INGESTION OF MAGNETS: CASE REPORT

Radu-Iulian Spataru[1], Niculina Bratu[1], Monica Ivanov[1], Dan-Alexandru Iozsa[1]

AbstractAbstract

Foreign body ingestion is a very common topic among pediatric surgeons due to the nature of their patients. Magnets ingestion is rare and it is a certain etiologic factor for gut wall ischemia or ileus leading to serious life threatening complications. In this case report we present a 3 year old boy that swallowed multiple magnetic balls. We managed to retrieve the objects by using minimal incision and by avoiding opening the GI tract wall. We consider magnetic body ingestion a surgical urgency and differential diagnosis with other type of items is essential to further care.

Key words: foreign body ingestion, magnets.

Introduction

Foreign body ingestion is a very common problem in pediatrics. The severity of the problem depends on the nature of the swallowed object. Ingestion of a magnet is expected to follow the behavior of the most of the ingested foreign bodies, but ingestion of more magnets is well-known that it can bring up serious problems like intestinal ischemia followed by perforation. The aim of this case report is to present a case of multiple magnet balls ingestion and the surgical method we used for their extraction.

Case report

A 3 year old boy presented in our department with nausea, vomiting and abdominal pain for approximately 24 hours. The physical examination showed spontaneous pain in the epigastric region, emphasized by local palpation, without tenderness or acute abdomen signs. The X-ray of the abdomen didn't show any signs of ileus or other organic abnormalities but it presented multiple radio-opaque round-shaped objects in the stomach (see Picture 1). The objects had the aspect of a "bunch of grapes" with a small loop of interconnected balls detaching from the ball, giving a highly suggestive image of multiple magnetic bodies ingestion. We have made the decision to intervene early in order to extract the items. The first attempt was to pull out the magnets using the endoscopic approach, but it failed, so we reoriented over the open surgical approach. Minimal median incision in the epigastrium was performed and the stomach and first part of the duodenum have been exposed. Intraoperative palpation of the stomach and duodenum presented a bunch of hard balls strongly connected one to other. We decided to model the ball of magnets into a linear string of magnetic balls so a 14 Ch Nelaton tube inserted through the esophagus connected to the aspiration device could retrieve the balls (see Picture 2). The intraoperative X-Ray that followed the removal of the balls showed up two more restant magnetic balls in the first part of duodenum that we pushed back in the stomach by gently squeezing the gut wall. We used the same method to retrieve the last two items. The method was successful and we managed to avoid opening the GI tract. After intervention the patient had an eventful evolution being discharged after 4 days.

Discussion

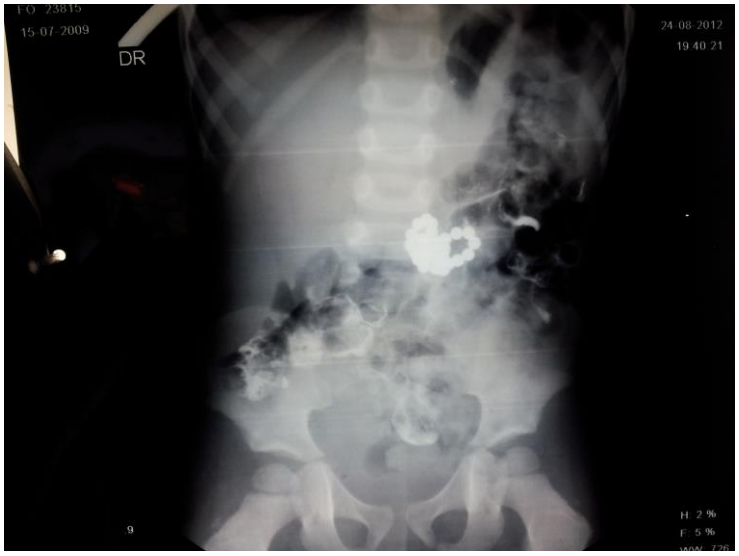
Foreign body ingestion is a very common problem in children, due to their natural cognitive development. [1] The peak of incidence of foreign body ingestion is between 6 months and 3 years old and in most of the cases (80-90%) and more than 70% of the cases involves children younger than 6 years. [2, 3]. Spontaneous passage through the GI tract occurs after the foreign body gets into the small bowel. [2] Most of the objects removed from the aero-digestive tract of the children (50-80%) are represented by food items like seeds, grains or pieces of meat and 30% of the non-food items are represented especially by coins, but screws, pins or button batteries were also reported. [5] Button batteries ingestion is well known for its complication due to local mucosal burning that can extent even to perforation. [6] Magnets ingestion is rare, but it can cause important damage to the GI tract regarding their size or shape. Single magnet ingestion is usually harmless and it behaves like most of the foreign bodies in the GI tract. Multiple magnet ingestion is way more rare - 20 cases of multiple magnet ingestion in children in the United States between 2003 and 2006 [8] - and in can produce serious complications. The magnets tend to produce ischemia, pressure necrosis, perforation, fistula formation or intestinal obstruction by holding the intestinal wall in between them. [1,6] Between 2003 and 2006 in a statistic resume of Consumer Product Safety Commission in the United States, it is reported one death by the complications of multiple magnet ingestion.

