



Endoscopic Mucosal Incision to Remove a Chain of Magnets Completely Embedded under the Gastric Mucosa: A Case Report

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Abstract

The rising use of electronic toys containing magnets has led to an increased incidence of magnet ingestion in children. While endoscopic extraction is the preferred approach in these cases, challenges arise when multiple magnets get swallowed, which can erode through the mucosal surface and become embedded in fibrous tissue. Extraction using simple endoscopic techniques and instruments is not possible in such cases and many times, surgical intervention becomes necessary.

This case showcases the application of cap-assisted endoscopic mucosal resection and endoscopic submucous dissection principles and the use of magnetic forceps, enabling the safe and complete removal of the embedded magnet pieces and highlighting the remarkable effectiveness of advanced endoscopic techniques in managing this unique challenge. The multidisciplinary approach and tailored interventions demonstrated in this case underscore the importance of prompt and comprehensive evaluation in cases of ingested foreign bodies, particularly those involving multiple magnets

Keywords

- ▶ endoscopic mucosal resection
- ▶ ESD
- ▶ FB
- ▶ magnetic forcep

Introduction

Generally, blunt gastric foreign bodies (FBs) are harmless and need no immediate intervention.¹ Rarely, these blunt objects can cause complications like impactions, perforations, bleeding, and obstruction. Endoscopic removal is the first choice for removing these FBs; surgical procedures are required if that is not possible due to the shape of the FBs, or if they are embedded within the gut wall. Here, we present a rare case of endoscopic extraction of a chain of magnets embedded in stomach wall.

Case Report

A 5-year-old boy was brought with a history of accidental ingestion of toy magnets approximately 6 to 7 days back.

Abdominal X-ray showed a chain of six magnets in the mid-body of the stomach (▶**Fig. 1**). Gastroscopy at a peripheral hospital showed that the magnets were partially embedded in the gastric wall (▶**Fig. 2**). Computed tomography confirmed the presence of a chain of magnets with a possible fistula formation with an adjacent bowel loop. A repeat gastroscopy was planned using a standard gastroscope (Olympus GIF-HQ190; Tokyo, Japan) under general anesthesia. Considering the possibility of gastroenteric fistula, consent was obtained for eventual exploratory laparotomy.

Endoscopy showed only the first piece of magnet visible in the lumen. The remaining pieces were completely embedded in the wall. To dig out the buried pieces, the mucosal incision was taken using a triangle tip knife J (Olympus KD-645 L; Tokyo, Japan), starting from the edge of the upper magnet (▶**Fig. 3**). The incision was deepened till the lowermost

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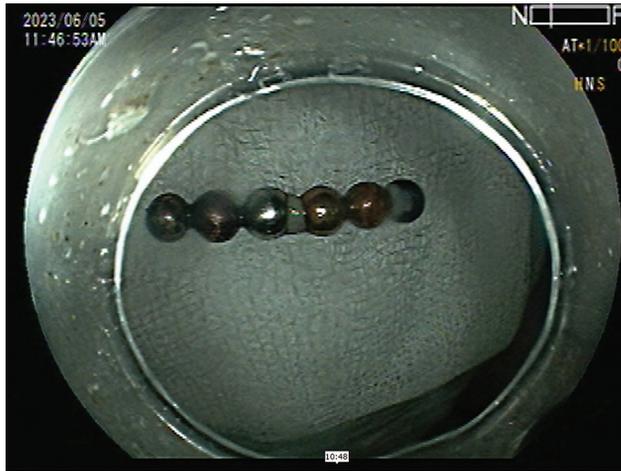


Fig. 1 X-ray image showing foreign body in the IB stomach.

piece of magnet became visible. Using the transparent cap (Fujifilm DH-28GR; Tokyo, Japan) and the triangular tip knife, slowly all the magnets were separated from the surrounding fibrous tissue.

It was important to remove all the pieces of magnets together. Otherwise, one or two pieces would have got lost in the wall, and finding them after that would have become very difficult. So instead of grabbing the piece using any forceps, we used magnetic forceps to catch the most proximal piece. The magnets got stuck to the forceps very tightly. Slowly all the pieces were separated from the surrounding fibrous tissues and were removed together. (► **Figs. 4–6**). On table, fluoroscopy was done that confirmed extraction of all the pieces. After this a water-soluble dye study was done to look for any signs of perforation or presence of fistula. When it was confirmed that there was no obvious leak outside the stomach, the mucosal incision was closed using hemoclips.

The child was kept nil orally for 1 day and was discharged uneventfully from the hospital on the second hospital day.

