

Ingestion of multiple magnets in a child with Down syndrome

A case report

Ilja Tachecí¹, Miroslava Králová², Vít Osoha³, Jan Bureš¹

¹ 2nd Department of Internal Medicine, Charles University in Praha, Faculty of Medicine at Hradec Králové, University Teaching Hospital, Hradec Králové, Czech Republic

² Department of Paediatric Surgery, Charles University in Praha, Faculty of Medicine at Hradec Králové, University Teaching Hospital, Hradec Králové, Czech Republic

³ Department of Radiology, County Hospital, Ústí nad Orlicí, Czech Republic

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Abstract. Foreign object ingestion is relatively common in children and most objects will pass through the gastrointestinal tract uneventfully. Accidental magnet ingestion is rare. A single swallowed magnet may pass through the gastrointestinal tract. The complication rate is higher when more than one magnet is ingested because there is a high risk of the ingested objects interacting. The magnets are often attracted to each other in the stomach or across the bowel wall in the small intestine and this may lead to gastrointestinal obstruction, pressure necrosis, perforation or fistula formation. We report the case of a 15-year-old child with Down syndrome, who ingested 47 magnets. Attempts to extract the magnets from the stomach using a gastroscop were unsuccessful. The definitive solution was surgical removal. We discuss the possibilities of handling this very special case and the risk of complications in the gastrointestinal tract.

Keywords: foreign objects ingestion, magnets, endoscopy, gastroscopy

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Souhrn. Spolknutí cizích předmětů je u dětí relativně časté, většina z nich projde gastrointestinálním traktem bez komplikací. Náhodné spolknutí magnetů je vzácné. Pokud je spolknut jeden magnet, může projít trávicím ústrojím bez problémů. Riziko komplikací je však vysoké, pokud je spolknuto více magnetů, protože se mohou navzájem magnetickými silami ovlivňovat. Magnety se často přitahují v žaludku jeden k druhému nebo i přes střevní stěnu a mohou způsobit obstrukci gastrointestinálního traktu, volvulus, otlakovou nekrózu, perforaci nebo vznik píštěle. Autoři popisují případ 15-letého chlapce s Downovým syndromem, který spolknul 47 magnetů. Pokusy o endoskopické odstranění magnetů ze žaludku bylo neúspěšné, musely být odstraněny chirurgicky. V diskusi je upozorněno na vysoké riziko komplikací takového případu.

Klíčová slova: spolknutí cizího tělesa, magnety, endoskopie, gastrokopie

Accidental foreign body ingestion occurs mainly in children and in edentulous or mentally impaired elderly subjects. Unless the objects are large or sharp, they usually pass through digestive tract without health consequences. However, approximately 10 – 20 % will require some intervention, mostly endo-

scopic extraction. Only in very rare circumstances will surgery be needed. As a general rule, foreign body ingestions are uncomplicated and the mortality rate is extremely low, but on rare occasions deaths have been reported. However, there are a few exceptions from this rule. If several magnets are ingested they

must be extracted as soon as possible. There is a high risk of serious complications, such as pressure necrosis, perforation, fistula formation, intestinal obstruction or volvulus. We report the case of a 15-year-old with Down syndrome who ingested several magnets.

Case report

A 15-year-old boy with Down syndrome, living in a Social Care Home, was admitted to the regional hospital with high suspicion of swallowing a large amount of small, tablet-shaped iron magnets. The precise number of the swallowed magnets and the accurate time of the accident were not clear. The boy started protracted vomiting without magnet expulsion. Physical examination revealed no peritoneal signs and a plain radiograph of the abdomen proved two groups of magnets massed together in the stomach (Fig. 1). Leukocyte count, haemoglobin and

haematocrit and all other laboratory findings were within normal limits.

The boy was transferred to our Department of Gastroenterology and acute gastroscopy was indicated. It revealed a large amount of magnets in the stomach adhering to each other, forming two long columns (Figs. 2-4). We tried to separate and extract the individual magnets using polypectomy snare, basket and net for about 40 minutes; however, this approach was not successful. The magnets were separated into three cylinders attracted to each other during the endoscopy. In this situation we were not able to cap-



Fig. 1
Plain abdominal radiograph showing two groups of magnets in the stomach and another suspected small magnet in the right mesogastrium.

