

Intestinal Volvulus and Perforation Caused by Multiple Magnet Ingestion: Report of a Case

ZEKERIYA İLÇE, HAKAN SAMSUM, EMİL MAMMADOV, and SİNAN CELAYİR

Department of Pediatric Surgery, Cerrahpaşa Medical Faculty, Istanbul University, Istanbul, Turkey

Abstract

Ingested magnets can cause intestinal fistulas, perforation, and obstruction. There have been reports of magnet ingestion causing intestinal volvulus, but multiple magnet ingestion causing perforation and intestinal volvulus in a child is very unusual. We report the case of a 4-year-old girl, who ingested four magnets she acquired as toys, which caused intestinal volvulus and perforation as a result of pressure necrosis, several days after ingestion. At surgery we repaired two perforations, but additional bowel resection was not required. The patient was discharged on postoperative day 10. If multiple magnet ingestion is suspected in a child, the child must be monitored carefully. If there are signs of obstruction, emergency surgery is mandatory.

Key words Magnets · Foreign body ingestion · Children

Introduction

Foreign body ingestion is common in young children. Intestinal foreign bodies usually cause no harm and are evacuated spontaneously without treatment.^{1–5} Magnet ingestion is rare, but is likely to cause severe damage to the gastrointestinal (GI) tract, regardless of size and shape.^{6,7} Cases of an ingested magnet causing intestinal fistula formation or perforation, leading to intestinal obstruction have been documented; however, there are few reports of multiple magnet ingestion causing intestinal volvulus and perforation in children.^{8,9} We report a pediatric case of intestinal volvulus after the ingestion of multiple magnets, and discuss the unexpected risk of

magnet ingestion in children based on our review of previous reports.

Case Report

A 4-year-old girl was admitted to a local hospital with a 4-day history of abdominal pain and bilious vomiting. An abdominal plain X-ray showed multiple air fluid levels, and a foreign body of probable metallic origin. The patient was transferred to our clinic for surgical management.

On admission, she appeared apathic and severely dehydrated. Physical examination revealed a slightly distended abdomen with generalized tenderness and muscle guarding. After appropriate intravenous fluid resuscitation abdominal X-ray, ultrasound (US), and computed tomography (CT) were performed. The X-ray showed a distended bowel loop in the left upper quadrant, multiple air fluid levels, and a radio-opaque object in the right lower quadrant (Fig. 1). Abdominal US showed the same object with bowel loops gathered around it and distended bowel loops proximal to suspected region. Computed tomography scan showed diffusely distended bowel loops and an object of probable metallic origin with intestinal loops gathered around it. The child's parents had not witnessed the ingestion. We performed an emergency explorative laparotomy, which revealed intestinal segments volvulated 40 cm distal to the Treitz ligament and ileocecal valve (Fig. 2). The ingested magnets had caused strangulation and perforation of the intestine at these levels (Fig. 3). There was local necrosis at the point of contact with the magnets. The strangulated bowel between these areas was not necrotic, but the mesentery of the bowel between the sites of perforation, was also perforated. The ileum was devolvulated and both perforations were primarily sutured. We found four separate magnets in the gastrointestinal tract (Fig. 4a,b). The child was dis-



Fig. 1. Plain abdominal radiograph showing a foreign body of metallic origin with distended bowel loops proximally

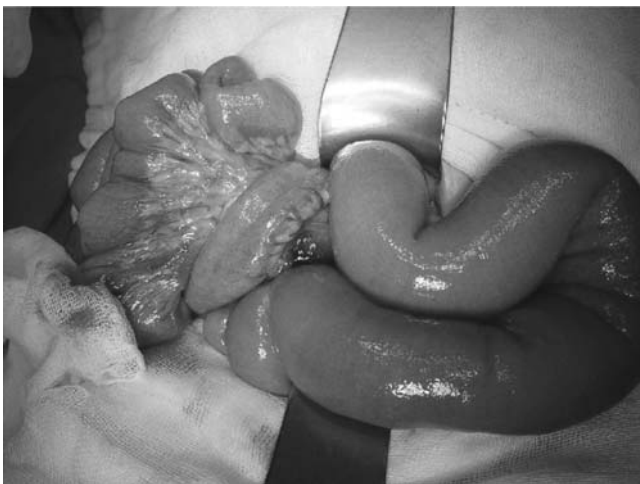


Fig. 2. Exploration revealed intestinal segments volvulated around the area where the foreign bodies were found

charged on postoperative day 10 after an uneventful recovery.

