardation, and food impactions or impairment, which occur more commonly in patients with a previous pathology (2, 4). While the majority (80%) of ingested FBs may spontaneously pass without intervention, it is crucial that clinicians recognize those FBs that might require urgent endoscopic or surgical retrieval when dealing with such scenarios (4, 8). Recent studies have showed that in intentional ingestion, the rate of endoscopic procedures is 63%-76% and the need for surgical procedures is 12%-16% (2, 9). The management of FB depends on several factors, such as anatomic location and size and shape of FB (2).

To the best of our knowledge, descriptive studies analyzing FB ingestions in hospitals in Saudi Arabia are limited. In this study, we aimed to retrospectively analyze the epidemiology, clinical presentations, findings, and outcomes of a cohort of patients who presented to King Abdulaziz University hospital (KAUH), which has emergency endoscopic settings, with FB ingestions and food bolus impactions.

Table 1. Age and sex distribution of foreign bodies in children and adults

	Sex		
	Male n (%)	**Female n (%)**	**Total**
Children			
1 month to 4 years	17 (46%)	20 (54%)	37
5-8 years	9 (75%)	3 (25%)	12
9-13 years	6 (75%)	2 (25%)	8
Total	32 (56%)	25 (44%)	57
Adults			
14-30 years	4 (50%)	4 (50%)	8
>30 years	3 (75%)	1 (25%)	4
Total	7 (58%)	5 (42%)	12

Materials and Methods

This study was approved by the research ethics committee of KAUH in June 2017. The need for informed consent was waived off by the ethical committee because all data were deidentified and no identifiable patients' information was collected or utilized during the study. We performed a retrospective descriptive study of a 4-year period (January 2013-June 2017) in which we reviewed the records of patients who had visited ED of KAUH for FB ingestion. KAUH is an 845-bed academic tertiary care hospital located in Jeddah, Saudi Arabia. Our ED is a 75 bed academic department offering full services (adult, pediatrics, and obstetrics). ED is staffed by board-certified emergency medicine consultants and specialists, including gastroenterologists and surgeons (for adult and pediatric patients), who provide 24 hours emergency consultations. There are approximately 64,000 ED visits per year.

We included all adult (≥14 years) and pediatric patients who presented with FB ingestion and who were managed with either upper endoscopy or laparotomy. Patients were identified using the electronic medical records (Phoenix; Al Anaiah) of KAUH. We also used the electronic reporting system (Provation) of the endoscopy unit to ensure that all cases were analyzed. We excluded those who were treated medically since there was no intervention performed to confirm the presence of the FB, which similar to what other studies did.

We developed a data collection sheet prior to data collection using variables, including patient demographics, presenting symptoms, comorbidities, radiological investigations, anatomical location, type of FB material, and therapeutic procedures, which were significant for our study and applicable in ED.

We categorized FB into three types: metallic, food, and others. The data were collected from procedure reports, progress notes by physicians, medical discharge reports, and radiological reports. Four researchers collected and reviewed the records simultaneously in two groups. The first group collected the records and the second group reviewed those records; thereafter, the groups switched roles.

Statistical analysis

All statistical analyses were performed using Statistical Package for the Social Sciences 20 (IBM SPSS Statistics; Armonk, NY, USA) to determine the descriptive values. Frequency tests were used, and categorical values were analyzed using the Fisher's exact test. A p value of <0.05 was considered significant.

Results

A total of 130 patients were initially identified. However, only 69 patients were included in this study. The 61 excluded patients were those who were treated medically without intervention (17 patients), who had no FB (31 patients), who had insufficient data on record (9 patients), or who had ingested a chemical (4 patients). FBs were identified using upper endoscopy or laparotomy in all 69 patients. Regarding age and sex distribution, we found that the

Table 2. Type of foreign body (FB) by age group, sex, nationality, clinical presentations, number of FBs, anatomical location, procedure type, and number of attempts for removal by endoscopy

