

The fate of unusual intra-abdominal (sub-diaphragmatic) foreign bodies in children

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Abstract

Background: Foreign body (FB) ingestion in children is very common. Children can ingest a wide variety of FBs. Most of the ingested FBs pass spontaneously through the gastrointestinal tract. Other FBs, especially un-commonly ingested objects, can present with complications and need intervention so that foreign body could be extracted. The aim of this study was to highlight the importance of closed observation and timely intervention of the intra abdominal foreign bodies.

Material and Methods: This was a retrospective study between November 2017 and May 2019 included all patients who presented to our department with variously ingested FBs were reviewed to detect those who needed intervention (surgical or endoscopic) to extract these FBs. The study was approved by our ethical committee and parent of each individuals gave informed consent to participate in the study.

Results: During the specified time period, 80-patients with FB ingestion presented to our department. Out of these children, 4-patients ingested un-common FBs, presented with symptoms of complications and needed intervention to extract these FBs. 2-patients swallowed tooth pick. 1-patient ingested needle which were penetrated the duodenum. 1-patient ingested a sticky rubber toys and wires which were impacted in the colon.

Conclusion: Children who ingest un-common FBs are more likely to present with complications of impaction or perforation. Negative plain abdominal and chest x-rays are not sufficient to conclude conservative treatment as radiolucent FB might have been ingested. CT or endoscopy should be done to rule out retained foreign bodies prospective identification of the site of perforation has become the essential part of pre-operative evaluation, Contrast-Enhanced Computed Tomography (CECT) can determine the site of perforation in the accuracy of 86% medical decision making, requires integration of clinical data, closed observation and timely intervention. Foreign body impaction lead to serious complications, despite being a rare situation, prevention remains the key to this health problem.

Keywords: Paediatric foreign body ingestion, un-usual foreign body, x-ray chest, x-ray abdomen, endoscopy, Contrast-Enhanced Computed Tomography (CECT)

Introduction:

The majority of foreign body ingestions occur in children between the ages of 6-months and 3-years.¹ Fortunately, most foreign bodies that reach the gastrointestinal tract pass spontaneously. Only 10 to 20 percent will require endoscopic removal, and less than 1-percent require surgical intervention.¹ Coins are the most com-

mon foreign bodies ingested by children, including toys, toy parts, magnets, batteries, safety pins, screws, marbles, bones have been reported.³ Ingestion of multiple foreign objects and repeated episodes are un-ommon occurrences and usually occur in children with developmental delay^{4,5} a small number of un-usual foreign bodies get impacted in the gut. These un-usual

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Figure 1: FB retrieved at the time of laparotomy Metallic, plastic, seeds, metallic wire.



Figure 2: Metallic FB ,two parts

foreign bodies have to be surgically removed because either they are stuck or are dangerous, as in case of a pointed needles, fish bones, and button batteries that have been known to cause bowel perforation, infection.² Sometimes FB may migrate from their original entry point and pose a danger to major structures as a blood vessels or solid viscera. Removal is straight forward through open laparotomy after localization. We describe four cases of un-usual foreign bodies that were surgically removed, to highlight the importance of closed observation of un-usual FBs and timely intervention to remove these FBs. All these children have a smooth post-operative course and are under follow up.

Material and methods:

Patients presented to Pediatric Surgery Department, King Abdullah Hospital, Bisha, between November 2017 and May 2019, were enlisted in the study. Ethical approval from Ethical Review Board, King Abdullah Hospital, Bisha, was taken. All patients with various ingested FBs were

retrospectively reviewed to detect those who ingested un-common FBs or presented with symptoms of complications of impaction. The informed consent was taken from the parents of all childrens in the study.

Results:

During the specified time period, 80-patients with FB ingestion presented to our department. Their age ranged between 6-months and 10 years (mean: 5.2 years). Out of these 80-children, 4(5%) children ingested un-common FBs and presented with symptoms of complications of impaction or perforation and needed intervention to extract these foreign bodies. 2-patients swallowed tooth-pick. 1-patient ingested pins which were impacted in and penetrated the duodenum. One patient ingested a sticky rubber toys and wires which were impacted in the colon and all were surgically extracted.

