

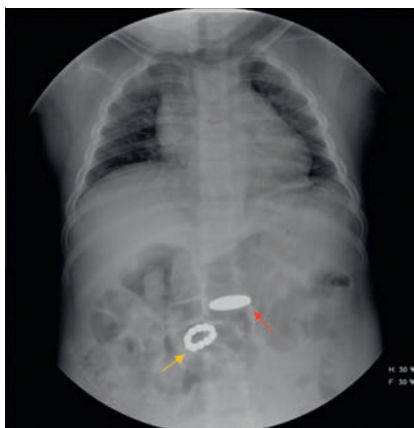
Endoscopic removal of magnetic beads causing duodenal chronic fistula

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A 4-year-old girl with pituitary dysplasia for 2 years presented to our hospital after swallowing a coin 3 hours earlier. An abdominal X-ray revealed the coin in her stomach, along with an unexpected string of beaded, high-density images in the right upper abdomen (► **Fig. 1**). Her parents disclosed that the girl had played with magnetic beads a month prior and might have ingested them then, but she had no symptoms of abdominal pain, vomiting, or fever. Under intravenous anesthesia, the girl underwent gastroscopy.

A coin was identified in the stomach (► **Fig. 2**) and removed using a foreign body forceps. Additionally, a string of magnetic beads with corroded surfaces was discovered in the descending duodenum, with one end protruding from the intestinal cavity, while the other end was invisible (► **Fig. 3**). Given that it had been a month since ingestion and the X-ray showed the beads forming a ring, we inferred that a chronic fistula might have developed due to the magnetic force of the beads. Attempting endoscopic removal, we grasped one bead firmly with the forceps and successfully removed all the beads with the aid of a transparent cap (► **Video 1**, ► **Fig. 4**). After removal, a fistula was exposed with no bleeding and there was no damage to the intestinal mucosa (► **Fig. 5**). A nasointestinal tube was used to maintain nutritional intake. Postoperatively, no complication occurred. Abdominal X-ray also revealed no complications. The girl was discharged 2 days later.

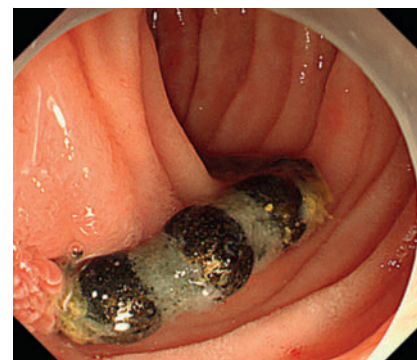
The incidence of injury from magnetic beads in pediatric patients has increased in recent years. When more than two magnetic beads are ingested, the intestinal walls are tightly attracted to each other, leading to necrosis and fistula formation [1], often requiring surgical intervention [2]. In this case, the swallowed beads were discovered relatively late due to the absence of symptoms, and a chron-



► **Fig. 1** Abdominal X-ray showed the image of the coin in the stomach (red arrow), and a string of beaded, high-density images, forming a ring, in the right upper abdomen (yellow arrow).



► **Fig. 2** Endoscopy showed a coin in the stomach cavity.



► **Fig. 3** A string of magnetic beads with corroded surfaces was discovered in the descending duodenum, with one end protruding from the intestinal cavity.



► **Fig. 4** The removed magnetic beads.



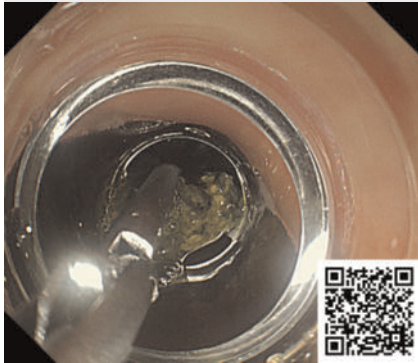
► **Fig. 5** A fistula was exposed with no bleeding.

ic fistula had developed. Our experience suggests that endoscopic removal of magnetic beads can be safe in the presence of chronic fistula.

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Conflict of Interest

The authors declare that they have no conflict of interest.



Video 1 Endoscopic removal of the magnetic beads.

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