

## A unique case of magnet ingestion with respect to presentation and management

Şule Yalçın, İbrahim Karnak, Saniye Ekinçi, Mehmet Emin Şenocak

Department of Pediatric Surgery, Hacettepe University Faculty of Medicine, Ankara, Turkey

**SUMMARY:** Yalçın Ş, Karnak İ, Ekinçi S, Şenocak ME. A unique case of magnet ingestion with respect to presentation and management. Turk J Pediatr 2012; 54: 287-289.

Magnet ingestion may lead to serious complications with delay in diagnosis and treatment. The forceful attraction between magnets, with gastric and/or intestinal wall entrapped between them, can cause injury through pressure necrosis. The radiological appearance of more than one magnet on X-ray can be easily misinterpreted as belonging to only one rod-like radiopaque foreign body, even if the magnets are located in different parts of the gastrointestinal tract, thus delaying the management up to the onset of emergent surgical complications. A 17-month-old female with ingestion of a pair of magnets is presented, together with introduction of the clinical picture and therapeutic approach, which differed from the other previously reported cases. The ovoid shape of the magnets, their localization in the gastrointestinal tract (leading to entrapped gastric and intestinal wall between them), absence of any complication, and the therapeutic approach of endoscopic retrieval are the main distinguishing features of this case from those previously reported.

**Key words:** child, foreign body, magnet, ingestion.

In recent years, magnets have come to occupy a more expanded space of interest among the other ingested foreign bodies since the clinical presentation and complications in ignored cases can be quite serious, necessitating emergent surgical intervention<sup>1</sup>.

Herein, we report a child with ingestion of a pair of magnetic balls. This case differs from the previously reported cases of magnet ingestion with respect to the clinical presentation and therapeutic management.

### Case Report

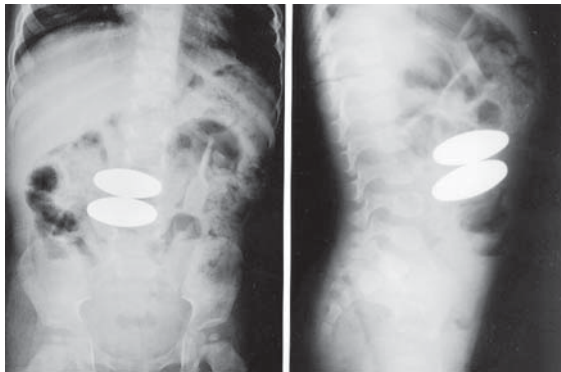
A 17-month-old female was admitted to the hospital with the complaint of abdominal pain and vomiting for the last three days. While the physical examination revealed no pathologic sign, the plain abdominal X-ray showed two ovoid ball-like foreign bodies, attached to each other and lying horizontally (Fig. 1A). The objects were anterior to the vertebral column on the lateral abdominal radiograph (Fig. 1B). Despite their being no history of foreign body ingestion witnessed by the family, the objects as viewed on the X-ray reminded the parents

of stress balls, with the property of magnetic attraction, which had been lost a few days before.

Since the physical examination and radiological findings revealed no sign of intestinal obstruction, follow-up was decided for spontaneous passage of the foreign bodies. The absence of any sign of obstruction during the close observation of the child on an outpatient basis let us lengthen the wait up to two weeks, until the best instrument for endoscopic extraction could be determined. Since the localization of the objects never changed on X-ray throughout the follow-up, it was apparent that waiting for spontaneous passage any longer would be useless, especially given the magnetic property of the balls.

Before endoscopic management, a search for the most appropriate forceps was undertaken, and one ending with a mesh-like basket was selected, since a pre-procedural trial outside utilizing an identical pair of the foreign bodies showed the best performance (Fig. 2).

Esophagogastroduodenoscopy by flexible instrument revealed only one of the balls,



**Figure 1.** Plain (A) and lateral (B) abdominal X-rays showing two ovoid foreign bodies, attached to each other and lying horizontally.

which was found in the stomach. The ball was captured by the mesh-like basket of the forceps and was extracted with endoscopic guidance. The X-ray seen perioperatively showed the other ball in the intestinal segment (Figs. 3A, 3B), which was expected to pass spontaneously, since the forceful magnetic attachment of the two had been eliminated.

During the outpatient follow-up, the other ball was passed spontaneously two days after the endoscopic management.

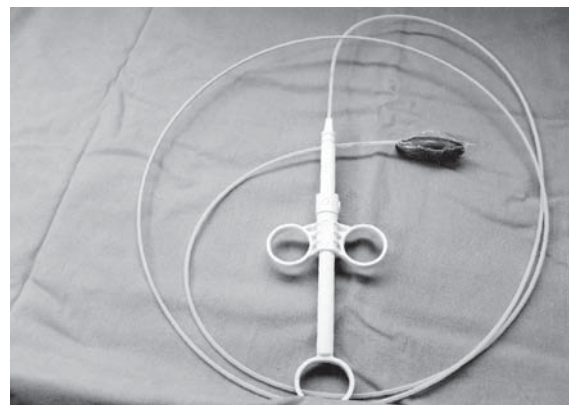
### Discussion

Foreign body ingestion is a common clinical problem among children<sup>2</sup>. While coins, toy parts, jewellery, batteries, needles and pins, and fish and chicken bones are the most commonly known<sup>2</sup>, the importance of magnets as ingested foreign bodies has increased recently with the developments in the toy industry, leading to different complications and necessitating different therapeutic approaches in the management of foreign body ingestion<sup>1,3</sup>.

