

Incidence of pediatric rigid esophagoscopy for foreign body removal before and after coin currency implementation in Saudi Arabia in 2017

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BACKGROUND: Foreign body (FB) ingestion is a common problem in children, which can lead to severe complications. Coins are the most common FB ingested. Since coin currency was recently implemented in Saudi Arabia, we decided to assess whether any changes have occurred in the incidence of FB removal by esophagoscopy.

OBJECTIVES: Incidence of rigid esophagoscopy for ingested FB removal before and after coin currency implementation.

DESIGN: Medical record review

SETTINGS: Main referral hospital in Jazan region.

PATIENTS AND METHODS: Our study included pediatric patients who underwent rigid esophagoscopy for removal of FB between February 2015 and July 2020 in the otorhinolaryngology department. We reported the incidence, age, gender, and type of FB. As the coin currency implementation started on December 2, 2017, the data were analyzed before and after this date.

MAIN OUTCOME MEASURES: Annual incidence of pediatric rigid esophagoscopy for removal of ingested FB and type of the FB.

SAMPLE SIZE: 124 patients

RESULTS: The median age and interquartile range was 6.0 (5.0) years. After implementation of coins in 2017, 104 cases were reported over 32 months; before that date, 20 cases were reported over 34 months. Coins were the FB in 2 cases (10%) before implementation of coins and in 83 cases (79.8%) after implementation ($P=.0001$).

CONCLUSIONS The annual incidence of pediatric esophagoscopy for FB removal has increased more than five times since implementation of coin currency. This increase is exclusively related to the increase in coins as a FB.

LIMITATIONS: Retrospective study.

CONFLICT OF INTEREST: None.

Foreign body (FB) ingestion a very common clinical problem. In the United States, more than 125 000 foreign body ingestions were reported in patients 19 years old and younger in 2007.¹ Ingestion of foreign bodies is more common in pediatric patients, with most cases occurring in children aged 6 months to 3 years.² Although foreign bodies cause significant morbidity in less than 1% of all patients, approximately 1500 individuals die each year in the United States because of esophageal FB ingestion.³ The majority of foreign bodies that are swallowed pass through the esophagus and gastrointestinal tract without causing injury, but 10%–20% require intervention.⁴ Intervention mainly depends on the type, size and shape of the FB, as well as the age of the patient and presence of esophageal stricture or another anatomical or physiological abnormality.⁴

Coin ingestion and retention in the esophagus is one of the most common types of FB ingestion.² Coins have different sizes and diameters, some of which can pass easily, but others can cause severe complications. Different approaches can be used to extract coins.² A lodged esophageal coin is an emergent condition that presents with acute dysphagia, chest pain, and FB sensation. Sometimes, the coins can pass through the gastrointestinal tract without any symptoms. However, if left untreated, they can cause complications. These complications vary in severity and frequency (e.g., intestinal blockage, perforation, severe bleeding, abscess formation, development of respiratory distress with potential progression to death).⁵ Endoscopy is the

most widely used and accepted method for removing coins from the esophagus.⁶ In this study, we evaluated the incidence and types of FBs ingested in pediatric patients who required esophagoscopy for FB removal in the Jazan region of Saudi Arabia before and after the substitution of the paper currency with coins.

PATIENTS AND METHODS

Our study was approved by the Institutional Review Board to review the pediatric cases (less than 18 years old) in the medical records who underwent rigid esophagoscopy for ingested FB removal in King Fahd Central Hospital, the main referral hospital in the Jazan region. In the Jazan region, during the study period, these procedures were exclusively performed in this hospital. We reviewed records between February 2015 and July 2020. The service was available all through this period. We excluded patients with esophageal strictures and tumors, syndromic children, and patients with neurological disorders that might cause dysphagia. As the coin currency implementation started on December 2, 2017, the data were analyzed before and after this date. We reported the annual incidence of FB ingestion that required esophagoscopy, age, sex, and FB type. The data were statistically analyzed using the IBM SPSS version 22. Categorical variables were evaluated using the chi-square A test, whereas the continuous variable age was evaluated by a nonparametric test. *P* value of <.05 was considered statistically significant.

RESULTS

The 124 participants included 65 boys (52.42%) and 59 girls, (47.58%). The median age was 6.0 years in both boys and girls; the IQR was 4 in boys and 5 in girls. The incidence of FB removal was markedly increased after coin currency implementation, from 20 cases (16.1% of all cases) in the 34 months before coin currency implementation to 104 cases (83.9%) in the 32 months after coin currency implementation ($P<.0001$) (Table 1, Figure 1). Different types of FBs were reported, but coins were predominant (68.5%) (Table 2). The annual incidence is shown in Table 3. There was no significant effect of age ($P=.267$) or gender ($P=.815$) on FB ingestion.

