

# Removal of a dinner fork from the stomach by double-snare endoscopic extraction

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Long and pointed foreign objects in the stomach are difficult to remove by endoscopy, and they can cause complications such as perforation and impaction. The endoscopic removal of long and pointed objects involves the following principles: (1) presenting the blunt end cephalad to prevent perforation or impaction during extraction; (2) orienting the long axis of the object in the line of extraction; and (3) applying traction to the foreign body without losing grip. Currently practised methods of extraction, which use a protector hood or an overtube, do not address these three principles. We report on a case in which an ingested metal dinner fork was removed from the stomach by using a double wire-loop snare technique. This method uses two snares to hold the object and allows the endoscopist to change the presentation, orient the axis, and maintain traction to allow the safe removal of long and pointed objects.

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## Introduction

The majority of ingested foreign objects will pass spontaneously through the alimentary canal, and the risk of perforation is only 1%.<sup>1</sup> Sharp or pointed objects, however, are reported to perforate the gastrointestinal wall in 15% to 35% of cases.<sup>1-3</sup> The removal of long and pointed objects from the stomach by using an endoscope is especially fraught with difficulty. The aims are to present the blunt end as the leading end, to orient the long axis of the object in the line of removal, and to avoid losing grip while applying traction to remove the object.

By using a double wire-loop snare, all three aims can be fulfilled. In this technique, two snares are used to hold the object: one snare at the sharp end and one at the blunt end. This double-snare arrangement allows the endoscopist to control the longitudinal axis

of the object and to present the blunt end of the object to the cardio-oesophageal junction. Traction is then applied at the distal (sharp) end of the object, while the snare at the proximal (blunt) end guides the object along the stomach, oesophagus, and pharynx. Hence, there is no danger of losing grip while removing the object.

## Case report

A 42-year-old chronic schizophrenic patient was admitted to the Tan Tock Seng Hospital, Singapore, in November 1997 for treatment of amoebic colitis. He had also swallowed foreign objects. An abdominal X-ray showed a dinner fork and a toothbrush in the region of the stomach. There were also scattered needles and paper-clips mainly in the lower abdomen (Fig 1). Endoscopic removal of the metal fork and toothbrush in the stomach was done successfully using a double-snare technique, which has not been previously described. The patient had a gastrograffin study performed the next day and was discharged back to his attending physician.

## Endoscopic technique

The endoscopic removal of the fork was performed under general anaesthesia with endotracheal intubation. A double-channel gastroscope was not available, so a slight modification of the technique was made using two gastroscopes. A gastroscope was passed into the stomach and a wire-loop snare was used to securely

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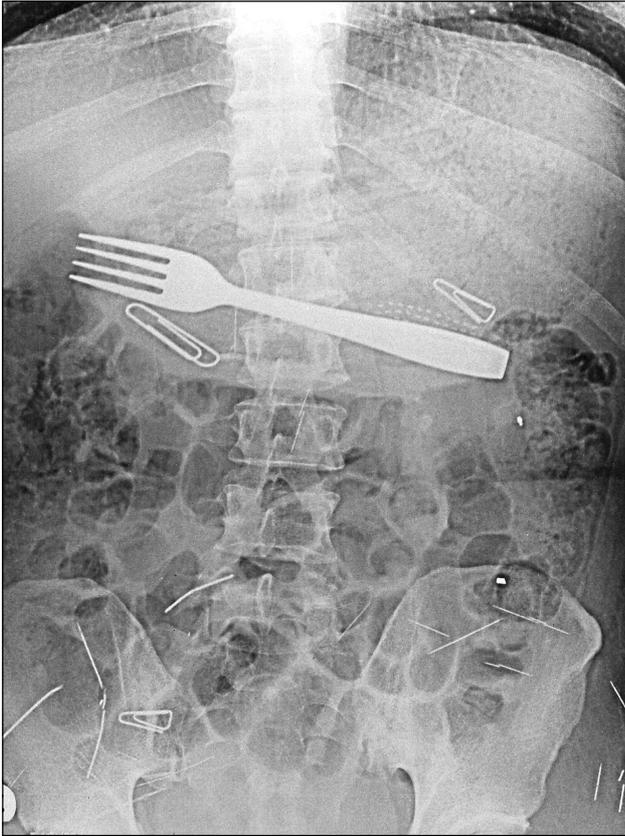
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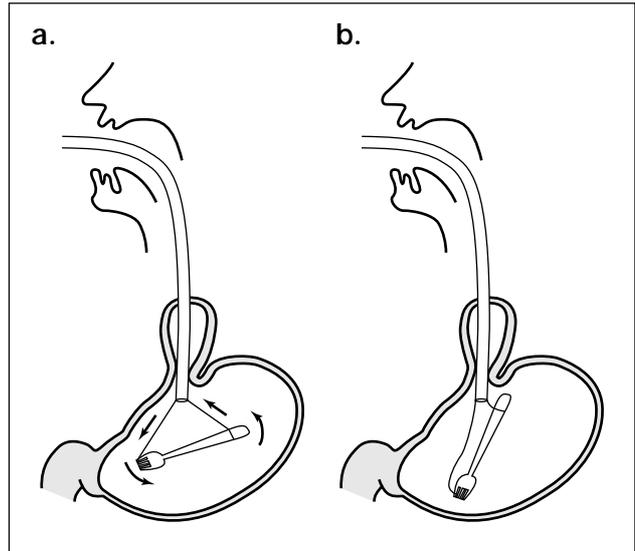