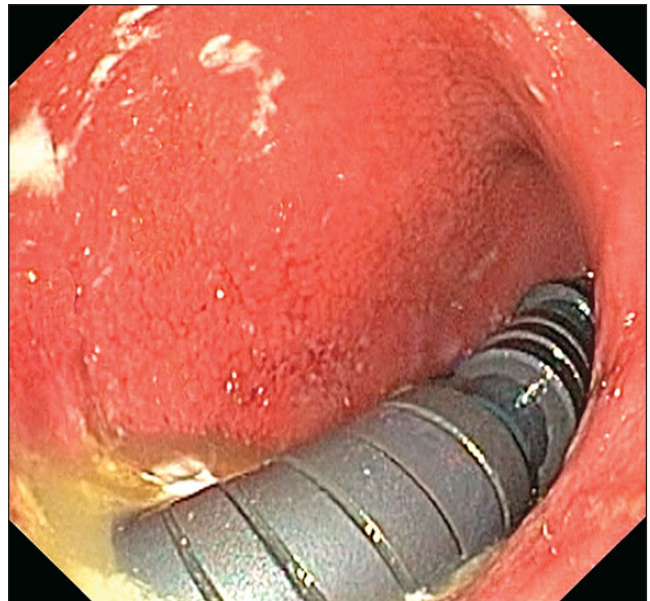


Fig. 2
Long column of several magnets attracted to each other in the gastric antrum.

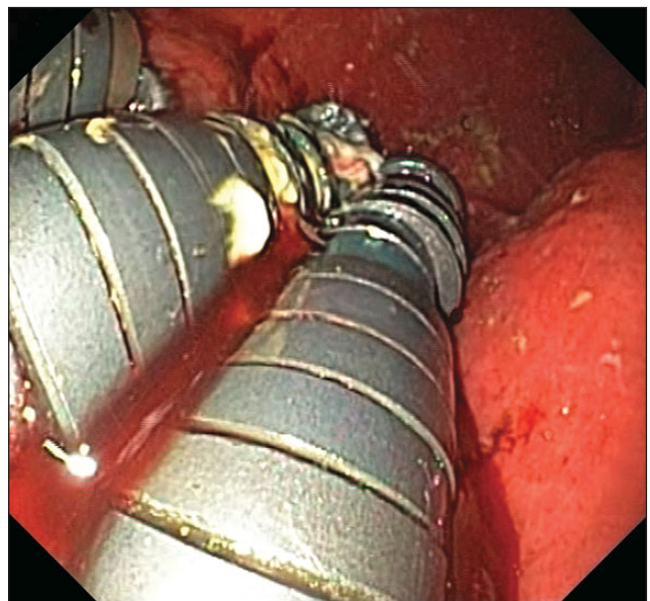


Fig. 3
Three cylinders of magnets after separation of one column in the stomach using a polypectomy snare.

ture this relatively large cluster of magnets and remove it through the cardia. Therefore the laparotomy was performed and the surgeon removed all 47 magnets. In the postoperative period, after finding one additional magnet in the stool, X-ray of the abdomen was already negative. The patient was transferred to the intensive care unit where he remained for three days before transfer to a general ward. After another week, he was transferred back to the Social Care Home in a generally good condition.

Discussion

The presented case of multiple magnet ingestion and its unsuccessful endoscopical retrieval is interesting because of rarity in the possible complications and management of this event.

Inadvertent or intentional ingestion of a foreign body is common found in the paediatric population (the age at highest risk is between 6 months and 3 years), psychiatric or elderly patients, intoxicated persons and prisoners. Commonly ingested objects include coins, toy parts, jewellery, batteries, needles and fish or chicken bones. Approximately 80 percent of the objects that reach the stomach will pass through the digestive tract within 7 to 10 days without causing harm, so surgical management is not usually necessary. Objects which are large (> 2 cm in diameter) and/or long (> 5 cm in length) are unable to pass through the pylorus. Sharp or poisonous objects are dangerous as are corrosive batteries (13). Bowel perforation and obstruction are the most common complications due to foreign body ingestion (3,4,11).

