

CASE REPORT

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This is a successful removal of more than 450 pieces of metal objects from a patient's stomach: a case report

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Abstract

Background Ingestion of foreign bodies may be seen unconsciously or intentionally in patients with mental health problems. Most cases pass through the esophagus slowly; however, in some cases, the tumor may be located in narrower areas of the digestive tract that require endoscopic or surgical intervention. This study describes a rare case of successful removal of more than 450 pieces of metal objects from the stomach of a 36-year-old man via ingestion of foreign bodies at Imam Khomeini Hospital in Ahvaz.

Case presentation A 36-year-old male patient (Aryan race) presented with complaints of chronic abdominal pain, frequent vomiting, and intolerance to liquids and food. The patient's companions mentioned a history of gradual ingestion of small metal objects 3 months prior. The patient was conscious and had stable vital signs. In the patient's X-ray and endoscopy, multiple metal objects inside the patient's stomach were observed, causing gastric outlet obstruction. The patient underwent gastrotomy surgery, and 452 screws, nuts, keys, stones, and other metal parts weighing 2900 g were removed from the stomach. Five days after the operation, the patient was transferred to the psychiatric service in good general condition and was diagnosed with psychosis, and her condition returned to normal at follow-up.

Conclusion Successful removal of this foreign body is rare. In chronic abdominal pain, especially in the context of psychiatric disorders, attention should be given to the ingestion of foreign bodies. In swallowing large amounts of sharp and metallic foreign objects, surgical intervention is necessary, especially in cases of obstruction, and saves the patient's life.

Keywords Foreign body ingestion, Gastric outlet obstruction, Gastrotomy, Iran

Background

Foreign body ingestion is a potentially serious health problem [1]. This complication is common in children and, to a lesser extent, in adults, especially those with underlying mental illness and who are prisoners [2]. These indigestible foreign bodies accumulate in the digestive tract and are called bezoars [3]. Based on the type and composition of the foreign body, several types of bezoars have been identified thus far [4]. The most common types are phytobezoars, which include indigestible plant fibers; pharmacobezoars, which include

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indigestible drugs; trichobezoars, which include hair; and lactobezoars, which include undigested milk and mucus [5]. The ingestion of a large number of metal objects, such as nails, screws, stones, and sharp nails, is an example of metal bezoars, with few cases reported in studies [6–10].

Most ingested foreign bodies pass through the esophagus slowly and without any problems. However, some may become lodged in anatomically narrow areas, such as the cricopharyngeus, lower esophageal sphincter, pyloric canal, ileocecal region, and anus. These patients are often asymptomatic, but in rare cases, they may present with acute abdominal symptoms due to obstruction or peritonitis. Studies have shown that approximately 10 to 29% of patients may require endoscopic intervention, with surgery being required in rare cases [2].

Almuhsin *et al.* presented the case of a 29-year-old man with schizophrenia in Saudi Arabia who had ingested metal. He underwent exploratory laparotomy, during which 52 pieces of nails from the stomach and 14 pieces of nails from 100 cm of the ileocecal junction were removed [6].

Mohamed *et al.* reported on a 37-year-old mentally retarded woman in Iraq who had ingested a metal. During exploratory laparotomy, a large number of nails were removed from her stomach, one of which ruptured the stomach wall [7].

Dorado *et al.* discussed a case involving a 44-year-old mentally retarded man in Spain who had ingested a large quantity of foreign metal objects. During an exploratory laparotomy, 238 pieces of nails and screws were removed from the patient's stomach and cecum [8].

In some instances, foreign body ingestion, such as the ingestion of small amounts of nonsharp substances, can be managed nonsurgically through observation or removal with the assistance of endoscopy [3]. However, in cases where patients are at risk of complications such as perforation, bleeding, and obstruction, surgical intervention may be necessary to prevent morbidity and mortality [1]. This study describes the case of a 36-year-old man who ingested a large quantity of various metals and required surgery at Imam Khomeini Hospital in Ahvaz.

Case description

This research was approved by the Ethics Committee of Jundishapur University of Medical Sciences in Ahvaz (IR.AJUMS.HGOLESTAN.REC.1402.687). The patient was a 36-year-old man (Aryan race) with suspected psychiatric problems (unconfirmed), who complained of chronic abdominal pain for the past 2 months, frequent vomiting, and intolerance to liquids and food for the past week and was referred to the surgery clinic. The patient's companions mentioned a history of gradually swallowing small

metal objects such as screws, nuts, plaques, and stones for the past 3 months, which had not caused any serious problems for the patient until now. The patient had no history of surgery. He did not take any special medication, but he was strongly addicted to opium. Upon entering the emergency room, the patient was alert and answered all questions completely. The patient's heart rate was 110 beats/minute, systolic blood pressure was 110 mm Hg, and diastolic blood pressure was 70 mm Hg. During the examination, the patient's abdomen was soft, and he had tenderness in the left upper quadrant of the abdomen.

