

ingested objects were later found to be pieces from magnetic construction toy sets.

The first patient was an 11-year-old child with autism. An initial laparoscopy revealed marked dilatation of the small bowel and interloop adhesions. Subsequent laparotomy revealed several magnets (rods, rings and balls) in adjacent loops of the small bowel (Box, A), as well as necrosis and 13 perforations of the small bowel. Segmental resection was performed with a defunctioning ileostomy. During surgery, radiography was performed to ensure that all foreign bodies were removed before closure of the abdomen. The child made a good recovery, and the ileostomy was closed 3 weeks later.

The second patient was 4 years of age. An abdominal x-ray revealed a cluster of foreign bodies in the right lower quadrant of the

abdomen, with a small gap between the fourth and fifth foreign bodies. A laparoscopy revealed a cluster of magnetic rings (Box, B) perforating the small bowel and the caecum. Two of the rings were on the caecal side and four were on the small bowel side, with an intervening fold of mesentery — the gap on the x-ray. The magnets were retrieved through a minilaparotomy, and the caecal perforation was oversewn.

The third patient was a 5-year-old who presented with similar symptoms and x-ray findings. Laparotomy revealed an area of pressure necrosis underlying the magnet and causing perforation of the jejunum, which was repaired by segmental resection and primary anastomosis.

As ingestion of foreign bodies is usually not witnessed, a high index of suspicion is required for correct diagnosis.² Of confirmed cases, 50% of patients remain asymptomatic.³ Fewer than 10% of cases require intervention, and about 1% require surgery.^{4,5} Ingestion of multiple magnetic objects in children is particularly serious, because of their tendency to aggregate in the bowel and compress intervening tissue, and should be treated aggressively.

These cases demonstrate the harmful consequences of magnets in toys. More stringent regulations on the use of magnets in toys — especially in toys for children younger than 5 years — and measures to increase public awareness of this issue are needed.

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Ingestion of magnets in children: a growing concern

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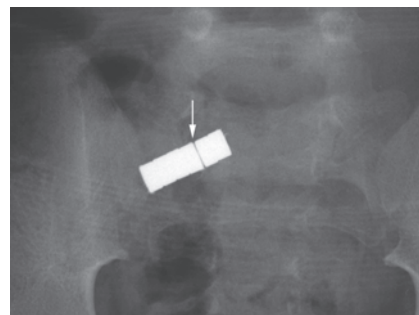
TO THE EDITOR: Accidental ingestion of foreign bodies is common in children. Most pass through the gastrointestinal tract spontaneously,¹ but some, such as magnets and batteries, can cause serious problems. We treated three children, aged 4–11 years, who ingested magnets that caused multiple bowel perforations.

All three children presented with abdominal pain and vomiting, and were initially treated for gastroenteritis as the history of ingestion was not available. Plain abdominal films were subsequently used to make the diagnosis of foreign body ingestion. The

Clusters of ingested magnets in children



A: Magnets in loops of the small bowel.



B: Magnetic rings perforating the small bowel and caecum, showing intervening fold of mesentery and bowel wall (arrow). ♦

- 1 Nagaraj HS, Sunil I. Multiple foreign body ingestion and ileal perforation. *Pediatr Surg Int* 2005; 21: 718-720.
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- 3 Arana A, Hauser B, Hachimi-Idrissi S, Vandeplass Y. Management of ingested foreign bodies in childhood and review of the literature. *Eur J Pediatr* 2001; 160: 468-472.
- 4 Webb WA. Management of foreign bodies of the upper gastrointestinal tract: update. *Gastrointest Endosc* 1995; 41: 39-51.
- 5 Nandi P, Ong GB. Foreign body in the esophagus: review of 2394 cases. *Br J Surg* 1978; 65: 5-9. □