

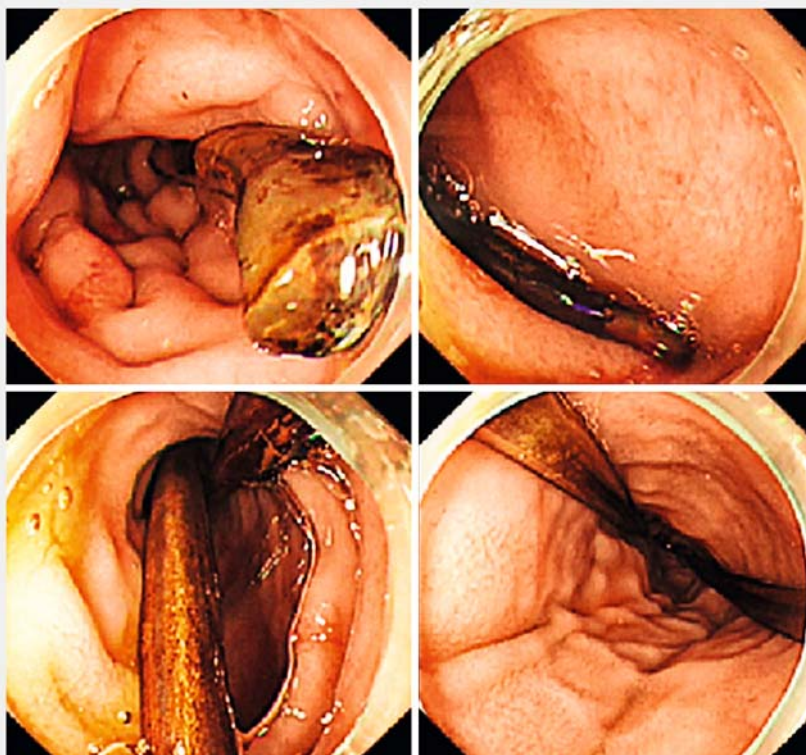
Use of a nylon loop and transparent cap to assist in the endoscopic removal of a long and bent metal foreign body incarcerated in the duodenum



► **Fig. 1** Computed tomography scan showing a long and bent metal foreign body incarcerated in the duodenum.

There are many endoscope-assisted techniques that have been reported for the removal of traditional foreign bodies in the digestive tract (e.g. rat-tooth grasper, mini-snare, and end loop, among others) [1–3]. However, for any long and bent metal foreign bodies incarcerated in the duodenum or stomach, the technical difficulty is how to make the angled and sharp ends pass through the physiological narrow areas (e.g. pyloric canal, cardia, and esophageal entrance) in a relatively safe way.

A 45-year-old man presented to our hospital with abdominal pain for 6 hours, having swallowed a metal wire 12 hours previously. Computed tomography (CT) scanning showed a long and bent metal foreign body (approximately 20 cm) incarcerated in the duodenum (► **Fig. 1**). Gastroscopy examination (GIF-Q260; Olympus) revealed that the two ends of the bent wire were incarcerated in the duodenal bulb and descending duodenum, with the anal side of the metal foreign body being located in the horizontal section of the duodenum (► **Fig. 2**). It would be impossible for foreign body forceps to safely remove the bent wire and pull it out of the pyloric canal because of its angled and sharp ends. An attempt was therefore made to tie the two ends of the bent wire and slowly



► **Fig. 2** Endoscopic views showing the two ends of the bent wire incarcerated in the duodenum.

fold it into a straight line with a nylon rope (HX-400U-30; Olympus), before dragging it from the duodenum into the stomach. However, the angle between the nylon rope's hard outer tube and the metal foreign body made it too difficult to get it through the cardia. We therefore released the tightened nylon loop (► **Fig. 3**), clamped the ends of the wire with the foreign body forceps, and pulled it into a long transparent cap (OlympusMH-463), allowing the metal foreign body finally to be removed through the cardia and the entrance of the esophagus (► **Fig. 4** and ► **Fig. 5**; ► **Video 1**). We have provided a new safe and effective method for removing long and bent metal foreign bodies.

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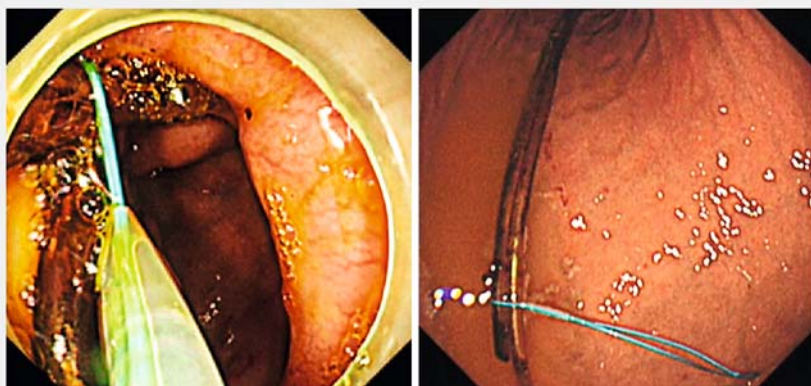
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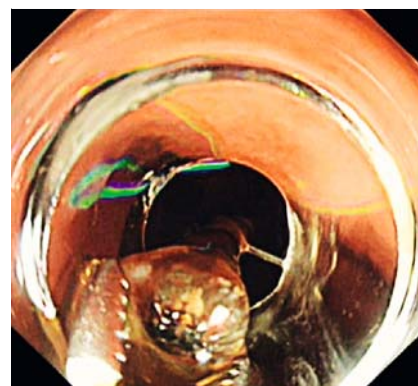
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Competing interests

The authors declare that they have no conflict of interest.



► **Fig. 3** Endoscopic views showing the nylon rope loop pulling the two ends of the bent wire together and into a straight line, before dragging it from the duodenum into the stomach, and then releasing the nylon loop.



► **Fig. 4** Endoscopic view showing the metal foreign body within a long transparent cap being passed smoothly through the cardia and esophageal entrance.



► **Fig. 5** Photograph showing the size of the metal foreign body and the angle formed by its two ends.

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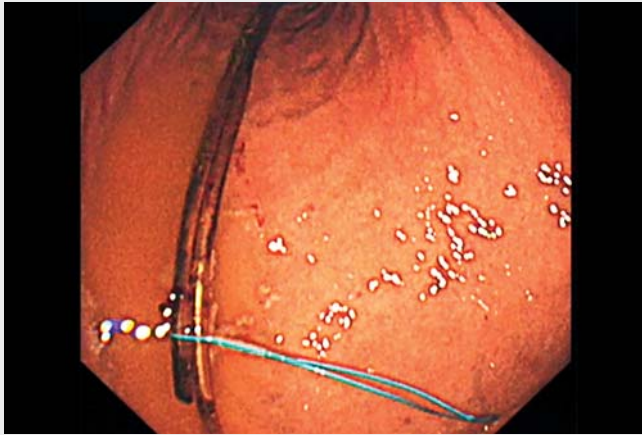
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Video 1 A long and bent metal foreign body incarcerated in the duodenum is removed endoscopically using a nylon loop and transparent cap.

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