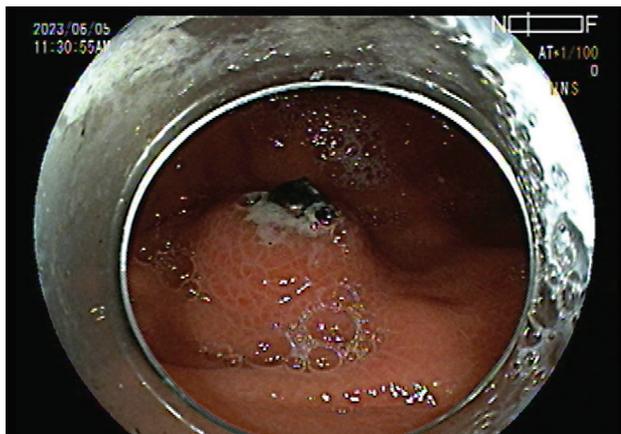


Fig. 2 Computed tomography abdomen showing the foreign body with possible fistula.

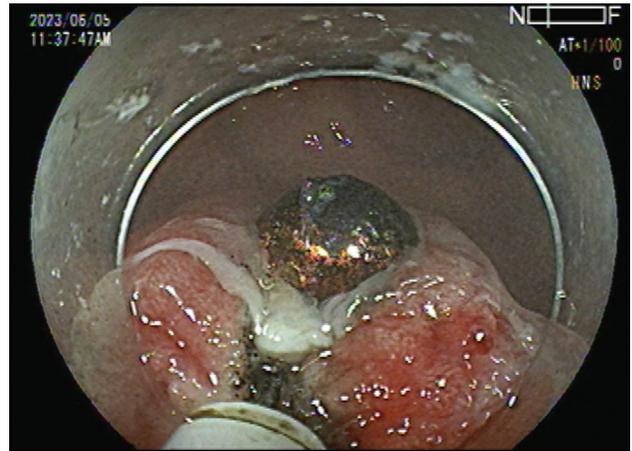


Fig. 3 Endoscopy showing embedded foreign body.

Discussion

When a patient swallows multiple magnetic FBs, they can attract each other across the bowel walls, leading to complications like intestinal obstruction, perforation, and peritonitis or death.² Asymptomatic patients can receive conservative treatment,² where monitoring by serial X-rays is advisable.³ The majority of such FBs will pass through the digestive tract without medical intervention. However, if the magnetic FBs remain in the same position on serial abdominal X-rays, surgical treatment may be needed because these FBs can lead to the formation of intestinal fistulas.⁴

A FB in the stomach can be easily removed endoscopically using accessories like rat tooth forceps and Dormia baskets.³ But when multiple magnets are swallowed simultaneously, they can erode through the mucosal surface.² Such embedded FBs pose a unique challenge to the endoscopist. The embedded pieces of FB will be covered with fibrous tissue.

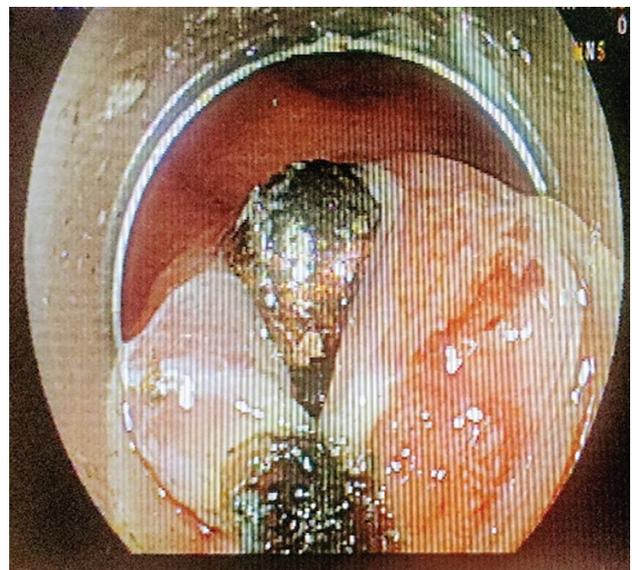


Fig. 4 Mucosal incision.



Fig. 5 Fluoroscopy showing en-bloc removal of foreign body.



Fig. 6 Extracted foreign body.

If only the visible part of FB is grabbed using forceps, the deeper pieces may get separated due to adhesions and the remaining pieces can get lost in the gut wall making their removal very difficult. To prevent this from happening, care needs to be taken to remove all the pieces simultaneously.

Advanced endoscopic techniques like endoscopic mucosal resection, endoscopic submucosal dissection (ESD) have made it possible for an endoscopist to go in the gut wall.⁵ In our case, using these principles, a mucosal incision was taken over the FB and it was deepened till the last piece of magnet was reached. Slowly the fibrous tissues surrounding the magnet pieces were cleared and all the pieces were freed. This technique made sure that all the pieces remained intact.

For extraction from the stomach, special magnetic forceps were used preventing dislodgement of the pieces from each other.

This case highlights the importance of tailored interventions for FB removal, in which ESD allows for precise and controlled dissection.⁵ By going into the submucosal plain, the endoscopist can safely detach and remove the magnet beads while minimizing the risk of complications.

Conflict of Interest

None declared.

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