Most of the children present acute abdomen signs or intestinal obstruction or other symptoms 1 to 7 days after the ingestion, but there were reported cases where signs or symptoms were absent. [9] The universal principle of foreign body ingestion that considers every object that passes the esophagus able to pass the whole GI and be spontaneous eliminated is not applicable in multiple magnet ingestion. [1]

Early investigations like X-Rays of the abdomen and pelvis in magnet ingestion is indicated to detect the number of the objects and surgical intervention is the key to prevent or to reduce complications. [10] When the history is not concluding, multiple radio-opaque findings should alarm the physician into excluding multiple magnet ingestion. [2].

[1]Clinical and Emergency Hospital for Children "Marie Sklodowska Curie", Department of Pediatric Surgery, Bucharest, Romania

E-mail: radu_spataru@yahoo.com, nina.bratu@yahoo.com, dan.iozsa@yahoo.com, mqmivanov@yahoo.com.



Picture 1. Abdomen X-Ray findings of multiple magnet ingestion

Picture 2. The Nelaton tube with string-shaped magnets

Picture 3. Magnetic balls puzzle

In case of a single magnet ingestion is confirmed it is recommended to simply follow-up the patient by simple physical examinations until the object is expelled. Some authors recommend counseling the patient not to wear clothes with metallic parts (like buttons, belts, chains or buckles) due to the attraction that can be produced between the inside item and the abdominal wall. [11] A large literature review made by Naji H [1] presents the explorative laparotomy as the elected intervention for retrieving the magnets (42 cases), followed by laparoscopy (5 cases) – two of them being in converted into laparotomy. Endoscopy is reported in only one case as the only way of extraction the foreign body from the GI tract, but it's known as an auxiliary procedure in 4 cases. One case was reported when the magnetic objects passed the GI tract without any interventionMost of the magnetic objects are found in toys (see Picture 3) and ingestion is often associated with other metallic objects and most of the children have underlying psychosocial, psychiatric and developmental risk factors. Clinicians have the duty to aware the parents of the risks represented by multiple magnet ingestions and other metallic objects. [1, 11]

Conclusion

Foreign body ingestion is very frequently among toddlers and young children. Most of the times it doesn't represent a surgical challenge due to the capacity of the GI tract to adapt and eliminate the objects, but sometimes – depending on the nature or number of the items – surgical intervention is recommended as an urgency in order to prevent life-threatening complications. Multiple magnetic ingestion can lead to mechanical ileus or peritonitis (due to perforation) and it always need to be excluded by abdominal X-Ray findings. In order to avoid complications, early surgical intervention is strongly indicated to remove the objects and depending where the foreign bodies are located different approaches should be considered. In our case, minimal incision keeping the gut wall intact was possible for the extraction of multiple magnetic balls from the stomach and duodenum.

References

1. Naji H, Isacson D, Jan F, et al. Bowel injuries causted by ingestion of multiple magnets in children: a growing hazar. Pediatr Surg Int (2012) 28:367–374.
2. Uchida K, Otake K, Iwata T, et al. Ingestion of multiple magnets: hazardous foreign body in children. Pediatr Radiol (2006) 36: 263–264.
3. Uyemura MC. Foreign body ingestion in children. Am Fam Physician. 2005 Jul 15;72(2):287-291.
4. GW Holcomb III, JP Murphy, DJ Ostlie, et al. Ashcraft's Pediatric Surgery, 5th ed. Philadelphia: Elsevier Saunders, 2010
5. Puri P, Hollwarth M. Pediatric Surgery – Diagnosis and Management. Berlin: Springer-Verlag, 2009.
6. Michael L, Jacqueline M, Guarisco J, et al. Update on the Diagnosis and Treatment of Caustic Ingestion. The Ochsner Journal. 2009; 9(2): 54-59.
7. Ilce Z, Samsun H, Mammadov E. Intestinal Volvulus and Perforation Caused by Multiple Magnet Ingestion: Report of a Case. Surg Today (2007) 37:50–52
8. Biervliet V, De Putte V, De Jaegher A, et al. Multiple Magnet Ingestion : A Real Challenge for the Pediatric Surgeon. Acta Clinica Belgica 67.4 (2012): 298-300
9. Dutta S, Barzin A. Multiple Magnet Ingestion as a Source of Severe Gastrointestinal Complications Requiring Surgical Intervention. Arch Pediatr Adolesc Med. 2008; 162(2): 123-125.
10. Sahin C, Alver D, Gulcin N, et al. A rare cause of intestinal perforation: ingestion of magnet. World J Pediatr 2010;6(4):369-371.
11. Wong, Helen HL, Phillips, et al. Opposites attract: a case of magnet ingestion. CJEM : Journal of the Canadian Association of Emergency Physicians 11.5 (Sep 2009): 493-5.
12. Schieling S, Snyder SK, Custer M. Magnet Ingestion. J Pediatr 2008;152:294.

Correspondance to:

Radu Iulian Spataru
Maria Sklodowska Curie" Children Hospital
Bd. C-tin Brancoveanu nr. 20 Sector 4 Bucuresti
E-mail: radu_spataru@yahoo.com