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Original Research Article

Outcome of uncommon intestinal foreign bodies in pediatrics

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ABSTRACT

Background: Foreign body (FB) ingestion in children is very common. Children can ingest a wide variety of Foreign Bodies. Most FBs pass spontaneously through the gastrointestinal tract. Other FBs, especially uncommonly ingested objects, can present with complications and need intervention to be extracted. The aim of the study was to highlight the importance of closed observation, proper investigation, and timely intervention for uncommon gastrointestinal FBs.
Methods: This was a prospective study, conducted at pediatric surgery department, Al-Azhar University Hospitals, between November 2020 and September 2022, that included all patients who presented to our department with variously ingested FBs, were prospectively evaluated to detect those who needed surgical intervention to extract these FBs.
Results: During the specified time period, 86 patients with FB ingestion presented to our hospital. Out of these children, four patients ingested uncommon FBs, presented with symptoms of complications, and needed intervention to extract these FBs. One patient swallowed magnet tools; two patient's swallowed toothpicks; and one patient swallowed a needle with a necklace, which was impacted in the small bowel and surgically removed.
Conclusions: Children who ingest uncommon FBs are more likely to present with complications of impaction or perforation. Negative plain films are not sufficient to conclude conservative treatment especially for radiolucent FBs. CT should be done to rule out retained and radiolucent foreign bodies; closed observation and timely intervention are mandated to avoid serious complications.

Keywords: Surgical extraction, Pediatric foreign body ingestion, Uncommon foreign

INTRODUCTION

The majority of foreign bodies swallow usually occur in children between the ages of six months and 5 years. Fortunately, the vast majority of foreign objects that enter the digestive system pass easily and spontaneously.

Less than 1% require surgery, while from 10 to 15% need endoscopic removal.[1,2] The most frequent foreign object that children swallow is a coin. Toy pieces, magnets, batteries, pins, screws, marbles, and bones have all been reported, in addition to a few more complicated and unusual foreign objects.[3] However, children with mental retardation frequently experience repeated episodes of the syndrome and ingest many foreign objects.[4,5]

These unusual foreign objects must be surgically removed because they are either trapped or harmful, such as fish bones, magnets, button batteries, and sharp needles, which have been reported to induce gastrointestinal perforation or obstruction.[2] Sometimes FBs may migrate from the gastrointestinal tract and pose a danger to major structures such as blood vessels or solid organs.[4] In order to emphasize the significance of closed observation and prompt intervention to remove uncommon FBs, we intended to offer our experience with foreign bodies that were swallowed and required surgical removal.

METHODS

This was a prospective study, conducted at Pediatric Surgery Department, Al-Azhar University Hospitals, between November 2020 and September 2022, ethical approval obtained by the Institutional Review Board of faculty of Medicine Al-Azhar University and strictly adhered to the tenets of the Declaration of Helsinki, our study Included all pediatric patients presented to the Pediatric Surgery Department, Al-Azhar University hospitals, with ingested FBs.

All patients were prospectively evaluated for clinical presentation, associated conditions, type of foreign bodies, and complications, for all ingested common and uncommon FBs, a plain X-ray, and a CT scan in non-visualized FBs cases was done, to determine the site of ingested foreign bodies. Foreign bodies located in the esophagus, stomach was excluded from our study and transferred to pediatric gastroenterology for endoscopic extraction. Written informed consent was obtained from parents to participate in the study.

Statistical analysis

Data was presented as mean, standard deviation, number and percentage. Statistical analysis will be performed with IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corporation.

RESULTS

During the specified time period, 86 patients with FB ingestion presented to our hospitals: 48 (55.8%) males and 38 (44.2%) females, their age ranged between 6 months and 12 years (mean: 5.2±2.4 years) (Table 1). These children ingested various types of FBs, the most common type of foreign body ingested in our study was a coin 60/86 (69%), then pins 10/86 (11.6%), and button batteries 9/86 (10.4%), others uncommon foreign bodies also included, Needle 1(1.1%), Magnet 1 (1.1%), Wooden Toothpick 2 (2.3%), and Necklace 1 (1.1%) **(**Table 2).

Out of these children, 4 (4.6%) ingested uncommon FBs, presented with symptoms of complications of impaction or perforation, and needed surgical intervention to extract these FBs from the intestine (Table 3).

One patient ingested magnet tools that were impacted in a small intestine, presented by bilious vomiting and abdominal distention, a plain X-ray and CT scan was done, which showed signs of intestinal obstruction with radiopaque foreign bodies at the left iliac fossa (Figure 1).

