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Case Report

Metalophagia: Splenic artery pseudoaneurysm after foreign body ingestion and retrieval ☆,☆☆,★,★★,†

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ABSTRACT

Persistent eating of non-nutritive, nonfood substances (Pica) is seen in children and adult patients with psychiatric problems. Ingestion of multiple metallic FBs with resultant bezoar formation is rare. While many FBs are passed without complication, mucosal injury, bleeding, obstruction or perforation can occur in some cases. Endoscopic FB removal is performed in 20% of patients following FB ingestion. Generally, these are safe procedures, and very effective in extracting ingested FBs. We report, a 25-year-old male patient with a metal ingestion predominant Pica, requiring multiple prior extraction procedures (including open gastrostomy). He developed a splenic artery pseudoaneurysm following his latest endoscopic FB removal, that was successfully treated with transarterial coil embolization. The unique circumstances leading to this rare complication and its successful endovascular management make this case worthy of report.

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Introduction

Pica refers to ingestion of non-nutritive, nonfood substances over a period of time and is seen in children and adult patients with psychiatric problems [1]. Ingestion of multiple metallic FBs is a rare form of Pica [2–4]. While many FBs are passed without complication, larger and sharp FBs require endoscopic and rarely surgical removal [5–9]. Splenic artery injury with pseudoaneurysm formation following endoscopic removal of FBs has never been reported. We describe an adult patient with a metal ingestion predominant Pica, who developed a splenic artery pseudoaneurysm following his latest endoscopic foreign body (FB) removal, that was successfully treated with transarterial coil embolization.

Case report

A 25-year-old Spanish-speaking male with a history of metal ingestion predominant pica and open gastrostomy for removal of multiple metallic FBs 1 month prior (Fig. 1 A-C), was admitted for abdominal pain and hematemesis after repeat ingestion of multiple metallic FBs. Patient was febrile (38.8°C) and hypotensive (97/53 mmHg) on arrival and received 4 units of packed red blood cells (PRBCs) and 1 unit of fresh frozen plasma in the emergency department (ED). Admission labs revealed hemoglobin (Hgb) of 7.6 g/dl, and lactic acid of 4.4 mmol/L. Radiographs of the chest and abdomen revealed multiple FBs throughout the gastrointestinal (GI) tract, including a 20 cm long wrench in the region of the esophagus/upper stomach (Fig. 2A and B). A computed tomography (CT) abdomen and pelvis without contrast confirmed the presence of multiple FBs, however, showed no evidence of bowel perforation or intrabdominal fluid. The patient was taken for endoscopic FB removal. The upper endoscopy (EGD) performed at the time revealed the foreign body (metal wrench) in the esophagus extending into the stomach, with hemorrhagic superficial mucosal tears without perforation. Following successful removal of the gastro-esophageal FB (Fig. 3) the patient was admitted to ICU.

The following day he had multiple episodes of hematemesis with bright red blood and clots totaling at least 1 L in volume. He was hypotensive with a blood pressure of 61/41 mmHg. The patient subsequently, received 4 units of

