Duodenal plastic bezoar as a rare cause of acute pancreatitis: case report and literature review

Abstract

Introduction: A Bezoar is defined as a non-digestible foreign body ingested intentionally or accidentally. In 1779 Baudamant published the first case report of a bezoar in a human patient.

Case report: We present a case of a patient in which a plastic bezoar, a toothbrush, was found as the etiologic factor of acute pancreatitis. We describe its management with laparoscopy and literature review.

Discussion and conclusion: Although gastro-duodenal bezoars are rare, it is important to take them into account as a rare yet possible etiology of acute pancreatitis. A laparoscopic approach yields positive results in stable patients with no intestinal obstruction.

Keywords: stomach, foreign body migration, pancreatitis, laparoscopy, toothbrush, plastic bezoar

Abbreviations: TF, textile fibers; HS, hair strings; MDD, major depressive disorder; h, hours; AP, abdominal pain; AXR, abdomen x-ray; EC, endoscopy; L, Laparotomy; LCP, Laparoscopy; GTY, gastrotomy; ETY, enterotomy; SSIs: surgical site Infections; E, eviscerations; ECF, enterocutaneous fistula; IO, intestinal obstruction; DTB, digestive tract bleeding; CT, computed tomography

Introduction

A bezoar is defined as an indigestible foreign body ingested intentionally or accidentally, trapped somewhere inside the digestive tract, usually in the stomach. The first case ever to be reported of a Bezoar in a human patient was published by Baudamant,1 in which a foreign body was incidentally found during an autopsy of a 16-year-old patient. Bezoars are usually classified based on the element that they are composed of; in general, they can be categorized as phytozeboar (vegetables and fruits), trichobezoar (hair), onicobezoar (nails), pharmacobezoar (medicines), lactobezoar (proteins present in milk products) and plastic bezoars, among others. As soon as the diagnosis of a bezoar is made, it must be removed or dissolved, as conservative management can lead to intestinal obstruction, ulcers, bleeding, and, less frequently, acute pancreatitis.2,3 We report a case of a plastic bezoar as the cause of acute pancreatitis, its management via laparoscopy and literature review.1,3

Case report

A 39-year-old woman presented with a clinical picture of 24hours of acute abdominal pain in the mesogastric area that radiated to the dorsal region. Subjective pain severity was 8/10 and was associated with multiple episodes of vomiting. She had a history of two past episodes of mild acute pancreatitis of unclear etiology and a 1 year follow up period the patient did not report new episodes of abdominal pain or ER admissions. During physical examination there had epigastric tenderness without peritoneal irritation or palpable masses. Laboratory results showed a serum amylase of 872U/L, alkaline phosphatase of 277U/L and normal liver function with total bilirubin count at 1.1mg/dL, direct bilirubin of 0.2 mg/dL and indirect bilirubin of 0.9mg/dL, and a CBC showed leukocytosis of 13,540 per mm. She had a HDL of 73mg/dL and LDL of 113mg/dL; total cholesterol was of 150mg/dL and triglycerides of 112mg/dL. Due to the clinical features of the case associated to the laboratory test findings, the patient was diagnosed with mild acute pancreatitis of unknown origin, with a Marshall scale score of 1, and an Acute Physiology and Chronic Health Evaluation Score (APACHE II) of 5. A biliopancreatic endoscopic ultrasound showed a common bile duct of 3mm in diameter with no evidence of CBD stones, pancreatic edema, and a foreign body that corresponded to a toothbrush with compacted bristles in the first and second duodenal portion, with areas of severe erosion (Figure 1). Endoscopic removal was attempted until resistance at the cardia along with high risk of perforation discouraged continuing an endoscopic extraction. The patient was taken to the operating room for surgical extraction through laparoscopy under general anesthesia. The procedure was carried out without complications, with a four-port technique in a French position. An antro corporeal gastrostomy was made using a Harmonic® (Ethicon) ultrasonic dissector. The plastic bezoar was extracted laparoscopically with graspers, inserted into an endobag and extracted through one of the laparoscopic ports (Figure 2). Gastrotorrhaphe was made with laparoscopic suture and intracorporeal continuous single knots, with 3-0 vicryl® polyglactin 3-0 (Ethicon) suture in a single surgical plane (Figure 3). Surgery time was 93minutes with minimal blood loss and the patient had a favorable recovery and was discharged on POD 3. At a 1 year follow up period the patient did not report new episodes of abdominal pain or ER admissions.
Discussion