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Magnet ingestion is a rare but very specific situation (1,7). Although magnets are generally small enough to pass through the digestive tract, when more than one magnet is ingested, they can clump together and therefore may cause various complications (2,6,9). The magnets are attracted to each other in the stomach and create a mass too large to pass through the pylorus spontaneously or to be grasped into the snare, basket or net during the gastroscopy. Magnets attract one another forcefully and the trying to separate them is often (as it was in our case) unsuccessful. Another problem is represented by the attraction of magnets to the metallic instruments, thus the use of these devices is difficult. The local pressure of the magnets can lead to the necrosis of the gastric mucosa and bleeding or perforation. The patient suffers pain in the epigastric area and vomits. If the magnets are passing into the small bowel, they can attract together and grip the intestinal wall between them. This can form a significant barrier for the passage and can lead to ileus. The pressure on the intestinal wall between the magnets can lead to development of necrosis and perforation of the intestinal wall, too. Whereas free perforation allows the magnets to join together extra-luminally, the covered perforation can lead to the formation of the fistulas. There are several reports of multiple magnet ingestion causing intestinal volvulus in children (8,14). The initial clinical signs (vomiting in case of the obstruction and diarrhoea due to irritation of the mucosa) are non-specific, leading to delayed diagnosis and larger extent of injury.

The possibility of poisoning from the magnets was discussed as well. The most widely used types of magnets (ingested also in our case) are ceramic magnets, also known as ferrite. They are made of a composite of iron oxide and barium/strontium carbonate. These materials are cheap and easily available. As reported by Kirrane et al. (5) no signs of acute toxicity of absorbed strontium were observed after strontium ferrite magnet ingestion (5). However, only limited information is available at the moment about its possible chronic toxicity.

Correct management of the swallowed foreign objects can comprise observation, endoscopy or surgical retrieval. If the foreign body passes into the stomach, it will usually pass through the pylorus; however, surgical removal is indicated if the object

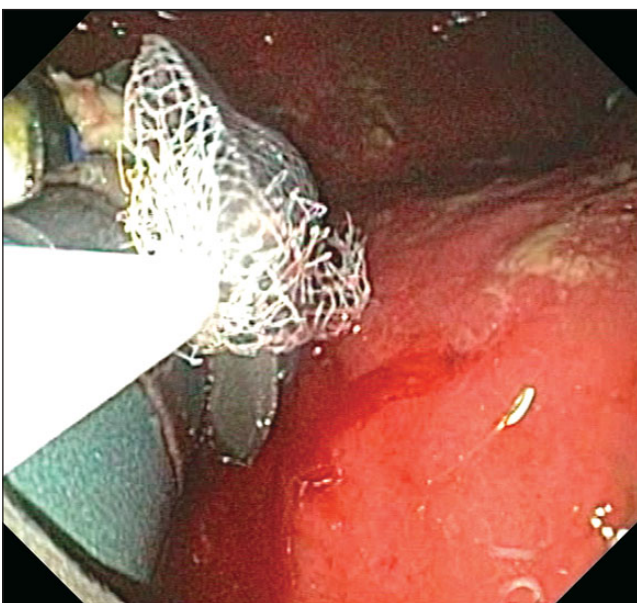


Fig. 4
An endoscopic retrieval net was too small to grasp the cluster of magnets massing together.

has sharp points or if it remains in one location for more than 4 to 5 days and in the presence of symptoms. A definitive decision on the type of therapy should be based on the nature of the foreign body. Magnet ingestion is a special situation. Miscellaneous possibilities of management for magnet ingestion have been reported (8,10,12). Affordable data support, that only observation is indicated with one magnet < 5 cm without sharp borders without coexistence of other metallic objects or underlying intestinal illness. If ingested magnets or a magnet along with a magnetic object are detected in the upper gastrointestinal tract, they should be swiftly removed while

they are still accessible with an endoscope. The risk of aspiration and perforation can be averted by use of protective techniques during foreign body removal (11). When magnets have passed through the pylorus or if they cannot be retrieved endoscopically, an emergency explorative laparotomy and their surgical removal should follow. In the presence of signs of any complications (such as bowel obstruction or perforation), emergency surgery is obligatory.

In conclusion, multiple magnet ingestion is a very special situation and can lead to serious gastrointestinal complications. Timely and correct management is important.

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Correspondence to:

Ilija Tachecí, MD, 2nd Department of Internal Medicine, Charles University Teaching Hospital, Sokolská 581, 500 05 Hradec Králové, Czech Republic
E-mail: tacheci@fnhk.cz