First child is a 10-year male mentally retarded child, can not communicate presented to emergency department with bilious vomitings and distension of abdomen. He was treated in another hospital before being referred to us. Child is dehydrated and having rapid pulse. Physical examination was difficult as the child is distressed. A plain x-ray was done which has shown multiple air fluid levels. Plain CT scan of the abdomen was done which has revealed multiple foreign bodies fig 3 and 4. He was taken for laparotomy which revealed small bowel obstruction at the junction of jejunum and ileum. An enterotomy was performed and the foreign body (plastic with organic material impacted) was extracted. Another metallic foreign body present in the hepatic flexure region was extracted through the appendicular stump after appendicetomy.

Second and third case were 2-male child, 10 and 12-years old presented with symptoms suggested acute appendicitis (right lower abdominal tenderness associated with fever and vomiting) the plain x-ray abdomen was un-remarkable. Patients underwent open appendectomy; accidentally we discover (tooth-pick) causing minute perforation at terminal ileum about 8 cm from ileocaecal junction, in the first child and in the



Figure 3: Plain x ray with features of obstruction and metallic FB

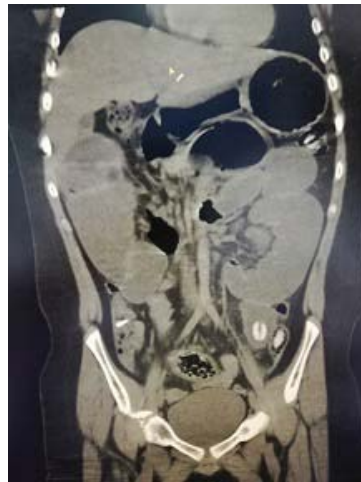


Figure 4: CT scan shows multiple radiolucent FB

second child the perforation was present 20 cm away from ileocaecal junction, foreign body extraction done through small entotomy with closure of the perforation after trimming of the edges. Post-operative period was smooth and the children allowed to go home after 5-days of hospital admission.

Fourth child is a 3-year male child presented to emergency department with pain abdomen. Child is vitally stable, and is having continuous pain, abdominal examination has revealed mild distension and child is not allowing to examine him. There is no history of foreign body ingestion. Plain x-ray has revealed sharp foreign body, and a CT abdomen was done to further assessment. The child underwent laparotomy. The sharp foreign body was found to be having two components, one part has perforated the second part of duodenum and went towards the liver. The other component has perforated the ileum and formed a band causing adhesive obstruction.

Discussion:

“Advancing points puncture trailings do not” Jacksons axiom.⁶ Many sharp foreign bodies follow this axiom and pass the G.I. tract uneventfully.⁷

Esophageal foreign bodies tend to lodge in areas of physiologic narrowing, such as the upper

esophageal sphincter (cricopharyngeus muscle), the level of the aortic arch, and the lower esophageal sphincter.

Once a swallowed foreign body has passed the esophagogastric junction, most will pass uneventfully in the stool. The exact amount of time it will take to pass is not predictable as the transit time is variable. Al-Berikiet al⁸ advocated keeping these patients under observation and suggested hospitalization if the foreign body is sharp and unusually large. Objects longer than 5 cms are unlikely to pass the duodenum and they should be removed endoscopically.⁹ We feel that admitting these patients to the hospital is necessary as it may causing complications like impaction and perforation.⁸

Once lodged, the object may partially or completely obstruct the GI tract. Furthermore, some foreign bodies may erode through the GI tract, causing complications due to perforation or migration of the object. Certain patients may be at higher risk for retention, obstruction, or perforation. These include younger patients with smaller anatomy, those with prior upper GI tract surgery, history of significant gastroesophageal reflux or eosinophilic esophagitis, neuromuscular disease states, or presence of congenital malformations.^{10,11}

