A report of 15 cases of small-bowel obstruction secondary to phytobezoars: Predisposing factors and diagnostic difficulties

Les occlusions intestinales aiguës sur phytobézoards : facteurs favorisants et difficultés diagnostiques : à propos de 15 cas


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Available online 19 May 2008

Summary Phytobezoars are a rare cause of acute bowel obstruction. The purpose of this work was to identify the predisposing factors and diagnostic difficulties of this rare entity.

Material and methods. — This was a retrospective study including all cases of small-bowel obstruction secondary to phytobezoars observed between April 2001 and August 2007. The diagnosis of bezoars was established by surgical exploration or by computed tomography (CT).

Results. — During the study period, 375 patients were hospitalized at our institution with a diagnosis of bowel obstruction that, in 15 (4%) cases, was secondary to phytobezoars. The average patient age was 55 years, with a gender ratio of 1.7, favoring men. The predisposing factors were gastroduodenal surgery for peptic ulcer in nine patients, and excessive consumption of prickly pears (cactus figs) in 12. The diagnosis was established by CT scans in three patients, who were successfully treated with gastric aspiration, thereby avoiding surgery. Laparotomy was performed in 12 patients to allow digital fragmentation of the bezoar, which was then washed into the colon. There were no postoperative deaths and morbidity was about 13%.

Conclusion. — An abdominal CT scan should be obtained for patients with small-bowel obstruction. This examination offers a precise diagnosis of bezoars, reducing the number of unnecessary surgical procedures, and helping to guide the approach if surgery is needed.

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doi:10.1016/j.gcb.2008.01.045
Small-bowel obstruction secondary to phytobezoars

Introduction

Phytobezoars are a rare cause of acute bowel obstruction that often go unrecognized before surgery due to the absence of specific signs either clinically or radiographically (plain X-rays). Multifactorial mechanisms are involved. While fibrotic scars are a predominant cause of bowel obstruction in patients with a past history of abdominal surgery, bezoars are a likely cause in patients free of abdominal scars. In this context, emergency computed tomography (CT) of the abdomen can help to rule out an organic cause of intestinal stenosis. The size and location of a phytobezoar can also be identified, which can then serve as a guide for the therapeutic strategy. The purpose of this research was to identify factors predisposing to the formation of phytobezoars and to highlight the diagnostic pitfalls of this rare clinical entity.

Material and methods

This is a retrospective report of all cases of acute bowel obstruction involving a bezoar seen at our institution between April 2001 and August 2007. The diagnosis of bowel obstruction was established on the basis of clinical presentation (abdominal pain, vomiting, absence of bowel movement, abdominal distention) and plain X-ray findings (air-fluid levels in the small-bowel). The diagnosis of a bezoar was confirmed either by intraoperative findings or on CT scans, showing an oval-shaped endoluminal mass, with no contrast uptake, lying between distended and collapsed intestinal loops. Cases of colonic obstruction that were not due to a bezoar were not retained for analysis.

The variables studied included the calendar period of the acute episode, patient age and gender, history of abdominal (particularly gastrointestinal) surgery, dental status, culinary habits during the days preceding hospitalization, results of abdominal examination, results of laboratory tests and the therapeutic interventions initiated.

Results

We identified 375 cases of acute small-bowel obstruction managed during the study period. Among these cases, 15 (4%) involved phytobezoars. The mean age of the patients with bezoar obstruction was 55 (range: 23—80) years. Nine of the 15 patients were under age 60, and male gender predominated (ratio = 1.7). Ten patients had a midline laparotomy scar: one had undergone abdominal surgery for a phytobezoar; four, for peritonitis subsequent to a duodenal ulcer treated by vagotomy with Judd pyloroplasty and five, for ulcerated stenosis of the bulb treated by vagotomy with gastroenterostomy. The obstruction occurred in the summer for 11 patients (6%), and in the fall for the remainder (31%). The patient’s history revealed that eight of the patients had recently eaten prickly pears (cactus figs), four within days prior to the acute obstruction.