The word bezoar comes from the Arabic Bāzahr, which means antidote; in the past, bezoars extracted from animals were used in potions against venoms until the nineteenth century. Bezoars of the digestive tract are uncommon, with an incidence that has been decreasing through time; Ahn et al.\(^7\) reported an incidence of 0.43% over a period of seven years, and Mihai et al.\(^5\) an incidence of 0.068% over a period of 20 years.\(^4\) Bezoars are most frequently found in female patients with psychiatric disorders, as in the case of our patient; however, its prevalence varies according to the populations and their cultural practices. For example, in Korea and Japan, phytobezoars predominate.\(^6,7\) The element found in our case report was made out of plastic (toothbrush), which is considered a very infrequent material and only occurs in about 0.1% of cases, since phytobezoars and the trichobezoars are much more frequent in the general population.\(^8\) It is believed that most bezoars originate from an alteration in gastric emptying, and there has been several predisposing factors identified, such as: previous gastric surgery (for example, subtotal gastrectomy), vagotomy, pyloroplasty, peptic disease, Crohn’s disease, gastric cancer, diabetes mellitus, advanced age, dehydration, and hypothyroidism. In general, these conditions lead to decreased gastric pH, gastric stasis, and diminished gastric motility or pyloric stenosis.\(^9\) In the present case, since our patient did not have any of the risk factors mentioned, the bezoar was formed due to its size and dimensions which did not permit its transit through the digestive tract.\(^6,9\) This disease can present with no symptoms and be diagnosed as an incidental finding during a superior digestive tract endoscopy in up to 0.5% of cases. But more frequently, it manifests itself as superior digestive tract hemorrhage, (41.2 to 64.5% of the cases) as reported by Lee et al.\(^10\) Bleeding is followed by intestinal obstruction. In addition, other complications include: perforation, peritonitis, protein-losing enteropathy, acute appendicitis or, as in this case, acute pancreatitis. Our patient developed pancreatitis because the plastic bezoar was located at the distal stomach with its body penetrating through the pylorus, first and second portions of the duodenum simulating a Rapunzel syndrome and generating proximal and distal compression over the ampulla of Vater, obstructing the Wirsung conduct impeding adequate drainage of pancreatic secretion.\(^11\)

The standard treatment consists of chemical or mechanical dissolution and extraction of the bezoar. The use of Coca-Cola\(^\oplus\), 3,000ml or 100ml, every 15 minutes for 12 hours has been reported in the literature with an efficiency of 42 to 91.2% as reported by Chung et al.\(^12\) Papain, water, and cellulose have not shown adequate efficacy in the management of bezoars.\(^10,12\) For the extraction and fragmentation of the bezoar, endoscopy can be used with the help of different devices, such as biopsy forceps, crocodile forceps, polypectomy forceps, baskets, argon plasma coagulator, lithotripter, electrosurgical endoscopic scalpel, or, as reported by Kurt et al.\(^13\) an oval poly-filament endoscopy specifically designed for the management of bezoars.\(^12,14\) However, these procedures are only effective with phytobezoars. Because of their high density, trichobezoars and the plastic bezoars are resistant to fragmentation and enzymatic degradation as demonstrated by Frohna et al.\(^15\) with a success rate of only 0.5%.\(^11\) Surgical management should always be considered. If medical therapy and endoscopic removal fail, surgical extraction of the bezoar is required. This can be carried out via an open or laparoscopic approach, depending on the clinical condition of the patient and the size of the bezoar, as reported by Diefenbach et al.\(^16\) in a retrospective and descriptive study of seven patients, of which five required laparotomy.\(^15,17,18\)

