

## An Unusual Presentation of Chronic Intestinal Fistula - A Forgotten Multiple Magnet Ingestion

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### Abstract

Ingestion of foreign body (FB), especially multiple magnets are becoming an increasing health hazard due to associated risk of intestinal obstruction, fistula formation and perforation with increased morbidity and mortality. Out of all the foreign bodies in the gut, 80% pass spontaneously, 10% to 20% require endoscopic removal and 1% require surgical intervention. The symptoms, when present may vary, even mild abdominal discomfort and vomiting in many. In younger age, high index of suspicion can be lifesaving by preventing delayed diagnosis and its complications, seen in up to 50% of cases. Chronic ingestion may cause well-healed intestinal fistula leading to problems at a later date. The location of FBs, and adhesions in the gut, if any, can be better visualized with CT abdomen compared to plain x-ray. Here we report a case of forgotten multiple neodymium magnets with multiple chronic intestinal fistula requiring multiple resections and end-to-end anastomosis.

**Keywords:** Foreign Body (FB); Chronic Intestinal Fistula; Multiple Magnet Ingestion

### Introduction

Ingestion of foreign body (FB), especially multiple magnets are becoming an increasingly serious health hazard due to associated risk of intestinal obstruction, fistula formation and perforation [1]. Neodymium or rare-earth magnets are at least 5 to 10 times stronger than the traditional ones, causing much more gastrointestinal injury when ingested [2]. Incidence of FB ingestion being more common under 5 years of age, a reliable history may not be available in this young population as close to 40% of FB ingestions are unwitnessed [1]. So, high index of suspicion can be lifesaving by preventing delayed diagnosis and its attendant complications. Awareness of correct method of imaging modalities can help in preventing morbidity and mortality. Here we report a case of unwitnessed ingestion of 27 neodymium magnets ingestion with chronic multiple fistulas formation without peritonitis. What was initially thought to be located in rectosigmoid area on abdominal radiography turned out to be in the jejunum and ilium on computerized tomography (CT) of abdomen and pelvis without contrast and confirmed on laparotomy.

### Case Report

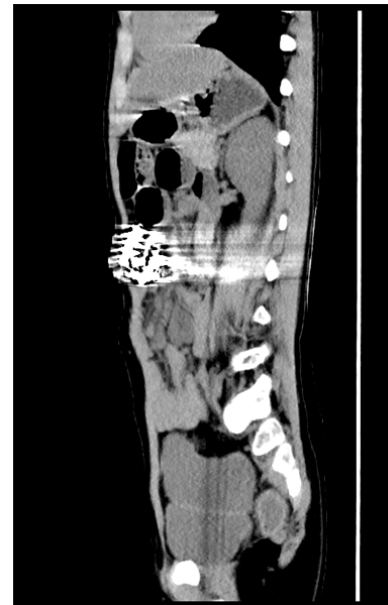
A 4-year-old boy with no previous history of any medical condition admitted in our hospital through the outpatient department with abdominal pain for one day, with one episode of vomiting a day prior to admission. Abdominal X-ray done in erect position in the referring hospital showed bracelet-like radiopaque shadows in the left lower abdomen. Mother retrospectively recollected a set of beaded magnets gifted to them a year ago, now missing for 3 months. She was not aware of the timing of the ingestion. On examination, he was moderately dehydrated with generalized abdominal tenderness, no distention and normal bowel sounds. Initial investigations showed leukocytosis with neutrophilia a high C-reactive protein. Considering a possibility of foreign body in rectosigmoid junction a colonoscopy and removal of FB was planned after bowel preparation (Figure 1). After admission patient started to have bilious vomiting with increasing intermittent abdominal pain. CT of abdomen and pelvis without contrast showed metallic foreign bodies in small bowel loops causing partial obstruction of the proximal small bowel with no evidence of free fluid or free intraperitoneal gas (Figure 2). An emergency laparotomy was performed, and 27 neodymium magnet beads were removed. Several chronic, well-formed fistulas in jejunum and ileum with kinking of the bowel and severe adhesions in some areas of small bowel were seen without intraperitoneal perforation. Three resections with end-to-end anastomosis were done with two in the jejunum and one in the ileum (Figure 3). He was discharged on sixth post-operative day without any complications.