The patient's laboratory test results at admission included a white blood cell (WBC) count of 6900 cells/mcl, a hemoglobin (Hb) concentration of 16.3 grams/deciliter (g/dl), a hematocrit (Hct) of 48.4%, a platelet (Plt) count of 560 thousand, and an international normalized ratio (INR) of 1 (Table 1).

The patient had a body mass index (BMI) of 19.5 kg/m². Abdominal X-rays of the patient revealed numerous metal objects in his stomach (Fig. 1). During endoscopy, multiple foreign bodies were observed in the antrum of the stomach, leading to gastric outlet obstruction (GOO) (Fig. 2). Initially, the patient received serum and antibiotics in preparation for surgery.

The surgery involved making a ten-centimeter longitudinal incision from the pyloric valve of the stomach, which was filled with various metal objects that were carefully removed. A total of 452 screws, nails, nuts, keys, stones, and other metal pieces weighing two kilograms and nine hundred grams were extracted from the stomach (Fig. 3). Subsequently, other areas of the small intestine, colon, and distal esophagus were examined, revealing no foreign bodies. Intraoperative X-ray confirmed the absence of foreign bodies, and the stomach was repaired in two layers.

Following surgery, the patient was transferred to the intensive care unit (ICU). On the first postoperative day, the patient was awake, had stable vital signs, and showed no signs of bleeding or a decrease in hemoglobin levels.

Table 1 Patient laboratory findings

Variable	N (%)	Reference range
WBC	7900 mcl	4500–11000
Hemoglobin	16.3 g/dl	14–18
Hematocrit	48%	40–54%
Platelet	560	150–450
International normalized ratio	1	<1.1
Albumin	3.6 g/dl	3.4–5.4
Total protein	5.8 g/dl	6–8.3

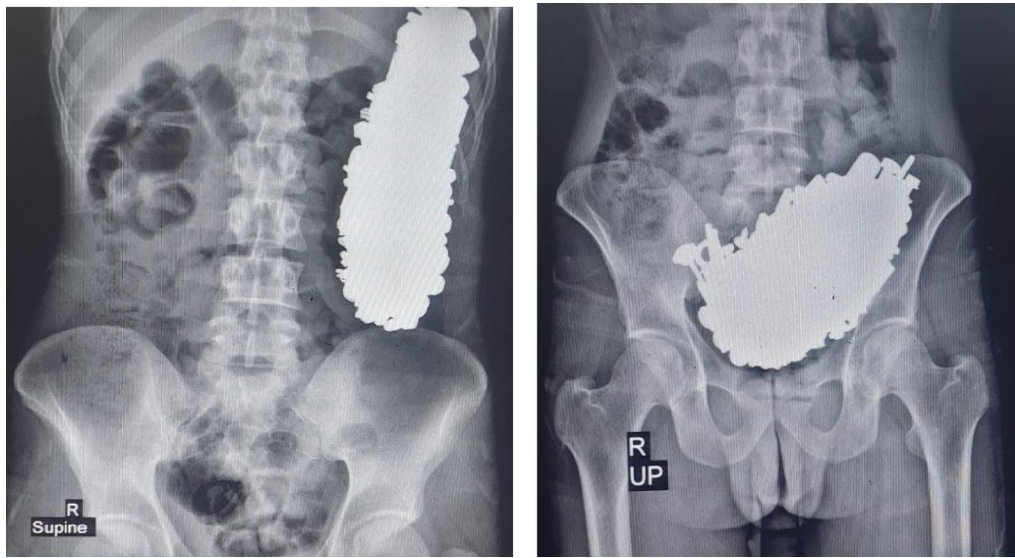


Fig. 1 Radiology findings of the patient

By the third postoperative day, the patient began a liquid diet, and a psychiatric consultation was conducted, resulting in a diagnosis of psychosis. On the seventh day postsurgery, the patient's general condition improved, leading to her being transferred to the psychiatric ward.

Two weeks later, the patient returned to the surgery clinic for evaluation, which revealed no signs of infection, bleeding, or digestive system issues. The patient was followed by a gastroenterologist through endoscopies and regular visits to the psychiatric service.

Discussion

The ingestion of large amounts of sharp metal objects in adults is a challenging condition that requires collaborative effort between emergency medicine specialists, gastroenterologists, surgeons, and psychiatrists for effective management.