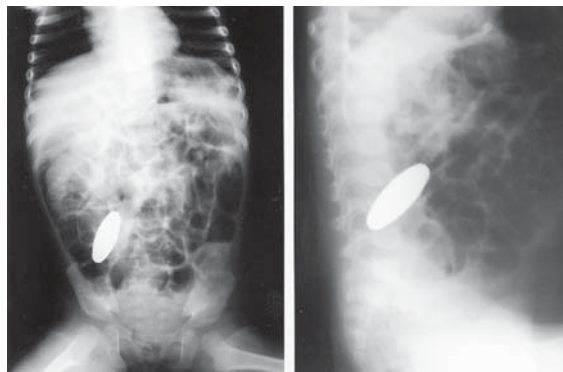
Even though ingestion of only one magnet generally causes no problem, with spontaneous passage, ingestion of more than one can potentially lead to serious complications. Attraction between magnets beyond the intestinal wall can cause bowel injury through pressure necrosis<sup>3</sup>. Intestinal perforation<sup>4,5</sup>, volvulus<sup>4,6</sup> and fistula<sup>4,7,8</sup> are the reported serious complications of multiple magnet ingestion, all of which necessitated emergent surgical intervention. One mortality was reported due to volvulus caused by multiple magnets<sup>5</sup>.

The radiological appearance of more than one magnet can be easily mistaken as if belonging to only one rod-like radiopaque foreign body, since all are attracted to each other on a straight line, even when located in different parts of the intestine and separated by a bowel wall<sup>7</sup>. The misinterpretation of the X-ray will lead to a misguided therapeutic approach of follow-up for spontaneous passage, with onset of intestinal complications<sup>2,5,6</sup>. With the recent knowledge of the potential hazards of magnets, the fixed position of the foreign body in follow-up X-rays should be a warning sign for probable multiple magnet ingestion, since they are unlikely to disengage spontaneously<sup>5</sup>. In our case, the huge oval shape of the two magnets avoided superposition and thus misinterpretation about the number. Nevertheless, it was not obvious initially that the two objects were in different parts of gastrointestinal system and attached to each other, even though they were separated by a bowel wall, and thus should have been extracted spontaneously. Despite the patient's having no sign of any intestinal complication during the close follow-up, the fixed position of the objects for up to two weeks forced the endoscopic intervention.

Our case is unique among all other previously reported magnet ingestions from several points of view. The shape and size of the ingested magnets were different from the previously reported small and cylindrical magnets<sup>6,7,9</sup>. The ovoid shape of the magnets in our case decreased the connection surface area between them, thus supposedly increasing the magnetic



**Figure 2.** The forceps ending with a mesh-like basket was considered to be the most appropriate instrument for endoscopic management.



**Figure 3.** Plain (A) and lateral (B) abdominal X-rays showed the one foreign body remaining in the intestinal segment.

attraction. However, they likely possessed a lower magnetic power compared to those mentioned in the literature, which could explain the absence of any intestinal complication throughout an extended observation period. The lodgement of one magnet in the stomach and the other in the intestine was also in contrast to most of the other reports with magnets in different levels of the intestines<sup>6,7,9,10</sup>, and may have helped to avoid possible pressure necrosis, supporting a thicker and a stronger interface.

The therapeutic management in our case also differed from the other reported cases<sup>3,4,6,7</sup>. While serious intestinal complications obligated emergent surgical intervention in all previously mentioned cases, the elective endoscopic approach in our report satisfied both diagnostic and therapeutic purposes. It was fortunately possible to overcome the forceful magnetic attraction between the two objects, with only an endoscopic intervention. The selection of the most appropriate instrument with a trial outside before endoscopy certainly played an important role in the successful management.

In recent years, magnets have come to occupy a more expanded space of interest among the other ingested foreign bodies since the clinical presentation and therapeutic management could strictly differ from that of other ingested foreign bodies<sup>6-10</sup>. Ignorance of multiple magnet ingestion could easily lead to rapid deterioration of the patient, with onset of serious and even fatal intestinal complications, necessitating emergent surgical management<sup>2-10</sup>. A fixed position of the foreign body on follow-up X-rays should raise the suspicion of ingestion of more than one magnet and the possibility of an entrapped enteral wall between them<sup>6,7,10,11</sup>.

Failure of endoscopic management or the onset of symptoms and signs relevant to intestinal complication should promptly lead to surgical exploration in proven or suspected multiple magnet ingestion, to avoid a morbid and/or mortal outcome. If ingested magnets are thought to be in the upper gastrointestinal tract, extraction with flexible endoscopy should be attempted primarily, with the most appropriate instrument, and the preceding duration of follow-up should not be lengthened. This approach for the management of magnet ingestion will likely improve the rate of endoscopic retrieval and support the avoidance of complications mentioned in the literature<sup>1</sup>.

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