Foreign Body Type	Total n (%)	Food n (%)	Metallic n (%)	Others* n (%)	p
Age group					
Adult patients	12 (17)	10 (83)	1 (8)	1 (8)	0.001
Pediatric patients	57 (83)	2 (3)	50 (88)	5 (9)	
Sex					
Male	39 (56)	8 (21)	29 (74)	2 (5)	0.40
Female	30 (44)	4 (13)	22 (73)	4 (13)	
Nationality					
Saudi Arabian	48 (70)	6 (12)	38 (80)	4 (8)	0.30
Not Saudi Arabian	21 (30)	6 (29)	13 (62)	10 (9)	
Symptoms					
Asymptomatic	22 (32)	1 (4)	21 (96)	0 (0)	
Symptomatic	31 (45)	7 (23)	19 (61)	5 (16)	0.06
Undeclared	16 (23)	4 (25)	11 (69)	1 (6)	
Number of FBs					
Single	67 (97)	11 (16)	50 (75)	6 (9)	0.45
Multiple		1 (50)	1 (50)	0 (0)	
Anatomical location					
Esophagus	52 (75.4)	9 (17)	39 (75)	4 (8)	
Stomach	9 (13)	0 (0)	8 (89)	1 (11)	
Duodenum	3 (4.2)	0 (0)	3 (100)	0 (0)	
Hypopharynx	1 (1.4)	1 (100)	0 (0)	0 (0)	0.005
Cricopharynx	2 (3)	2 (100)	0 (0)	0 (0)	
Broncos	1 (1.4)	0 (0)	0 (0)	0 (0)	
Cecum	1 (1.4)	0 (0)	1 (100)	1 (100)	
Procedure type					
Endoscopy	64 (93)	12 (19)	46 (72)	6 (9)	0.39
Laparotomy	5 (7)	0 (0)	5 (100)	0 (0)	
Attempts					
Single	66 (99)	11 (17)	49 (74)	6 (9)	0.69
Multiple	3 (4)	1 (33)	2 (67)	0 (0)	

**implies plastics, organic subjects such as human fingernails.*

majority of FB ingestions were in children aged 0-4 years and occurred more among females (54%), who had a slightly higher FB ingestion rate than males in this age group. However, among the overall pediatric patients, males (56%) had a slightly higher rate. Adult patients were similar to pediatric patients: males (58%) had a slightly higher FB ingestion rate than females (Table 1). The age range distribution was from 1 month to 91 years with a mean age of 9.4 (±15.9) years. The majority of the patients were pediatric patients with 57 cases (83%); the mean age was 3.8 (±3.2) years, the median age was 3 years, and the age range was from 1 month to 13 years. There were only 12 adult patients (17%), with a mean age of 36.3 (±23.7) years, median age of 26 years, and age range of 15-91 years.

Males represented 57% of the patients. In terms of nationality, 48 patients were Saudi Arabians (80%). Moreover, there were different types of FBs found in the gastrointestinal tract. The most common was the metallic type (74%), followed by various food particles (17%), plastics (6%), and organic objects (1%; e.g., human fingernails). Upon further subanalysis, we found that metallic FBs were the most common among pediatric patients (88%) compared with adult patients for whom food FBs were the most common (83%; Table 2).

Moreover, 45% of the patients were symptomatic, mostly with salivation, vomiting, dysphagia, pain in the neck or abdomen, and choking. Furthermore, 32% were asymptomatic, and in the remaining 23%, there was no documentation of the symptoms.

Table 3. Radiological investigations for foreign bodies

		Sex		
		Male n (%)	**Female n (%)**	**Total**
X-ray		52 (87)	8 (13)	60
CT		5 (1005)	0 (0)	5
	FB Type			
	Food n (%)	**Metallic n (%)**	**Others n (%)**	**p**
X-ray	9 (15)	48 (80)	3 (5)	0.004
CT	1 (20)	4 (80)	0 (0)	0.772

CT: computed tomography; FB: foreign bodies

There was no significant difference in the symptoms for different types of FB (p=0.06). Regarding comorbidities, majority of the patients (87%) did not have any comorbidity, whereas 13% had esophageal narrowing, peptic ulcer, autism, Down syndrome, bronchial asthma, esophageal narrowing, or upper respiratory tract infection (Table 2).

Regarding anatomical location, FBs were mainly located in the esophagus (75%), followed by stomach (13%); other locations included duodenum, hypopharynx, cricopharynx, bronchus, and cecum (Table 2). The most common procedure performed to remove FBs was upper endoscopy, it was performed in 63 out the 69 included patients (93%) (49% of all 130 FBs patients). Laparotomy (7%) as a secondary option was used either because of failed endoscopy or because FB was unreachable. Regarding the number of attempts, nearly all procedures were successful at the first attempt (96%; Table 2).

The most common radiological investigation was X-ray (87%), followed by computed tomography (CT; 7%). Eight patients (12%) did not undergo any imaging; however, all of them finally underwent interventional management. Among the five patients who underwent CTs, two underwent X-ray that showed FBs (Table 3).

Discussion

FB ingestion is considered a major health concern because it is a common occurrence in both pediatric and elderly patients. As demonstrated in this study, 83% of the patients were pediatric patients, and nearly 40% of the adult patients were aged >50 years. These results are similar to those of other studies in the literature (3, 4, 10, 11). Almost half of the patients who presented to ED with FBs were treated with endoscopic intervention, which is different from that reported in the literature. Louie and Bradin (12) concluded that the majority of FBs were spontaneously resolved; only 10%-20% required non-surgical intervention, such as upper endoscopy and <1% required surgical interventions, such as laparotomy. The high rate of endoscopic intervention in our study could be related to the presence of qualified emergency endoscopic staff that was comfortable in dealing with the patients and opted to intervene earlier to avoid potential FB complications.