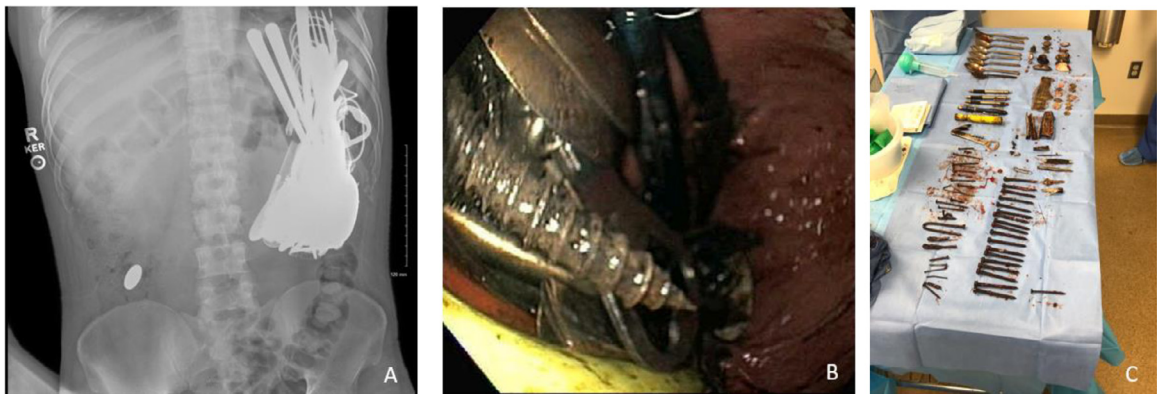

Fig. 1 – Abdominal radiograph (A) from the patient's past admission demonstrating multiple ingested metallic objects in the left upper quadrant, most likely with in the stomach. Endoscopy performed during that admission (B) confirms multiple foreign bodies in the stomach. The foreign bodies extracted following open gastrostomy laid out on the back table (C).

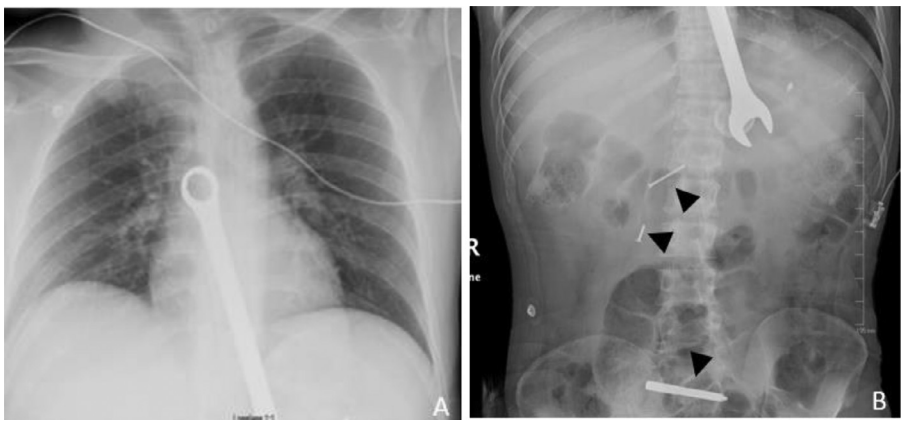

Fig. 2 – Patient's admission chest (A) and abdominal (B) radiographs showing a 20-cm long wrench in the region of the esophagus and stomach with multiple other metallic ingested objects (black arrowheads) throughout the gastrointestinal tract.

Fig. 3 – Image of the wrench outside the body, post extraction.

PRBC and 3 liters of Intravenous fluids (IVF) for resuscitation. Hemoglobin and hematocrit (H/H) stabilized at 7.8 g/dl and patient was taken to the endoscopy suite for repeat EGD. A 1 cm × 1 cm ulceration with a densely adherent clot was discovered at the junction of the anterior fundus and greater curvature (Fig. 4A). An attempt to place hemostatic clips in the ulcer, was met with torrential arterial bleeding from the ulcer. Despite placing at least 5 hemostatic clips (Fig. 4B) the endoscopist could not fully control the hemorrhage. The patient received 1 unit of PRBCs during the procedure. Following consultation with surgery, GI referred the patient to Interventional Radiology (IR) for emergent angiogram and possible embolization.

Selective celiac angiography demonstrated a 2.5 cm pseudoaneurysm from the midportion of the splenic artery with active contrast extravasation into the gastric lumen (Fig. 5A). Based on this finding, the splenic artery was selectively catheterized with a micro catheter and coil embolization was performed distal and proximal to the bleeding pseudoaneurysm with successful hemostasis (Fig. 5B).

The patient's postprocedural course was uncomplicated, and he was discharged in stable condition to follow-up with GI and psychiatry.