This study presented a rare case of successful removal of more than 452 screws, nuts, keys, stones, and other metal parts weighing two kilos and nine hundred grams from the stomach of a 36-year-old man at Imam Khomeini Hospital in Ahvaz. To our knowledge, the successful extraction of this amount of metal in Iran is unprecedented.

The results indicated that our patient belonged to the middle-aged group (30 to 60 years old), which aligns with the findings of Mohaamed *et al.* [7], Dorado *et al.* [8], Prieto-Aldape *et al.* [9], and Emamhadi *et al.* [10]. This is in contrast to the results of Almuhsin *et al.* [6], Vast *et al.* [11], and Upadhyay *et al.* [12], whose cases were in the young age group (20–30 years). Further research is

needed to determine which age group is more commonly affected by this problem and its underlying causes.

The results of the present study indicate that our patient was male, which aligns with the findings of Almuhsin *et al.* [6], Dorado *et al.* [8], Prieto-Aldape *et al.* [9], and Emamhadi *et al.* [10] but contrasts with the results of Mohaamed *et al.* [7] and Vast *et al.* [11]. The sex differences in susceptibility to this complication and its underlying causes have yet to be determined.

The results also showed that the patient in our study was suspected to have psychiatric issues and was subsequently diagnosed with psychosis by consulting psychiatrists. Patients in the studies by Almuhsin *et al.* [6] and Prieto-Aldape *et al.* [9] were diagnosed with schizophrenia, while those in Dorado *et al.* [8] were diagnosed with intellectual disability, and those in Mohaamed *et al.* [7] were diagnosed with mental retardation. It is common for individuals who ingest foreign objects to have underlying psychiatric conditions, emphasizing the importance of screening, treatment, and monitoring by a psychiatrist to prevent such occurrences.

The results showed that the clinical symptoms of our patient were chronic abdominal pain, nausea, vomiting, and intolerance to liquids and solids. The common clinical symptoms of individuals in the studies of Mohaamed *et al.* [7], Prieto-Aldape *et al.* [9], Emamhadi *et al.* [10], and Vast *et al.* were nausea, vomiting, and abdominal pain, which are similar to our findings. On the other hand, the patients in Dorado *et al.*'s study [8] and in Melna, Almuhsin, *et al.* [6] had no symptoms, and the patient in Upadhyay *et al.* [12] had gross hematuria and