The first laparoscopic extraction of a gastric bezoar was reported by Nirasawa in 1998. In a retrospective study, Yau et al.\(^13\) showed that the laparoscopic approach had a lower rate of local complications, less postoperative pain, fewer operative site infections, less recovery and hospitalization time, better esthetic results, and a similar surgical time when compared to laparotomy.\(^16,18\) Dorn et al.\(^19\) described a laparoscopic technique, in which an intragastric port is placed to remove the bezoar in small pieces in order to minimize the risk of contamination of the peritoneal cavity; however, with this technique, surgical time was prolonged up to an additional six hours.\(^16\) The approach we chose...
for our patient was based on the technique described by Kohler et al.\textsuperscript{20}, in which an anterior gastrotomy was performed and the bezoar was extracted using an endobag; although with this method there has been reported an increased risk of contamination of the abdominal cavity, in our case there were no complications; the surgical time was short, and the esthetic results were acceptable.\textsuperscript{16,18,19} Other therapeutic alternatives for the management of bezoars have been described, such as medications that increase intestinal motility (prokinetics such as ipopride, mosapride, and metoclopramide) so that the bezoar can be broken and ejected. In the case of asymptomatic patients, a conservative approach with constant follow up of the patient until achieving spontaneous expulsion of the bezoar is a rational alternative.

But in our case, due to the physical characteristics of the foreign body (size and consistency of the bezoar) in a symptomatic patient, a surgical approach was the best choice.\textsuperscript{20-22} In the series of cases consulted, as shown on Table 1, the average age for the diagnosis of bezoar was of 49.4 years (10 years older than the patient in our case) and the masculine gender predominated (Contrary to what is reported in the world medical literature). In most cases, patients consulted because of intestinal obstruction and abdominal pain (similar to what we found in our case). Conservative management showed to be ineffective in almost every scenario; reason why surgical extraction became necessary which is also similar to our experience.\textsuperscript{2,4,20,21,24}

### Table 1 Cases reported

<table>
<thead>
<tr>
<th>Author, et al.</th>
<th>Patients</th>
<th>Age</th>
<th>Gender</th>
<th>History</th>
<th>Symptoms</th>
<th>Clinical findings</th>
<th>Labs and images</th>
<th>Management</th>
<th>Composition of the bezoar</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ortiz-Soto et al.\textsuperscript{21}</td>
<td>1</td>
<td>15</td>
<td>F</td>
<td>TF and HS ingestion MDD</td>
<td>24h. of AP and vomit</td>
<td>Palpable mass</td>
<td>AXR: gastric mass</td>
<td>Lap. GTY.</td>
<td>HS and TF</td>
<td>Abdominal wall abscess</td>
</tr>
<tr>
<td>Zhang et al.\textsuperscript{1}</td>
<td>1</td>
<td>47</td>
<td>M</td>
<td>1 year of acid regurgitation.</td>
<td>Palpable mass</td>
<td></td>
<td></td>
<td></td>
<td>Tannin and cellulose</td>
<td>None</td>
</tr>
<tr>
<td>Kohler et al.\textsuperscript{20}</td>
<td>1</td>
<td>16</td>
<td>M</td>
<td>1 week AP</td>
<td>Abdominal tenderness</td>
<td></td>
<td></td>
<td></td>
<td>Hair strings and fruit</td>
<td>None</td>
</tr>
<tr>
<td>Campos RR\textsuperscript{4}</td>
<td>60</td>
<td></td>
<td></td>
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#### Abbreviations: TF: textile fibers; HS: hair strings; MDD: major depressive disorder; h: hours; AP: abdominal pain; AXR: abdomen x-ray; EC: endoscopy; L: Laparotomy; LCP: Laparoscopy; GTY: gastrostomy; ETY: enterotomy; SSIs: surgical site Infections; E: eviscerations; ECF: enterocutaneous fistula; IO: intestinal obstruction; DTB: digestive tract bleeding; CT: computed tomography

### Conclusion

Although gastro-duodenal bezoars are rare and plastic bezoars even more, it is important to take them into account as a possible cause of acute pancreatitis. A well-constructed medical anamnesis allows the physician to diagnose quicker and the appropriate treatment for each patient. When patients become surgical, the authors recommend a laparoscopic approach keeping in mind patient stability and presence or absence of intestinal obstruction; cases in which an open laparotomy should be preferred.

### Acknowledgements

None.

### Conflict of interest

The authors declare no conflict of interest.

### References

6. Altintoprak F, Degirmenci B, Dikicier E, et al. CT findings of patients

### Citation

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