Regarding the age distribution of children, we found that majority of the children were aged ≤6 years. These findings are similar to those reported by Diaconescu et al. (10), Adhikari et al. (13), and Gilyoma et al. (14), who stated that approximately half or more of their patients were aged <6 years. Regarding adult patients, we found the mean age to be 10 years younger compared with that reported by Geraci et al. (1) and 30 years younger compared with that reported by Zhang et al. (15).

In general, we found a male predominance in FB ingestion irrespective of the age group, which is consistent with that reported by Adhikari et al. (13) and Susy Safe Working Group (16), and in opposition to Smaranda et al. (10) who stated that sex involvement is not significant.

Anatomically, the location of FB impaction is commonly in the narrowest parts, such as the esophagus and pyloric sphincter, as in our study and similar to that reported in some other studies (15, 17, 18). Patients with FB ingestions present either as asymptomatic or with a variety of symptoms. In our study, 32% of the patients presented as asymptomatic, which was consistent with the findings of other authors who found asymptomatic presentation ranging between 25% and 55% (1, 19-21). Moreover, approximately 45% of patients presented with a variety of symptoms, most commonly vomiting and dysphagia. This also supports the findings of several studies in the literature (17, 22, 23), in which vomiting and dysphagia were the most common symptoms. The most common FBs ingested in our study were coins, followed by batteries and food bolus; similar results were found in other studies (10, 24).

One of the initial steps to approach FB ingestion is a radiological examination and identification of FB (25). In our study, plain neck, chest, and abdominal X-rays were the initial radiological choices for identifying FB. Approximately 87% of the patients underwent X-rays, which is similar to that reported in other studies in which the rates were 64%–96% (10, 16, 26, 27). Additional radiological studies, such as CTs, were used in a few patients in whom diagnoses could not be confirmed by X-rays or in patients in whom it was decided to directly perform CT. The management plan in 20% of the patients (14 patients: six did not undergo imaging and eight did not have FB on X-ray) who had a typical presentation of FB ingestion was an interventional procedure, which was similar to that reported by other studies (23, 28-30).

In the literature, the use of a variety of procedures, including balloon extraction, bougie, and upper endoscopy, has been reported. The choice of the optimal procedure for the patient mainly depends on the condition of the patient, characteristics of FB, anatomical location of FB, availability of the procedure, and availability of an expert to perform the procedure at the center (31, 32). In our study, the most commonly used procedure for the removal of FB was upper endoscopy in 93% of the included patients (49% of all 130 patients with FB ingestion), which was higher than 23% and 31% reported by Diaconescu et al. (10) and Yang et al. (33), respectively, and much lower than 98% reported by Pokharel et al. (34). However, the upper endoscopy success rate at the first attempt was 96%, which was higher than 63%-76% reported by Ikenberry et al. (8). FBs that could not be removed by upper endoscopy and could not be treated medically (7%)

were removed by laparotomy because of either inaccessibility of the anatomical location or failed endoscopic attempts. The most common FB was battery, which could develop further long-term complications if not treated surgically. Other studies reported 1%–2.6% of surgical intervention cases (5, 13, 17).

The limitations of this review are that it has a retrospective-descriptive design where data misinterpretation and insufficient documentation from physicians and nurses might occasionally be present. The data was from a single academic tertiary care hospital, so generalization is also an issue. In our study, there were very few adult patients, which makes it difficult to make any solid conclusions for this group.

Conclusion

FB ingestion remains a common occurrence in the pediatric population presenting to the ED. It represents both diagnostic and therapeutic challenges in patients regardless of being symptomatic or not. A 24-h emergency endoscopic service is of a great value to ensure prompt successful intervention when needed with a very low failure rate and complications.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of King Abdulaziz University.

Informed Consent: Written informed consent was waived by the ethical committee because all data were deidentified and no identifiable patients' information was collected or utilized during the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – J.T.A., M.M.A., M.A.A., A.K.D., N.T.A.; Design – J.T.A., M.M.A., M.A.A., A.K.D., N.T.A.; Supervision – J.T.A., H.A.J., Y.Y.B.; Resources – J.T.A.; Materials – J.T.A.; Data Collection and/or Processing – J.T.A., M.M.A., M.A.A., A.K.D., N.T.A.; Analysis and/or Interpretation – J.T.A., H.A.J., Y.Y.B., M.M.A., M.A.A., A.K.D., N.T.A.; Literature Search – M.M.A., M.A.A., A.K.D., N.T.A.; Writing Manuscript – J.T.A., M.M.A., M.A.A., A.K.D., N.T.A.; Critical Review – J.T.A., H.A.J., Y.Y.B.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

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