DISCUSSION

The incidence of emergency esophagoscopy increased dramatically after coin currency implementation. This is the first study in Saudi Arabia to evaluate the incidence of FB ingestion after coin currency implementation in Jazan region, where esophagoscopy and FB removal

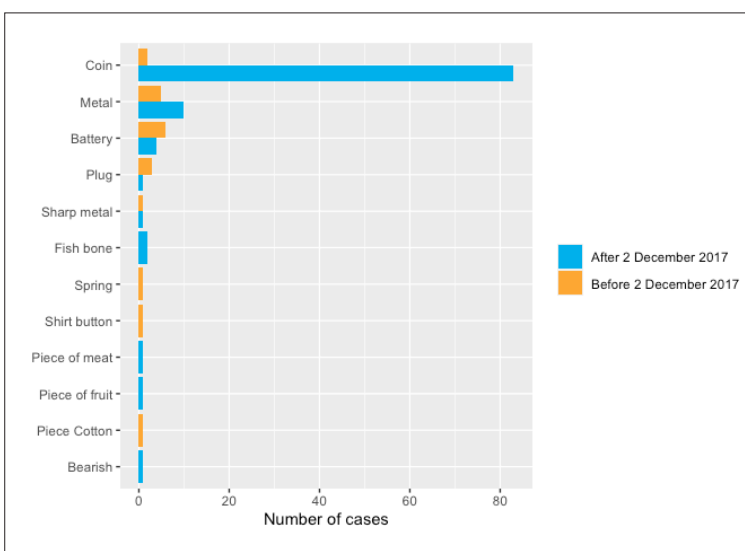


Figure 1. Number of cases of foreign body ingestion before and after the implementation of coin currency on December 2, 2017.

are solely performed in the center where the study was conducted. The service was available all through the study period. Several studies have evaluated FB impaction. One study collected 194 cases at Chiang Mai University in Thailand between January 2006 and December 2017.⁷ They found that coin impaction constituted the largest proportion of all pediatric FB impactions (41.2%). They also found that there was a higher risk of FB impaction among children with a positive family history of pediatric FB impaction. Another study was conducted at Westmead Children's Hospital in Sydney, Australia, between January 1994 and December 2004. A total of 530 pediatric patients were identified as having presented with FB ingestion. Of these, 241 (45.5%) ingested coins.⁸

In a local retrospective study, between March 1995 and March 2013, based on the records of all children aged up to 12 years who were admitted to King Khalid University Hospital in Riyadh, the number of cases was 70. The most common esophageal FB found in 30 patients (42.8%) was a coin.⁹ In this study period, coin currency was available but rarely used. In December 2017, the 1 Saudi Riyal note was replaced by a coin. Also, new denominations of coins were implemented at that time. Since the procedure was performed in different hospitals, none of these studies represented a regional population. Moreover, none estimated the annual incidence of FB ingestion.

In conclusion, the annual incidence of pediatric rigid esophagoscopy for FB removal under general anesthesia increased remarkably after coin currency implementation, primarily due to coins. The incidence of other types of FB ingestion were unchanged. Health education, coin modification, and return to paper currency are suggested measures to minimize the risks associated with coin ingestion, subsequent hospital admission, rigid esophagoscopy, and general anesthesia. The primary limitation of our study is that it was retrospective, but it was the largest study to date. Further multicenter studies can be conducted to evaluate the subsequent burden and costs of healthcare systems associated with these risks.

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Table 1. The incidence of foreign body ingestion requiring esophagoscopy before and after implementing coin currency. ($P < .0001$, comparison of number of cases before and after).

	Male	Female	
Before December 2, 2017	10 (15.4)	10 (16.9)	20 (16.1)
After December 2, 2017	55 (84.6)	49 (83.1)	104 (83.9)
Total	65	59	124

Data are n (%).

Table 2. Frequencies of each type of foreign body (FB) ingestion before and after the implementation of coin currency.

Type of the foreign body	After December 2, 2017	Before December 2, 2017	Total
Battery	4 (3.8)	6 (30.0)	10 (8.1)
Bearish	1 (1.0)	0	1 (0.8)
Coin	83 (79.8)	2 (10.0)	85 (68.5)
Fish bone	2 (1.9)	0	2 (1.6)
Metal	10 (9.6)	5 (25.0)	15 (12.1)
Piece of cotton	0	1 (5.0)	1 (0.8)
Piece of fruit	1 (1.0)	0	1 (0.8)
Piece of meat	1 (1.0)	0	1 (0.8)
Plug	1 (1.0)	3 (15.0)	4 (3.2)
Sharp metal	1 (1.0)	1 (5.0)	2 (1.6)
Shirt button	0	1 (5.0)	1 (0.8)
Spring	0	1 (5.0)	1 (0.8)
Total	104 (100.0)	20 (100.0)	124 (100.0)

Data are n (%).

Table 3. The annual incidence of FB ingestion in pediatric patients in the Jazan region.

Year	
2015	8 (6.5)
2016	6 (4.8)
2017	6 (4.8)
2018	34 (27.4)
2019	42 (33.9)
2020 (7 months only)	28 (22.6)
Total	124 (100.0)

Data are n (%).

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