Discussion

Pica is defined in the Diagnostic and statistical Manual of Mental disorders as persistent eating of non-nutritive, non-food substances over a period of at least 1 month [1]. Pica can be seen in otherwise normally developing children, but in adults it is more likely to occur in the context of intellectual

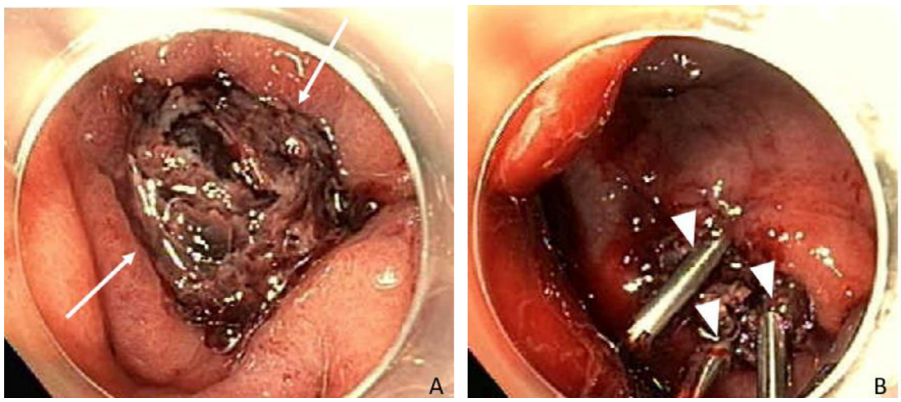

Fig. 4 – Endoscopic image showing a large ulcer with adherent clot (white arrows) in the anterior fundus of the stomach (A). Endoscopic image (B) after placing the clips in the ulcer.

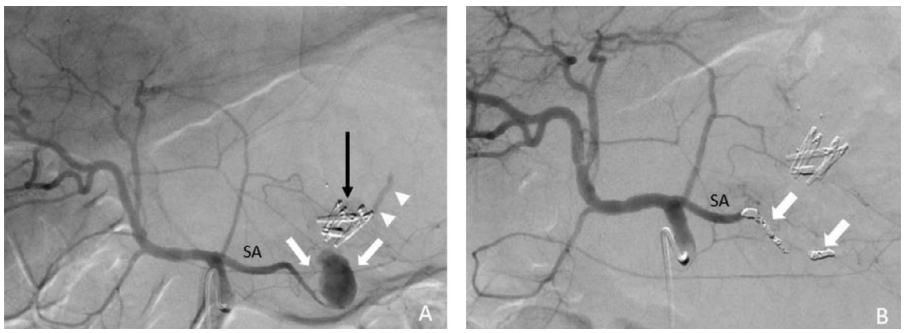

Fig. 5 – Celiac angiogram (A) showing a splenic artery pseudoaneurysm (white arrows) with extravasation into the gastric lumen (white arrow heads) adjacent to the clips (black arrows). Post coil embolization angiogram (B) with the coils distal and proximal to the aneurysm (white arrows). No evidence of the previously seen pseudoaneurysm or extravasation.

disability or other mental disorders [1,10–12]. Majority of the ingested foreign bodies pass spontaneously. However, approximately 10%-20% of cases require endoscopic removal, and less than 1% will need surgery to extract the FB or treat complications form initial ingestion [5–8,13]. Complications arise because retained foreign bodies induce inflammation and reactive fibrosis resulting in mucosal damage, hemorrhage, bowel obstruction, or hollow viscus perforation [14]. Typical offending objects tend to be long and sharp, with common examples including fish or chicken bones, dentures, sewing needles, toothpicks, or other caustic/compressive objects like medications or magnets [15]. There have been very few reports of repeated ingestion of metallic FBs causing metal bezoars and most of them are associated with some form of psychiatric disorder like Pica, as in our case [2,3].