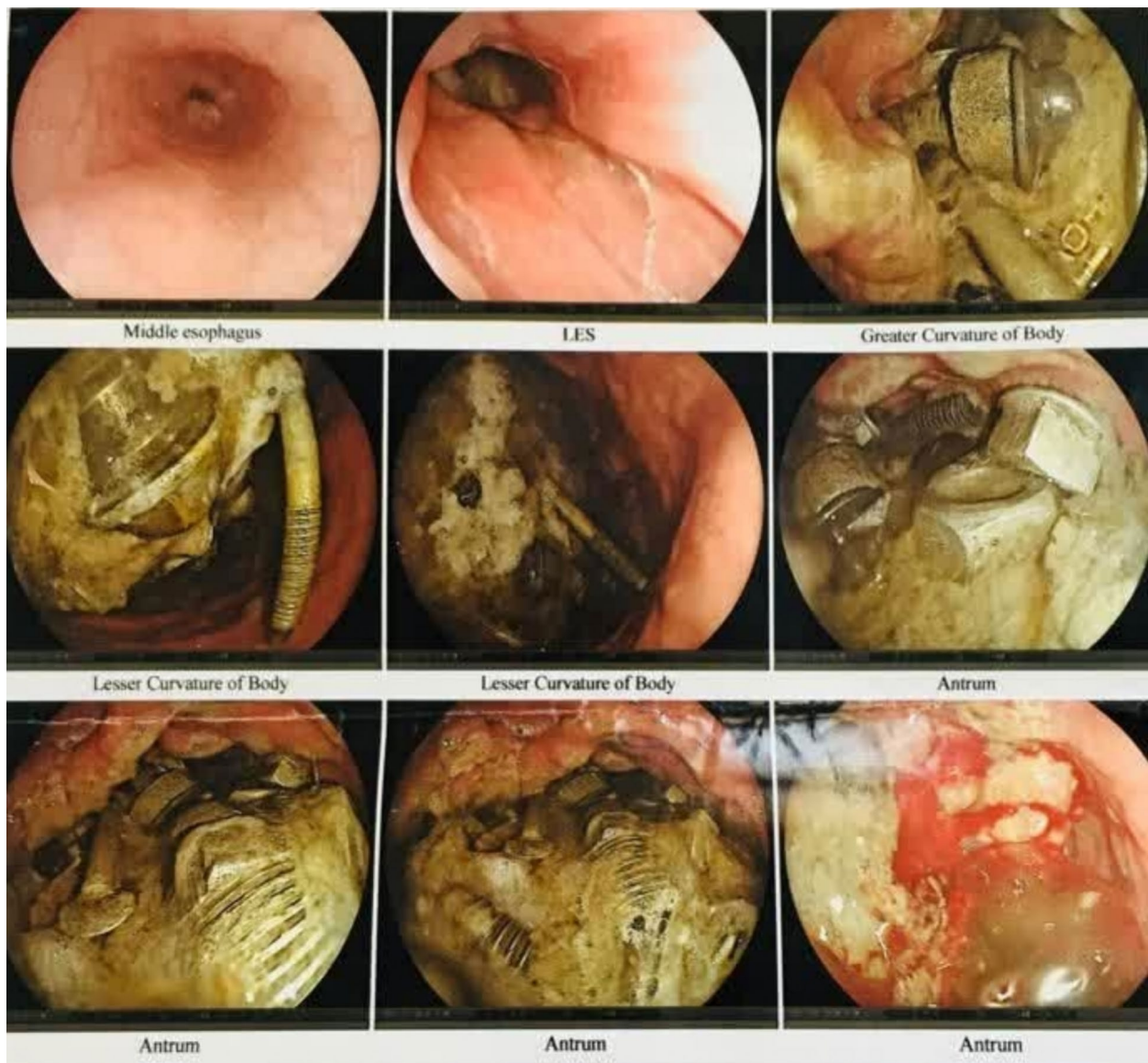


Fig. 2 Endoscopy findings of the patient



Fig. 3 Metal objects extracted from the patient's stomach

colic pain, which was inconsistent with the results of the present study.

Surgeons should always consider the ingestion of a foreign body in individuals with chronic abdominal pain, nausea, and vomiting, especially if they have an underlying mental illness, as it increases the probability of certainty.

The results showed that the foreign body in our patient was located in the stomach. In the studies of Almuhsin *et al.* [6], it was in the stomach and jejunum, and in the studies of Mohaamed *et al.* [7] and Dorado *et al.* [8], it was in the stomach and duodenum. The results also indicated that foreign bodies larger than

2 cm cannot pass through the pylorus or the ileocecal valve. Additionally, foreign objects larger than 5 cm cannot pass through the duodenum [7].

Our patient underwent gastrectomy, foreign body removal, and gastrography. In the study by Almuhsin *et al.* [6], the patient underwent gastrostomy and enterotomy. In the study by Mohaamed *et al.* [7], gastrotomy and cecum incision were performed, while Dorado *et al.* conducted gastrostomy and colectomy. Initially, Vast *et al.* treated the patient conservatively, but after developing secondary GOO, the patient underwent a gastrojejunostomy.

The choice of surgical treatment depends on the patient's vital signs, the amount of ingested material, the predicted damage before the operation, and the findings during the operation. In the present study, as there was no damage to the stomach tissue and all metal objects were completely removed (confirmed with intraoperative imaging), only gastrotomy and gastrography were performed.

Conclusion

The successful removal of this amount of foreign body from the patient's stomach during surgery with only one longitudinal incision is rare.

Overall, the results showed that one of the causes of chronic abdominal pain in adults, especially in people with psychological disorders, is the ingestion of foreign bodies.

In some cases, such as peritonitis, abdominal abscesses, food and liquid intolerance, and obstructions with no clear cause, surgeons should consider the ingestion of foreign bodies. Radiography is helpful in these patients, and serious complications can be prevented by appropriate diagnosis and treatment.

In cases involving the ingestion of large amounts of foreign metal and sharp objects such as screws, nails, nuts, and other items that cannot be removed through conservative or endoscopic treatment, surgical intervention is necessary. This is especially important in cases of obstruction, perforation of any part of the gastrointestinal tract, or peritonitis. In this study, a rare case of such intervention was introduced.

Abbreviations

GOO	Gastric outlet obstruction
ICU	Intensive care unit
WBC	White blood cell
HB	Hemoglobin
Plt	Platelet
INR	International normalized ratio
Hct	Hematocrit
BMI	Body Mass Index

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Author contributions

All authors contributed to the study's conception and design. Material preparation performed by FF, H.G M.P. M.M, H.G and A.A wrote the first draft of the manuscript and F.SH, F.F and H.G commented on the previous version. All the authors read and approved the final manuscript.

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Availability of data and materials

All data will be available upon request made to the corresponding author.

Declarations

Ethics approval and consent to participate

This research was approved by the Ethics Committee of Jundishapur University of Medical Sciences in Ahvaz (IR.AJUMS.HGOLESTAN.REC.1402.687).

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Informed consent

Written informed consent was obtained from the patient for the publication of this case report and any accompanying images.

Competing interests

The authors declare no competing interests.

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