### Discussion

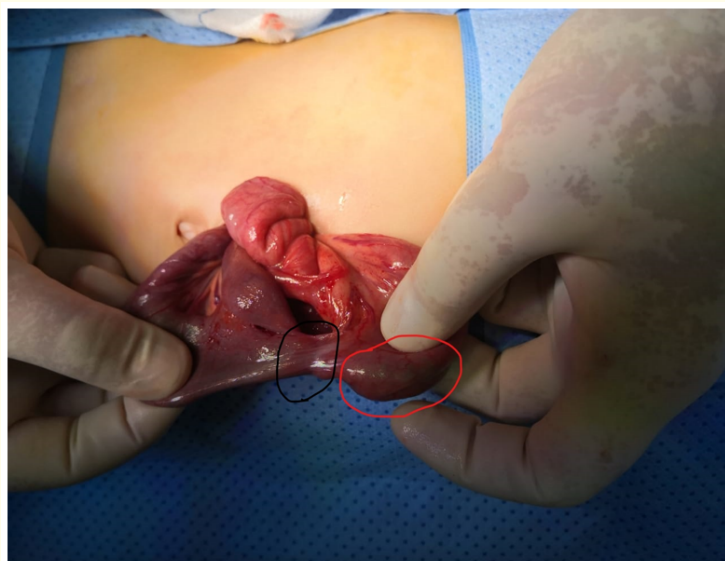
Foreign body (FB) ingestions are common from 6 months to 6 years in pediatric population. Approximately 40 percent of them are unwitnessed and many of them may not develop any symptoms or signs [3]. Fortunately, 80% of cases pass them spontaneously from the gut, with 10% to 20% requiring endoscopic removal and 1% requiring surgical intervention [4].



**Figure 1:** Abdominal plain radiograph, supine, anteroposterior (AP) view showing string-of-beads appearance.



**Figure 2:** Computerized tomography (CT) abdomen without contrast sagittal plane showing radio-opaque foreign bodies in the upper abdomen with associated metal artifacts.



**Figure 3:** Intra-operative photograph showing one of the fistula (in black circle) between two loops of otherwise healthy looking small intestine. The red circle overlies the loop of intestine with lumen full of multiple magnets.

Ingestion of magnet FBs in children is frequently reported. They account for about 2% of FB ingestions in children [3]. The incidence of magnet ingestion-related emergency department visits increased 8.5-fold among children in the United States [1]. Around 67% of children present with multiple magnets with the majority of patients being boys aged five to eight years old and three out of five children are asymptomatic [3]. Single magnet ingestion acts like any other FB ingestion but if ingested more than one, or with other metallic object, these tends to a cause pressure-necrosis of the gut wall sandwiched between the attracting FBs. The injury to gut is particularly severe with ingestion of commercially available, newly engineered magnets containing iron, boron, and neodymium that are 5 - 10 times stronger compared to traditional iron magnets [2]. The injuries include gut wall necrosis, perforation and fistula formation with attendant complications including death. Toys using strong magnetic force such as neodymium magnets are widely available. However, half (50.7%) of the magnets causing injury were products intended for use by adults [5].

Children with multiple magnets ingestion can be asymptomatic for several days as in our case, even if they were complicated by chronic fistulas [6]. The symptoms, when present, may be non-specific including mild abdominal discomfort and vomiting. Complications associated with multiple magnets ingestion occur with a probability of about 50% [1].

Magnets being radio-opaque can be screened for by abdominal X-ray quickly. Magnets can appear as other less harmful inorganic FBs (e.g. pearl) or may be indistinguishable from other metallic FBs (e.g. coins, parts of jewelry) [7]. A lateral radiographic view is recommended in all cases if FB is seen on flat plate (lying down) [8]. Multiple, tightly attached magnets may misleadingly look single radiographically leading to the delay in diagnosis of multiple ingestion [9]. Expansion of digital abdominal X-ray is sometimes useful in such situations as is the presence of a distinctive feature (like a beaded appearance) [6,9]. Moreover, it seems to be impossible to detect whether the magnets are in physical contact, rather than across the gut wall, via plain radiographs. A single-looking FB which is not progressing on serial Abdominal X-rays needs intervention. In 2015 the North American Societies of Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) devised a treatment algorithm for pediatric magnet ingestion [8]. CT abdomen and pelvis can give added information about the location of FBs when X-ray can be misleading as in our case [10]. The CT helped deciding for timely laparotomy since the colonoscopic removal, as planned on admission based on X-ray alone, would not have been helpful delaying the definitive treatment.

In our case, the ingestion was unwitnessed by parents, leading to delayed diagnosis and complications of gut perforation at multiple levels like reported earlier [6]. The signs of peritoneal irritation signs might be absent as observed in our case because intestinal contents or inflammatory exudate might be contained in a localized peritoneal space due to chronic intestinal fistula. Hence stable clinical condition may be misleading as has been observed earlier [6].

### Conclusion

Multiple magnet ingestion is associated with high risk of gut complications, and high index of suspicion is needed for early diagnosis and better outcome. The location of FBs, and adhesions in the gut, if any, can be better visualized with CT abdomen compared to plain x-ray. Benign abdomen is not a proof of non-complication especially with chronic ingestion as it may cause well healed intestinal fistula leading to problems at a later date.

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