Pre-existing gastrointestinal tract abnormalities, such as previous surgery, strictures, fistulas, diverticula, or functional abnormalities, increases the risk of a swallowed foreign body becoming lodged at the site of the abnormality. Some authors found that the presence of gut malrotation in a child who ingested atypical FBs resulted in serious consequences which required urgent surgical intervention.¹²

The average time from foreign body ingestion to development of perforation was noted as 10-days in the previous reports. There are case reports of up to months duration of asymptomatic period and later development of acute abdomen.¹³

Reported complications include perforation

and extra luminal migration, abscess, peritonitis, fistula formation^{14,15} appendicitis^{16,17} liver, bladder, heart, and lung penetration,¹⁶⁻¹⁸ incarcerated umbilical hernia,¹⁹ aorto-duodenal fistula, and death.²⁰ The ileocecal region is the most common site for intestinal perforation, but perforations have been reported in the esophagus, pylorus, angle of the duodenum, and colon.^{21,22} Tooth-pick and bone ingestions have a high risk for perforation^{17,22} and are the most common foreign bodies that require surgical removal.²³

In these four cases we have observed that clinical history of foreign body ingestion was not available, and the radiological and operative findings came as a surprise for the parents. Another important aspect is to have a pre-operative knowledge about the no of radiolucent objects present in the gastrointestinal tract, as there may be more than one foreign body probability. Sharp thin linear aluminium objects like metallic foil can be difficult to visualize by roentgenography, if they happen to lie on the spine at the time of examination. In a patient with a psychiatric disorder there may be problems concerning diagnosis because the patient does not complain of perforation symptoms.

Elsherbeny M et al^{18,20} in their series reported that, un-commonly ingested FBs (magnets, sticky rubber toy, and stone) needed extraction as they impacted in a part of the gastrointestinal tract.²⁴ The incidence for 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 (5%) which is higher than Elsherbeny M et al as the referral pattern to our center is different.

Conclusion:

Children who ingest un-common foreign body are more likely to present with complications of impaction or perforation. Negative plain films are not sufficient to conclude conservative treatment in radiolucent FB ingestion. CT or endoscopy should be done to rule out retained foreign bodies. Prospective identification of the site of perforation has become the essential part of

pre-operative evaluation, CECT can determine the site of perforation in the accuracy of 86%. Medical decision making, requires integration of clinical data, closed observation and timely intervention. Foreign body impaction lead to serious complications ,despite being a rare situation, prevention remains the key to this health problem.

Patient consent: Written informed consent was obtained from parents. The consents were approved by our Hospital's Ethical Committee.

Compliance with Ethical statements: The study protocol was approved by our Hospital's Ethical Committee.

Conflict of interest: None

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Role and contribution of authors:

Dr Abdulrahman Al-Maawi, the conception and design of the work, analysis, interpretation of data, writing the article including the literature review and operating on some of the patients in the series as the main primary surgeon.

Dr Ramakrishn Prasad, collected the data, references, and literature search and also did the initial writeup.

Dr Mohammed Al-Sayed Daboos, collected the data, did the literature search, and critically review the article.

Dr Omar Al-samahy, collected the references, and went through the article and gave useful advices.

Dr John F. Hakiem, collected the data, references and also helped in introduction writing.

Dr Mahmoud Ali Tolba, collected the data, references and also helped in interpretation of the data and helped in discussion and conclusion writing.