**Fig 1. Abdominal X-ray showing ingested dinner fork (18 x 2.5 cm) and toothbrush**

grasp the sharp end of the fork. The gastroscope was removed while the snare remained attached to the fork. A second gastroscope was then passed into the stomach to grasp the blunt end of the fork. The fork was rotated such that its blunt end was uppermost, and it was then oriented to be in the correct axis to negotiate the cardio-oesophageal junction (Fig 2). Traction was applied to the distal snare, which was attached to the sharp end of the fork. The proximal snare was used only to guide the direction and orientation of the fork during its removal under direct vision. When the fork reached the neck and cricopharyngeus area, the neck was flexed and the atlanto-axial joint extended to align the axis of the oesophagus and the oropharynx to allow the removal of the fork.

**Discussion**

The ingestion of foreign objects is common in children aged between 1 and 5 years; in adults who are edentulous, have a psychiatric history, or mental retardation; and among prison inmates.<sup>3</sup> Eighty percent of ingested foreign objects will enter the gastro-intestinal tract, whereas 20% will enter the tracheobronchial tree.<sup>4</sup> Children most often ingest coins, toys, crayons, and caps of ball-point pens, whereas adults swallow bones.<sup>3</sup> In Hong Kong, fish bones seem to be most commonly



**Fig 2. Changing the presentation and axis of a long and pointed ingested object**  
 (2a) Use of a double wire-loop snare to rotate the object by pulling on one snare and pushing on the other; (2b) correct presentation and axis: the proximal end is the blunt end and the object's long axis is aligned with the oesophagus

swallowed object.<sup>5</sup> Recurrent episodes and the ingestion of novel objects may occur especially among prisoners, psychiatric patients, and patients with peptic strictures.

About 80% to 90% of small foreign objects that reach the stomach will eventually pass through the alimentary canal.<sup>6,7</sup> Up to 20%, however, will need endoscopic removal and perhaps 1% will require surgical intervention.<sup>3</sup> The passage of foreign objects can be encouraged by a high-fibre diet, but the use of cathartics should be avoided. Serial abdominal X-rays every 1 or 2 days can be performed to follow the progress and passage of the object.

Sharp objects that lodge in the same place for more than 2 to 3 days<sup>3</sup> or objects in the stomach that have not moved for more than 5 to 6 days<sup>8</sup> are unlikely to pass through and should be removed endoscopically. Long objects are unlikely to pass through the stomach, especially those with dimensions of more than 13 cm in length for adults and 5 cm for children, or more than 2 cm wide.<sup>7</sup> Objects exceeding these dimensions have a higher risk of creating complications, and they require endoscopic removal. Objects that are both sharp and pointed have an even higher risk of perforation, of 15% to 35%,<sup>1,2</sup> and Bakaleinik<sup>9</sup> has suggested that such objects be removed by gastrostomy.

Endoscopic removal requires the expertise of skilled endoscopists as well as commonly available accessories such as snares, dormia baskets, or strong-toothed

graspers. Commercial accessories developed specifically for removing foreign objects are also available—for example, soft-latex protector hoods<sup>10</sup> and overtubes.<sup>11</sup> These devices are developed to protect the gastrointestinal tract during the removal of any sharp object, but they cannot control the axis of presentation and may lose grip during the object's removal. Furthermore, not all endoscopy centres have these special accessories as part of their usual equipment. In contrast, endoscopic snares are readily available accessories in any endoscopic facility, because they are used commonly for polypectomy.

The overtube is useful for removing sharp or pointed foreign bodies, but its use is limited by the small internal diameter of 11 to 15 mm, which precludes the removal of objects with a diameter exceeding those dimensions. The soft-latex protector hood was first described by Bertoni et al in 1992.<sup>10</sup> In that report, the hood was used to cover the pointed ends of a plastic fork. In this case, the pointed ends of the metal fork may have perforated the soft latex of a protector hood. Both the overtube and hood methods fail to orient the long axis of an object.

During the removal of any long object, the long axis should be aligned with the axis of the lumen and the endoscope. If alignment is not achieved as the object is withdrawn towards the cardio-oesophageal junction, the object will either penetrate the mucosa or the grip will be lost. The axis can be aligned in the double-snare method by selectively applying traction

to either one of the two snares that is attached to the object. During removal, traction is applied using the snare at the distal end of the object while the snare on the proximal end serves only as a guide to change the axis of the object. With two snares holding the object, the grasp is more secure and there is no danger of losing grip during the extraction procedure.

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