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Case Report

Magnet induced small bowel volvulus in a paediatric patient: a case report

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ABSTRACT

Ingestion of magnetic objects in children can cause life-threatening complications, such as small bowel perforation and peritonitis. Magnets are known to cause localised bowel ischaemia due to pressure necrosis that results in perforations and fistulae. However, the occurrence of small bowel volvulus, which carries more serious outcomes from the rotational mesenteric strangulation that leads to widespread bowel ischaemia and necrosis, is rarely reported. We present the case of a 4-year-old boy who developed an acute abdomen after swallowing magnetic pellets, which were discovered during laparotomy. Although magnet ingestion is a recognised cause of abdominal surgical emergencies, the risk of a volvulus underscores the need for a more urgent and decisive approach to obviate significant morbidity and mortality.

Keywords: Case report, Children, Magnet ingestion, Small bowel, Volvulus

INTRODUCTION

Ingestion of magnets, particularly two or more magnets or a magnet with a small metal object, poses a formidable danger of serious gastrointestinal complications in children due to the magnetic attraction force through the intestinal walls.[1-3] Such complications include bowel pressure necrosis and perforation, bowel volvulus and obstruction, fistula formation, and ultimately intraabdominal sepsis and peritonitis.[1-3] Small bowel volvulus is a dreadful surgical condition which is associated with the twisting of bowel around its mesenteric stalk and thereby occluding its blood supply.[4] Magnet induced small bowel volvulus is triggered by ingested magnetic particles attracting each other through the intestinal wall and inducing a rotational twist of the affected bowel segments.[4] The incidence of magnet induced small bowel volvulus in children is largely unknown.[2,5] Although considered rare, these cases are increasing observed in clinical practice with a potential for significant morbidity and mortality, if not urgently managed with surgery.[2,5] Below authors report a case of a four-year-old boy who presented with an acute abdomen after ingestion of four small magnetic balls.

CASE REPORT

A previously healthy 4-year-old boy presented with a 2-day history of worsening abdominal pains and vomiting. He had not passed stools and did not experience vomiting during this period. His hemodynamic parameters were within normal limits. The patient appeared well-nourished and non-toxic. On examination, the abdomen was moderately distended and showed generalised

tenderness without signs of peritonitis. Examination of other systems was unremarkable. Blood investigations, including a full blood count with differential, renal function, and liver function tests, were normal. Radiographic imaging revealed dilated loops of small bowel with air-fluid levels. Additionally, four small metallic pebbles were observed in the distal ileum, raising suspicion of possible magnetic pellet ingestion. At laparotomy, a small bowel volvulus with twisting around its mesenteric stalk was observed. Two adjacent bowel segments were adherent to each other, with a magnet eroding through the wall of one segment, resulting in pressure necrosis. The affected bowel loop was hyperaemic but remained viable. The bowel was detorsed, and the perforation site was debrided and primarily repaired. The abdomen was then closed. The patient experienced an uneventful recovery and was discharged after one week in the hospital.

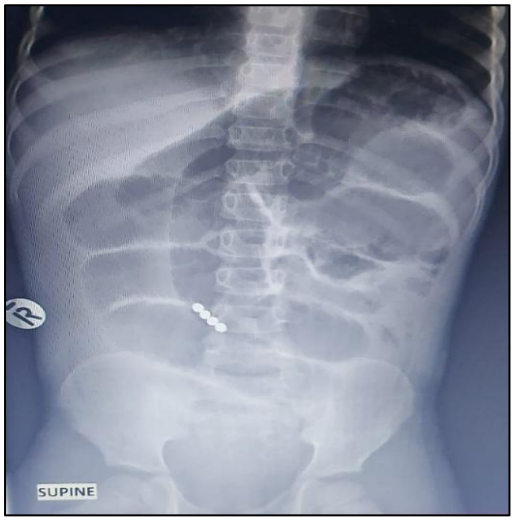

Figure 1: Radiographic image showing four small magnetic beads in the small bowel.

Figure 2: Intra-operative picture revealing volvulosed segment of small bowel.

DISCUSSION

Small bowel volvuli in paediatric patients, resulting from magnet pellets ingestion, are regarded as rare but potentially lethal.[6] Magnet ingestion, particularly multiple small powerful magnets like neodymium beads, can cause specific injuries, including small bowel pressure necrosis and perforation, by attracting each other through separate loops of bowel.[6] Small bowel volvulus, although often under-reported, is more fatal than the localised magnet induced pressure necrosis which is accompanied by focal ischaemia, necrosis, and perforation.[4,5] Volvulus involves the twisting of bowel loops around a narrow stalk of mesentery, which contains major vasculature supplying the bowel.

This twisting strangles blood flow from the root of the mesentery, causing extensive ischaemia across large segments of small bowel. The resulting widespread tissue necrosis can lead to small bowel gangrene. If untreated, this condition progresses to perforation or peritonitis, triggering septic shock, electrolyte imbalances, multiorgan failure, and ultimately death.[4,5] In the presented case, the patient had small bowel volvulus with mild, reversible ischaemia in the affected bowel segment. Prompt surgical intervention prevented the development of catastrophic sequelae associated with volvulosed bowel.

While ingestion of a single magnet often passes without any concern, ingestion of multiple magnets or a magnet with a metallic object poses a greater risk of surgical complications, including a volvulus.[1-3] According to literature, these cases are on the rise globally due to the availability of small, high-powered magnets in toys and desk products that are poorly embedded and can easily detach, making them accessible to children.[7] In South Africa, the Red Cross War Memorial Children's Hospital has documented several cases following such ingestions, indicating that these incidents may not necessarily be uncommon but rather under-documented.[6] Therefore, their increased recognition in clinical practice, highlights the serious health risks they pose.[6] However, the exact incidence of magnet induced small bowel volvulus in South Africa is not clearly quantified in available literature.[6]

The key preventative measures include eliminating access to small magnets by keeping magnetic toys and objects out of environments where children under 6 years are present.[8] Caregivers should be educated to recognize early symptoms, such as persistent vomiting, abdominal pain, or distention, which may indicate bowel injury and require urgent medical attention. Strict toy policies should be implemented to allow only toys which meet safety standards without small detachable magnets, and regular inspections of toys and play areas for loose or broken magnets are essential both at home and in daycare settings.[8]

CONCLUSION

A swift and determined approach to suspected magnetic ingestion is essential, especially when patients present with a history of object ingestion and worsening abdominal features. Early surgical intervention can be lifesaving, particularly given the increasing recognition of small bowel volvulus.

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