The Boy Who Swallowed 48 Magnets: A Surgical Emergency

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ABSTRACT

Foreign body ingestion is common among children. One of the most feared form of foreign body ingestions are magnet ingestions. Multiple magnet ingestions can lead to significant morbidities. Known complications of magnet ingestions include bowel perforation, fistula, volvulus, and bowel ischaemia. Such complications if left untreated or any form of delay in management can lead to sepsis and death. We report a case of a 5 year-old boy who allegedly ingested multiple magnets who presented to our hospital.

Keywords: Foreign body ingestion, Magnet ingestion, Pressure necrosis, Bowel perforation, Fistula.

1. Case

A 5 year-old boy with no known medical illness was brought to the hospital by his mother. She was concerned that he has been ingesting multiple small spherical magnets over an unknown short period of time. She suspected it as she found that certain magnetic parts of his toys were missing. The child presented with abdominal pain, fever and vomiting. He would also complaint of intermittent abdominal cramps.

Clinically, he was dehydrated, febrile at 38 degrees with tachycardia. Abdominal examination revealed periumbilical tenderness with mild abdominal distension. An abdominal x-ray was done and multiple groups of magnets were seen centrally located in the abdomen (Fig.1). In view of his clinical presentation and the x-ray further confirming the diagnosis of multiple magnet ingestions, the child was subjected to a laparotomy.

Fig.1. Presence of magnets seen centrally located in the abdominal x-ray

Fig.2. Presence of multiple magnets confirmed on I/I machine

On table, a I/I machine was used to aid in detecting the location of the magnets (Fig.2). The laparotomy findings showed three clusters of magnets that caused multiple loop adhesions leading to obstruction.

There were two loops of intermucosal fistulation, seen 150 cm and 275cm from the duodenojejunal flexure that were caused by the cluster of magnets.

Small bowel resection and end to end anastomosis was done on both areas. All magnets were identified and removed, and the large bowel was normal.

Fig.3. Two points of intermucosal fistulation formed by cluster of magnets

Fig.4. Magnets seen forming a fistula tract between two sides of the small bowel upon separation

Fig.5. Another cluster of magnets seen forming another fistula

Fig.6. Cluster of magnets removed after excising the fistula

Fig.7. A total of 48 pieces of magnets were removed

Post-operative, the child was well, and antibiotics were completed for a week. Fortunately, he was discharged well, and the parents were educated and advised on the importance of primary prevention of magnet ingestion in the future.

2. Discussion

Cases involving magnet ingestions often represents a unique situation. Ingesting just a single magnet can be typically insignificant and can be expected to behave like other foreign bodies. However, ingestion of multiple magnets can change a clinically benign situation into a life-threatening surgical emergency.

Magnets can easily be found today as widespread licensing of products, reduced prices and improved manufacturing has allowed the use of it especially in toys, beauty accessories and jewelleryes. History suggests that magnet ingestions among children are something rare, however, there are an increasing number of cases over the last few years.

The United States Centre for Disease Control and Prevention (CDC) reported 19 cases of magnet ingestion in 2006 [1]. Out of the 19 cases, 15 of them had bowel perforation, and four patients had peritonitis. In another surveillance data done by the Public Health Agency of Canada from 1993 to 2007, it was found that 328 of children below the age of 14 were involved in injuries associated with magnets, and nearly half of them ingested magnets [2].

In the past, magnets were treated like any other foreign bodies. Unfortunately, with the advancement of technology, there are newer magnets made from neodymium-iron-boron materials that are much smaller and stronger. Such magnets aids in ingestion due to their size, and ingestion of multiple magnets attract each other through loops of the bowel or stomach wall and this can lead to pressure necrosis which will lead to perforation [3].

Patients normally present with either a known or suspected ingestion. They may complaint of fever, abdominal pain and vomiting. Some patients may present with abdominal cramps and abdominal distension, which should raise the suspicion of an impending intestinal obstruction. Getting an accurate history in children can be tricky, as some children would continuously ingest magnets along with other foreign bodies separately at different times.