Discussion

Young children often ingest foreign objects such as coins, toy parts, jewelry, button-type batteries, needles and pins, as well as fish and chicken bones. These ingested foreign bodies usually cause no harm and are spontaneously evacuated through the rectum without any need for intervention.¹⁻⁵

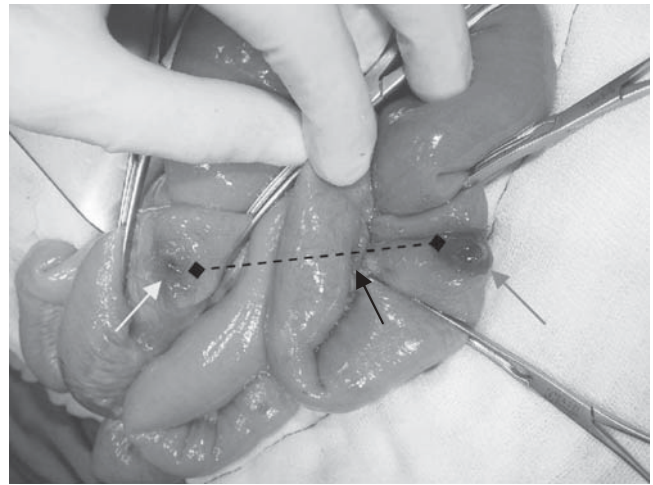
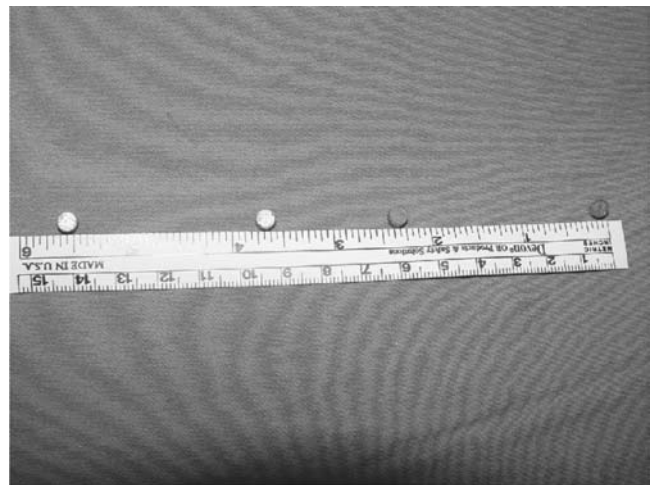


Fig. 3. Three areas of perforation (*left arrow, distal; right arrow, proximal; middle arrow, mesentery*) and the foreign body course marked with the *dashed line*



a



b

Fig. 4. a The foreign bodies were found to be four tiny magnets stuck together. **b** The magnets had strong attractive force

Magnet ingestion is rare, but very serious and needs to be monitored closely. It is likely that ingested magnets will cause serious GI complications, including intestinal fistulas, leading to obstruction or perforation.⁶⁻¹⁰ Single magnet ingestion may be evacuated in the stools without any sequelae, but multiple magnet ingestion needs to be managed carefully.^{6,11} Various forms of management for magnet ingestion have been reported.^{12,13} We assume that the affinitive force between the magnets attracts between the intestinal segments and the resulting continuous pressure on the bowel wall leads to pressure necrosis and, eventually, perforation. In our patient, part of the ileum volvulated around the mesentery.

About 80% of all cases of foreign body ingestion involve children between the ages of 6 months and 3 years, who instinctively put anything in their mouth. Our patient probably ingested the toy magnets at different times, which explains the pathology at exploration. The four tiny magnets with strong attractive force possibly followed a lone course in bowel for a short period of time and caused no symptoms. The complaints started when the magnets stuck together attaching intestinal segments to each other, resulting in intestinal perforation secondary to pressure necrosis. Interestingly the perforation was localized because of the strong magnetic attractive force, which caused the intestine to volvulate around the pathologic area and prevented spillage of the intestinal contents into the abdominal cavity.

In conclusion, if an ingested magnet is detected in the upper GI tract, endoscopic retrieval should be attempted. However, if the ingestion of multiple magnets is strongly suspected, they should be removed

immediately by laparotomy before serious complications occur.

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