Initial evaluation of a patient with FB ingestion includes a good history (including the timing, type of ingested foreign body, onset of symptoms) and physical exam. An accurate history may be challenging to obtain from people with intellectual disability or in cases of intentional foreign body ingestion for secondary gain, as seen in the prison population. Typical symptoms of FB ingestion include dysphagia, odynophagia, retrosternal pain, retching, and vomiting. Salivary aspiration or tracheal compression from the esophageal foreign body may result in choking, stridor, or dyspnea [6,7,13,16]. Hypersalivation and inability to swallow liquids is concerning for complete esophageal obstruction [5,8,13,17]. Physical examination may also reveal fever, tachycardia, peritonitis, subcutaneous crepitus, swelling of the neck or chest, and wheezing in cases complicated by perforation or respiratory involvement [8,13,16,18].

Radiographic evaluation of the neck, chest and abdomen is the essential next step in confirming the location, size, configuration, and number of ingested objects. Radiographs also may reveal complications like aspiration or hollow viscus rupture as indicated by pulmonary infiltrates, free mediastinal/peritoneal air and/or subcutaneous emphysema [5,8,13,16,19-24]. Although plain radiographs are recommended as the initial screening method, they have false-negative rates as high as 47%, especially for radiolucent foreign bodies, like fish bones [24–26]. CT scans have much higher sensitivity and specificity for evaluating FBs and are preferred when radiographs are negative despite high clinical suspicion for FB ingestion [5,23,27–30]. CT imaging is also useful for identification of hollow viscus perforation or obstruction, which commonly occur at sites of anatomic narrowing like the ileocecal junction, sigmoid colon, and duodenal-jejunal flexure [14,15].

While, conservative management and observation are appropriate for asymptomatic patients with small blunt objects (with the notable exception of multiple magnets), emergent FB extraction is recommended for large and sharp objects due to the high risk of perforation [5–8,13,18,20,31] FBs impacted in the esophagus should be removed within 24 hours as any delay decreases the chances of successful removal and significantly increases the risk of complications like mediastinitis, retropharyngeal abscess, and aorto-esophageal fistula [6–8,13]. Endoscopic FB retrieval is accomplished by a variety of forceps and snares that are advanced through the endoscope.

If endoscopic retrieval is not possible, close clinical observation with daily radiographs are recommended, especially to follow the passage of sharp-pointed objects. Large/sharp FBs that have passed the ligament of Treitz and fail to progress within 3 days after ingestion must be considered for surgery [5–8]. Notably, no description of endoscopic or surgical FB retrieval has yet identified splenic artery rupture or pseudoaneurysm as a post-procedural complication of retrieval.

Splenic artery embolization had been extensively used in traumatic and non-traumatic setting with good clinical outcomes [32–37]. The choice of distal or proximal splenic artery embolization following trauma is often based upon angiographic findings [32,38]. Partial splenic artery embolization has also been effectively used for a wide range of nontraumatic indications, mostly related to improving thrombocytopenia in portal hypertension, idiopathic thrombocytopenic purpura, cancer patients and to decrease transfusion requirements in patients with thalassemia [39].

Splenic artery pseudoaneurysms have been associated with pancreatitis, trauma, iatrogenic and postoperative situations [40]. Due to the high risk of rupture and the high mortality from a ruptured aneurysm, early intervention is recommended [41]. Splenectomy with or without partial pancreatectomy can be performed, however, the mortality and morbidity rates from surgery are 1.3% and 9%, respectively [41]. Minimally invasive endovascular techniques using coils, plugs or particles, are being increasingly used to embolize the pseudoaneurysms of the splenic artery and elsewhere due their low mortality/morbidity and high procedural success rates [41]. Percutaneous thrombin injection under CT guidance has been used to treat pseudoaneurysms in patients who were not candidates for endovascular therapy [42].

In conclusion, there is extensive literature about endoscopic FB extraction, and splenic artery pseudoaneurysm/embolization, however there is no report of a postprocedural splenic artery laceration/pseudoaneurysm formation following endoscopic FB extraction. It is quite possible that a combination of occult damage during prior surgical FB removal plus the repeated trauma/inflammation from subsequent ingestion and endoscopic retrieval of multiple bulky metallic FBs caused this unusual complication. In any case, the unique circumstances leading to this rare complication and its successful endovascular management make this case worthy of report.

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