References:

1. Litovitz TL, Klein-Schwartz W, White S, et al. 2000 annual re-

- port of the American Association of Poison Control Centers Toxic Exposure Surveillance System. *Am J Emerg Med* 2001; 19:337–395.
2. Arana A, Hauser B, Hachimi-Idrissi S, et al. Management of ingested foreign bodies in childhood and review of the literature. *Eur J Pediatr* 2001; 160:468–472.
 3. Chen MK, Beierle EA. Gastrointestinal foreign bodies. *Pediatr Ann* 2001; 30:736–742
 4. Spiers A, Jamil S, Whan E, et al. Survival of patient after aorto-oesophageal fistula following button battery ingestion. *ANZ J Surg* 2012; 82:186–187.
 5. Honzumi M, Shigemori C, Ito H, et al. An intestinal fistula in a 3-year-old child caused by the ingestion of magnets: report of a case. *Surg Today* 1995; 25:552–553.
 6. Webb WA. Management of foreign bodies of the upper gastrointestinal tract: update. *GastrointestEndosc* 1995; 41:39–51.
 7. Cheng W, Tam PK. Foreign-body ingestion in children: experience with 1265 cases. *J PediatrSurg* 1999; 34:1472–1476.
 8. Mocanse DE, Kurchin A, Hinshaw JR. Gastrointestinal foreign bodies. *Am j surg* 1981.142: 335-7
 9. Soergel k h, and Hogan w j:therapeutic endoscopy.hosp. pract.18, 81-92,1983.
 10. Litovitz T, Whitaker N, Clark L. Preventing battery ingestions: an analysis of 8648 cases. *Pediatrics* 2010; 125:1178–1183.
 11. McCormick S, Brennan P, Yassa J, et al. Children and mini-magnets: an almost fatal attraction. *Emerg Med J* 2002; 19:71–73.
 12. De la Fuente SG, Rice HE. Ingestion of unusual foreign bodies and malrotation: a 'perfect storm'. *PediatrSurgInt* 2006; 22:869–
 13. AlBahrani Z, Busbaih Z, Busbaih J, Busbaih A. Foreign Body Removal in Indian Patient after 18 Years of Ingestion. *J Surgery*. 2018;6(1): 2
 14. Selivanov V, Sheldon GF, Cello JP, et al. Management of foreign body ingestion. *Ann Surg* 1984; 199:187–191.
 15. Goh BK, Chow PK, Quah HM, et al. Perforation of the gastrointestinal tract secondary to ingestion of foreign bodies. *World J Surg* 2006; 30:372–377.
 16. Paul RI, Jaffe DM. Sharp object ingestions in children: illustrative cases and literature review. *PediatrEmerg Care* 1988; 4:245–248.
 17. Klingler PJ, Seelig MH, DeVault KR, et al. Ingested foreign bodies within the appendix: a 100-year review of the literature. *Dig Dis* 1998; 16:308–314.
 18. Akçam M, Koçkar C, Tola HT, et al. Endoscopic removal of an ingested pin migrated into the liver and affixed by its head to the duodenum. *GastrointestEndosc* 2009; 69:382–384.
 19. Karadayi S, Sahin E, Nadir A, et al. Wandering pins: case report. *Cumhuriyet Med J* 2009; 31:300–302.
 20. on presenting as incarcerated umbilical hernia. *APSP J Case Rep* 2011; 2:25.
 21. McComas BC, van Miles P, Katz BE. Successful salvage of an 8-month-old child with an aorto-oesophageal fistula. *J PediatrSurg* 1991; 26:1394–1395.
 22. MacManus J. Perforation of the intestine by ingested foreign bodies: report of two cases and review of the literature. *Am J Surg* 1941; 53:393–402.
 23. Pintero Madrona A, Fernández Hernández JA, Carrasco Prats M, et al. Intestinal perforation by foreign bodies. *Eur J Surg* 2000; 166:307–309.
 24. Hameed K, Hassan M, Rehman S. Management of foreign bodies in the upper gastrointestinal tract with flexible endoscope. *J Postgrad Med Inst (Peshawar-Pakistan)* 2011; 25:433–435.
 25. Elsherbeny M S, Allam AM and El-Asmar K M; Foreign body ingestion in children: unusual Presentations and timely intervention, *Annals of Pediatric Surgery* 2018, 14:157–160.