Student, Resident AND Fellow Research

Pediatric Ingestion of Rare-Earth Magnets: A Growing Problem

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Accidental ingestion of foreign bodies is a well-known cause of morbidity in the pediatric population. Unfortunately, the incidence of small-magnet ingestion (particularly those made of alloys of rare-earth elements) has been increasing since 2006. It is particularly dangerous when multiple magnets are ingested individually. Unless ingested simultaneously, magnets may connect between multiple loops of bowel leading to potential obstruction, perforation and fistula formation. Physicians, public health officials and parents need to be aware of this danger associated with magnets commonly used on refrigerators, in jewelry and in other household items.

Case
A 2-year-old boy presented to the emergency department following 12 hours of nausea, vomiting, poor oral intake and worsening abdominal pain. Family members stated that he swallowed a magnet the previous evening while playing with his sister. His mother noted that the child had ingested rocks and other small objects in the past, seemingly without complications. The child’s maternal aunt works at a factory that produces rare-earth magnets and brings these for the patient and his older sister to play with. His mother stated that he had previously ingested these magnets.

The patient presented to the ED with a temperature of 37.9°C and elevated heart rate (145 beats per minute). On physical exam, he was noted to be lethargic; however, abdominal exam elicited diffuse tenderness to palpation and attempts on the part of the patient to push away the examiner’s hand. The patient’s white blood cell count was 12,400/µL (normal: 5,500 to 15,500), with an absolute neutrophil count of 8.6/µL (normal: 0.8 to 7.7) and an elevated C-reactive protein of 110 mg/L (normal: < 8.0). Abdominal plain films revealed a foreign body in the right lower quadrant and gas-filled loops of bowel in a nonobstructive pattern. There was no intra-abdominal free air (Figure).

The patient was taken to the operating room for an urgent diagnostic laparoscopy to exclude small bowel injury and potential fistulization. Laparoscopy demonstrated dilated loops of bowel, dense adhesions and free fluid in the pelvis; therefore, the procedure was converted to laparotomy. One perforation was found at the base of the cecum and an additional pair of perforations were found at 40 cm and 60 cm, respectively, proximal to the ileocecal valve. These perforations were associated with chronic-appearing fistulization of the two involved small-bowel segments with...
several magnets as lead points. The cecal perforation was repaired with partial cecectomy. The ileo-ileal fistula was taken down and the two bowel perforations were repaired primarily with suture. Intraoperative fluoroscopy confirmed removal of all foreign bodies. The child did well postoperatively and was discharged seven days later.

Discussion
Since 2006, there have been changes to the mandatory standards pertaining to the use of rare-earth–variety magnets in children’s toys. However, these standards do not extend to other household items. As with the boy who presented in our ER, children will treat these magnets as toys if allowed. Our patient does not have developmental delay, pica or other hyperoral disorders. Children who do are at even greater risk of injury from magnet ingestion. Physicians, public health officials and parents need to press for changes to the standards for rare-earth magnet use in items other than toys and, in the meantime, support public health initiatives to better protect children from this avoidable source of morbidity.

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REFERENCES

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cancer such as personal and family history, UV radiation exposure, advancing age and fair skin. The latter three risk factors were relevant for our patient. It is recommended that all persons between 20 and 40 years of age undergo routine skin screenings every three years and that they get screened annually after age 40.

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