Once an adequate history is obtained, the patient should be subjected to an abdominal x-ray to confirm the ingestion. It is then vital, to determine whether a single or multiple magnets were ingested. It is also important to keep an eye for other possible metallic objects. At times, multiple x-ray views are needed as multiple magnets can easily stick together, deceiving the clinician to think that only a single magnet was swallowed as a whole. Adequate fluid resuscitation is needed if the patient is suspected to be obstructed as they would be having third space losses during the insult. A single magnet ingestion can be treated conservatively, with proper education and advice given to the parents and child [4]. Patients who ingested multiple magnets or a single magnet with another metallic object should be closely monitored as the risk of perforation is high. Timing and presentation is important. It was found that children who presented to the emergency department with ingestion of more than 12 hours were associated with complications such as perforations and fistula [5]. Based on the NASPGHAN survey, the earliest presentation of bowel perforation due to magnet ingestion was 8 hours [6].

Magnets in the stomach are easily accessible via endoscopy, removal can be attempted under general anaesthesia with a protected airway. Endoscopy offers various options such as a net retrieval device, snares, basket or a multiprong forceps which can be used to remove the magnets. The use of laxatives to expedite the progression of magnets through the intestines is still debatable. At the moment, there are no published data to support this method. However, if a magnet is suspected to be dislodged in the large bowel, polyethylene glycol colonoscopy preparation solutions can be used to aid in retrieving the magnet later on during colonoscopy.

Ultimately, multiple magnet ingestions that are not treated promptly will lead to pressure necrosis, fistula formation and perforation. Fistula formation along with pressure necrosis is a slow process and ometum walling can limit the

peritoneal inflammation in older children. This can result in masking the physical examination findings. In view of this, the absence of obvious signs and symptoms should not deviate the clinician from aggressive treatment. Children below the age of 3 have a fat devoid omentum and this prevents any form of perforation to be contained. Children of this age may therefore present unwell early on.

Children that fail to be treated conservatively will then require surgical intervention. The child is first subjected to a laparotomy, and enterotomies can be performed to remove the magnets. Any fistulation should be excised followed by bowel resection and anastomosis. If the child presents with multiple bowel perforations, a thorough peritoneal washout is indicated, and it is vital to assess if the child would benefit from a defunctioning stoma if multiple areas of primary repair is needed to allow adequate healing.

3. Conclusion

Magnet ingestions among children is becoming more prevalent. Awareness should be raised to prevent this problem. Primary prevention is the best method as magnet ingestions carry grave morbidities and they can also lead to mortalities. Healthcare providers play a major role in providing important and accurate information on the risks of magnet ingestion. They should be aware of certain special circumstances involving children with developmental delay, autism or attention-deficit disorders as these groups of children are most prone to magnet ingestions. Besides that, toy manufacturers should also advocate the use of small warning labels on magnet-based toy products, and more targeted campaigns are needed to educate parents on the risks.

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References

1. Centers for Disease Control and Prevention (CDC), Gastrointestinal injuries from magnet ingestion in children: United States, 2003-2006. MMWR Morb Mortal Wkly Rep 2006; 55 (48) 1296- 1300.
2. Public Health Agency of Canada Child and youth injury in review, 2009 edition: spotlight on consumer product safety. Ottawa (ON): The Agency; 2009.
3. Kay M, Wyllie R. Pediatric foreign bodies and their management. Curr Gastroenterol Rep 2005; 7:212–8.
4. Naji H, Isaacson D, Svensson J, et al. Bowel injuries caused by ingestion of multiple magnets in children: a growing hazard. Pediatr Surg Int 2012; 28:367–74.
5. Hussain SZ, Bousvaros A, Gilger M, et al. Management of ingested magnets in children. J Pediatr Gastroenterol Nutr 2012; 55:239–42.
6. North American Society for Pediatric Gastroenterology, Hepatology and Nutrition Warning labels ineffective at preventing high-powered magnet ingestions. Flourtown (PA): The Society; 2012. October 23.