Laparotomy and enterotomy was performed and the magnet tools were extracted (Figure 1). Two patients swallowed toothpicks presented with symptoms similar to acute appendicitis. The plain X-ray abdomen was unremarkable (Figure 2).

Both patients underwent open appendectomy, and accidentally we discovered a toothpick (Figure 2) causing a minute perforation at the terminal part of the ileum, so extraction and closure of the perforation was done.

One patient ingested a needle and a metallic necklace that were impacted in a small bowel, presented by signs of peritonitis and intestinal obstruction. A plain X-ray and a CT abdomen were done, which revealed radiopaque foreign bodies **(**Figure 3).

Laparotomy was done. A metallic necklace that was impacted in the small intestine (Figure 3), and a sharp needle (Figure 3) have perforated the ileum and impeded in the urinary bladder wall.

The needle was removed simply from the bladder wall, while the necklace required an enterotomy to be extracted. The post-operative period passed smoothly for all cases.

Table 1: Demographic data.

Demographic data	N (%)
Number of patients	86
Age	6 months 12 years (5.2±2.4)
Sex	
Male	48 (55.8%)
Female	38 (44.2%)

Table 2: Types of ingested foreign bodies swallowing.

Type	N	%
Coin	60	69.7
Pin	10	11.6
Button battery	9	10.4
Needle	1	1.1
Magnet	1	1.1
Wooden toothpick	2	2.3
Necklace	1	1.1

Table 3: Clinical data and surgical interventions.

Type of foreign body	%	Clinical presentations	Surgical intervention
Coin	69.7	Asymptomatic	No
Pin	11.6	Asymptomatic	No
Button battery	10.4	Asymptomatic	No
Needle	1.1	Intestinal perforation	Laparotomy and extraction
Magnet	1.1	Intestinal obstruction	Laparotomy and extraction
Wooden toothpick	2.3	Intestinal perforation	Laparotomy and extraction
Necklace	1.1	Intestinal obstruction	Laparotomy and extraction

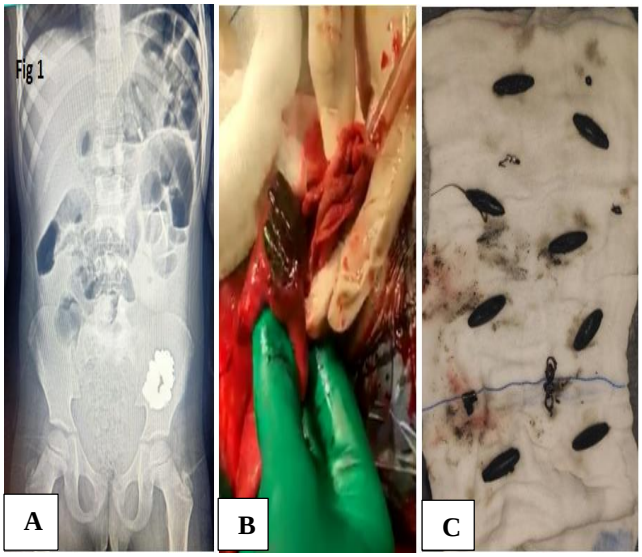

Figure 1: (A) AXR with radio-opaque shadow of FB; (B) FB removal through enterotomy; and (C) multiple magnets after removal from intestine.

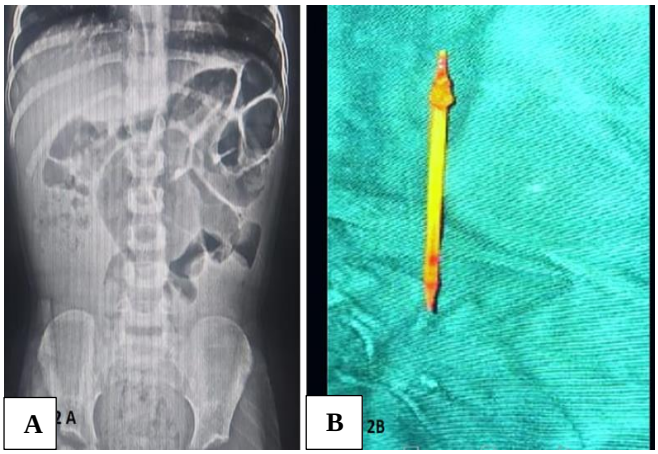

Figure 2: (A) AXR with radio-opaque shadow of FB; (B) FB removal through enterotomy; and (C) multiple magnets after removal from intestine.