Clinically, the mean elapsed time from symptom onset to consultation was two (range: 1—4) days. Physical examination identified signs of acute obstruction in two patients who presented fecaloid vomiting, fever and abdominal tenderness requiring emergency surgery. For 13 of the patients, the physical examination was not alarming. These patients were free of fever and presented with no signs of abdominal (peritoneal) suffering. Gastric aspiration collected bilious fluid. Dental status was noted as “very poor” in three patients (aged 69, 75 and 82 years, respectively). Blood tests disclosed functional renal failure in one case, and high white cell counts in two patients, who underwent emergency surgery.

Four of the 13 patients whose clinical presentation was not considered alarming had complementary explorations. One had a small-bowel study using a water-soluble contrast agent; this revealed significant distention of the first
jejunal loop upstream of an endoluminal jejunal defect, measuring 5 cm, which was interpreted as a probable bezoar. The three others had an abdominal CT scan, which identified a small-bowel obstacle between distended and collapsed loops that was identified as a bezoar (Figs. 1 and 2).

Two patients required emergency surgery after a brief stay in intensive care. Fluid-electrolyte infusions and gastric aspiration was sufficient to stabilize the 13 other patients, 10 of whom then underwent surgery when their clinical and radiographic presentations failed to improve sufficiently within 12—48 h (average: 24 h). Bowel movements reappeared in three patients within 48 h, with resolution of the air-fluid levels seen on plain X-rays. The presence of a bezoar was confirmed on the CT scans of these three patients.

Preoperatively, the diagnosis was intestinal obstruction due to bezoar impaction in only one patient (the patient who had undergone the small-bowel study with water-soluble contrast). For the 11 others who underwent surgery, the preoperative diagnosis was adhesive small-bowel obstruction because of a past history of laparotomy in 10 of them.

A midline laparotomy was performed in the 12 surgical patients. According to the operative findings, and the CT results in the non-operated-on patients, the phytozoar was located in the terminal ileum in 13 cases, and in the jejunum in two. In four patients, an anatomical lesion favored the formation of the bezoar, which was located just upstream of an adhesive band in three patients, and within a loop-fold in the fourth case. In all of the surgical patients, the bezoar was friable and fragmented easily with digital manipulation, and an antegrade washout flushed the debris into the colon. Enterotomy was not necessary in any of the patients, and there were no postoperative deaths. Two patients, however, developed pulmonary congestion as a postoperative complication, which resolved with antibiotics and physical therapy. The mean hospital stay was 4.5 days, and patients were counseled regarding oral hygiene and dietary habits before discharge. At the mean follow-up of 28 months, all of the patients remained free of bezoar recurrence.

Discussion

Bezoar is a word from the Persian Farsi language and refers to concretions found in the alimentary tract of various ruminants (goats, antelopes) [1]. In 1854, Quain reported an autopsy describing an intragastric alimentary mass he called a "bezoar" [1]. The development of intestinal phytozoars is a multifactorial process, involving anatomical, dietary and alimentary factors.

Several predisposing factors have been reported. One is gastric motility disorder, secondary to vagotomy, which accelerates gastric emptying and decreases gastric acid secretions, leading to more viscous stomach contents. In addition, gastrectomy and gastroenterostomy both allow the passage of large-diameter solid matter from the stomach into the small intestine [2—6]. In our series, this was a predominating factor as two-thirds of the patients had had a vagotomy, and half had undergone a gastroenterostomy. A similar preponderance was also found in a series of 34 cases reported by Erzurumlu et al. [7]. Other dietary factors include an excessive consumption of persimmons [5,6,8], citrus fruits, mangos [9], bananas [9] and, particularly in the summer in Tunisia, prickly pears. Prickly pears, which are also called "cactus figs", are rich in grains that can accumulate in the small-bowel, forming an obstructive mass in the intestinal lumen. In addition, for breakfast in Tunisia, many people have a staple, or even exclusive, diet of figs, the second type of fruit incriminated as a cause of intestinal obstruction. Ingestion of large quantities of the entire fruit, including the pulp, can lead to adherence of viscous fragments of the fruit to the intestinal mucosa, with subsequent accumulation leading to the formation of an obstruction. This problem was recognized in ancient times, as our ancestors recommended dipping figs in a bowl...
of olive oil before ingestion, which would probably have prevented the fruit from sticking to the intestinal wall. These two fruits were incriminated in at least 80% of the bezoar obstructions observed in our series.

Other predisposing factors include eating habits such as insufficient mastication or poor dental health, as reported in other series [4,9] and observed in three of our patients, and diabetic gastroparesis, hypothyroidism [4,6], atrophic myotonia [6], kidney failure and drugs that affect gastric motility (anticholinergic, adrenergic and antiser secretory agents) [6,11].

Epidemiological data show that 2−3% of small-bowel obstructions are caused by bezoars. This proportion was 4% in our series. The proportion is low because of the difficulty of establishing the diagnosis, particularly in patients with a laparotomy scar for whom an adhesive band would be the predominant etiology. Most of the published series have emphasized the typical diagnostic triad of physical examination, plain X-ray of the abdomen and small-bowel study. This triad can, however, provide the diagnosis preoperatively in only 10% of cases [12−14].

At present, an emergency CT scan contributes the most to a diagnosis of small-bowel obstruction. It enables confirmation of the diagnosis of obstruction, localization of the obstacle and its mechanism and, most important, the therapeutic approach to take because of the nature of obstruction (for example, a phytobezoar) [10,12,15,16]. A well-delineated, oval-shaped mass lying within the lumen, with a mixed density and sometimes containing air, and which fails to take up an iodine contrast is considered pathognomonic of a bezoar [12,17]. An abdominal CT scan was obtained in three patients in our series and enabled a positive diagnosis of bezoar obstruction in all three. Analysis of the scans also enables an assessment of bowel ischemia, and identification of the exact location of the obstacle for guiding any therapeutic decision-making and the choice of surgical approach.

The purpose of treatment is to empty the intestinal lumen, treat the complications and avoid its recurrence. If the clinical situation allows, medical treatment should always be attempted first. Enzymatic dissolution using cellulose has been proposed, but the results are controversial [4,5]. The clinical symptoms improved with medical treatment in three patients in our series after a positive diagnosis by CT. On reviewing the charts of these three patients, we noted that we had delayed surgery, prolonging their intensive-care phase after the diagnosis had been established. As for the other patients who had abdominal scars, the fear of intestinal necrosis due to an adhesive band led to our invasive approach. We can, thus, conclude that, if a CT scan had been performed in all cases, the medical-care phase may have been successfully prolonged for a few more hours, thereby avoiding surgery in a large number of patients.

In terms of surgical approach, laparoscopy can reduce the risk of the complications seen with open surgery [3,6], and shorten the hospital stay [6]. This approach can, however, be difficult if the small-bowel distention is particularly pronounced or if the intestinal wall is frail, emphasizing the importance of rigorous patient selection for laparoscopy. In such a situation, the CT scan is especially useful for evaluating the lesion and orienting the surgical approach. Laparoscopy was not used in our series as two patients presented major small-bowel distention with signs of ischemia, and 10 others had a past history of midline laparotomy, thus compromising this operative approach.

For most patients, the phytobezoar was easily fragmented and successfully pushed into the cecum by antegrade washout [5]. An enterotomy is indicated only if the bezoar cannot be fragmented and mobilized [5,6]. Bowel resection is rarely indicated and should be reserved for cases of intestinal necrosis or if the bezoar is intimately encrusted within the intestinal wall [6].

Conclusion

Intestinal obstruction due to a phytobezoar is an unusual diagnosis that may be difficult to establish preoperatively. An abdominal CT scan should be obtained whenever possible for all patients with bowel obstruction to establish the diagnosis and avoid unnecessary surgery, and to guide the surgical approach if required. The best treatment for a bezoar is prevention, based on good eating habits and oral hygiene, particularly in subjects with a history of gastroduodenal surgery.

References