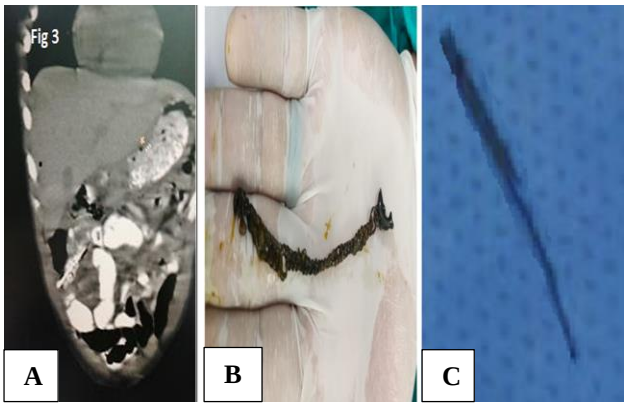

Figure 3: (A) Intra-abdominal FBs in the CT scan; (B) necklace after extraction from intestine; and (C) sharp needle after extraction from urinary bladder wall.

DISCUSSION

Foreign body (FB) ingestion is a common problem in children, causing serious complications, the average time from foreign body ingestion to the development of perforation was noted as 10 days in many reports. There are case reports of up to a one-month duration of the asymptomatic period and later development of acute abdomen.[6]

Khorana et al reported that the most common type of foreign body ingested in their study was a coin (41.2%), followed by food boluses (15.5%), and a button battery (10.8%), In our study, the most common type of foreign body ingested was a coin (69%); pins and button batteries were the second most common FBs swallowed, with incidences of (11.6%) and 10.4%, respectively.[7]

Reported complications include perforation, extra-luminal migration, abscess formation, fistula formation, appendicular obstruction, liver, bladder, heart, lung penetration, incarcerated umbilical hernia, aorto-duodenal fistula, and death.[8-14] The ileocecal region is the most common site for intestinal perforation, but perforations have also been reported in the esophagus, pylorus, angle of the duodenum, and colon.[15,16]

Clinical history and plain radiography are the mainstays for localization. Although they are not frequently required, alternative imaging techniques like CT, MRI, or ultrasound imaging may have benefits in some circumstances, especially in radiolucent foreign bodies or uncommonly ingested materials.[7] We use the same method for the clinical and radiological evaluation of our cases.

In these four cases, we have observed that the clinical history of foreign body ingestion was not available in three cases, and the radiological and operative findings came as a surprise for the parents. So, the radiological examination by CT scan was the mainstay for evaluation, especially for radiolucent objects present in the intestine, as there may be more than one foreign body. Also, sharp, thin, linear aluminium objects like metallic foil can be difficult to visualize by plain X-ray and may lie on the spine at the time of imaging.[7]

A single magnet may naturally travel through the digestive tract, but numerous magnets may need to be removed endoscopically or surgically to avoid or treat post ingestion complications.[17] Daboos et al reported a series of cases of a dangerous complication of magnet ingestion, clinically presented with GI symptoms, the same as our case of magnet swallowing.[17] For suspected cases involving probable FB consumption and vague pain in children, a plain abdomen X-ray should be taken, a CT scan of the abdomen with contrast may also

be helpful. In current case, we used both modalities. Clinical suspicion of obstruction and the inability of several magnets to advance were the most frequent reasons for surgical intervention, as reported by Jonathan et al which is the same in our case.[18]

Toothpick ingestion is not common in comparison to other causes of FB ingestion, toothpick and bone ingestions have a high risk of perforation.[11,16] Rami et al reported a case of cecal perforation post-toothpick ingestion, same as our cases, whose presentation mimicked acute appendicitis but differed in findings; in our cases, perforation was at the terminal ileum.[19]

Also, one of the uncommon foreign bodies is a necklace, reported before by Jiraporn et al in our index case, the patient had intestinal obstruction and perforation, so he was treated by surgical extraction.[20]

Elsherbeny et al in their series that uncommonly ingested FBs (magnets, sticky rubber toys, and stones) needed extraction as they impacted a part of the gastrointestinal tract.[21] The incidence of surgical intervention in their series to extract the ingested FBs was 2% (10/480), which is slightly higher than that reported in the literature (1%). The incidence of surgical intervention in our series was (4.6%) which is higher than Elsherbeny et al as the referral pattern to our center is different.

Limitation

This was a single-centre study, so more research from multiple centers with a larger number of cases is mandatory to assess the condition and our recommendation.

CONCLUSION

Children who ingest uncommon FBs are more likely to present with complications of impaction or perforation. Negative plain films are not sufficient to conclude conservative treatment especially for radiolucent FBs. CT should be done to rule out retained and radiolucent foreign bodies; closed observation and timely intervention are mandated to avoid serious complications.

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