

Case Analysis

Clinical Spectrum and Treatment of Bezoars in Adults: Experience of 20 Cases in a Single Institute

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Key Words

Bezoar;
Intestinal obstruction;
Laparotomy;
Phytobezoar;
Trichobezoar

Purpose. Bezoars within the intestinal tract are the uncommon result of ingestion of poorly digestible or indigestible substances. The purpose of this study was to analyze the 20 cases' experience of adult gastrointestinal bezoars in our hospital and to assess their clinical entity, diagnostic methods, and treatment strategies.

Methods. After searching the medical database of our institute, records of all patients with the discharge diagnosis of bezoars, including phytobezoars and trichobezoars of the gut, were collected and evaluated.

Results. Nineteen patients had phytobezoars and one patient was diagnosed as having a trichobezoar. In most (17 of 20) patients, bezoars were found in only one site, two patients had bezoars in two sites and one in three sites. Most patients (16 of 20) had a single bezoar, including the one patient with trichobezoar, and the other four patients (20%) had more than two bezoars. Seven patients (35%) had previous abdominal operations. Five patients were treated endoscopically and 15 patients were treated surgically. Two postoperative complications with abdominal wound infection were noted.

Conclusions. Bezoars are increasingly recognized as a cause of intestinal obstruction. A thorough understanding of bezoars can allow clinicians to be especially alert when dealing with patients showing signs of intestinal obstruction, allowing diagnosis of such a condition at an early stage, followed by appropriate treatment.

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Bezoars are uncommon in adults. They are retained concretions of animal or vegetable material in the intestinal tract.¹ Historically, bezoars have been classified according to the material involved and include phytobezoars (fruit and vegetable fibers), trichobezoars (balls of ingested hair), lactobezoars (milk curds) and lithobezoars (stones). Bezoars secondary to other substances have also been described.² Altered gastric physiology, with impaired gastric emptying and/or reduced acid production, is usually the cause of

bezoars. This is usually related to previous gastric operations, such as vagotomy or partial gastrectomy, but may be caused by gastroparesis or gastric outlet obstruction.³ Furthermore, poor mastication and ingestion of indigestible solids may precipitate bezoar formation. Therefore, most bezoars occur in the stomach, but they may be encountered elsewhere, including the rectum and even the esophagus.⁴

The most common bezoars are phytobezoars, which are composed of plant material (1, 4). Trichobezoars

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are very uncommon and occur mainly in children with mental retardation and in psychiatric patients.³⁻⁶ The most common presenting symptoms are abdominal distension and colicky pain. Nausea, vomiting, diarrhea and constipation are other clinical findings. Although endoscopy, gastrointestinal barium study, and computed topography (CT) scan can help preoperative diagnosis, some patients are diagnosed during emergent operations. The treatment of bezoars can be either conservative or surgical. We present our experience with bezoars in adults over the past 16 years, and discuss their manifestations and treatment.

Methods

Records for 37 patients diagnosed with bezoars at the Tri-Service General Hospital from July 1990 to July 2006 were reviewed retrospectively. Data for 20 patients (54%) older than 18 years of age were gathered from patients' charts and operation notes. Details concerning the presenting symptoms and signs, the type and locations of bezoars, the types of treatment, and postoperative complications were analyzed.

Results

Clinical features

During the 16-year period, 20 adult patients with a surgically or endoscopically definitive diagnosis of bezoars were identified. The patient demographic data, clinical symptoms and types of management are summarized in Table 1. There were 15 men and 5 women, with a mean age of 51.8 years (range 18-86 years). Seven patients (35%) had prior abdominal surgery, three of them for perforated gastric cancer, one for gastric ulcer with pyloric stenosis, one for perforated duodenal ulcer, one for duodenal ulcer with massive bleeding, and one for appendectomy.

The most common symptom was intermittent abdominal cramping pain, seen in 18 patients (90%). Three patients (17%) had a positive peritoneal sign. Abdominal distension, nausea, vomiting, diarrhea and constipation were other common findings at the time of presentation. A palpable mass on physical exami-

nation was uncommon, and was found in only three patients (15%).

Patients were divided into three categories based on the duration of one or more above-mentioned symptoms: acute (< 4 days), subacute (4-14 days) and chronic (> 14 days). Nine patients (45%) had acute symptoms, 11 patients (55%) had subacute symptoms and no patients had chronic symptoms. The mean duration of symptoms was 4.35 days (range 1-10 days).

Three patients (15%) were admitted with acute peritonitis, and another two patients (10%) were suspected preoperatively to have mechanical intestinal obstruction. These five patients (25%) underwent immediate surgery with an intraoperative diagnosis of a bezoar with intestinal obstruction.

Preoperative diagnostic studies

All patients had abdominal X-rays, 13 patients (65%) had abdominal and pelvic computed tomography (CT) scans, five patients (25%) had an abdominal sonography, five patients (25%) had a panendoscopy, two patients (10%) had a colonoscopy, two patients (10%) had a small bowel barium study, and one patient (5%) had a barium enema (Table 2).

The diagnosis of a bezoar was made preoperatively in 15 patients (75%). This was based on CT findings in 11 patients (55%); two patients (10%) were diagnosed by abdominal sonography, one patient (5%) by barium enema and one patient (5%) by small bowel barium study. The remaining five patients (25%) were diagnosed on exploratory laparotomy; three of them for acute peritonitis, two of them for suspected mechanical obstruction.

The CT scan was the most accurate preoperative study, showing mottled-appearing bezoars (Fig. 1) in 11 of 13 patients (85%) in this series.

Etiologies, locations and treatment

Nineteen patients (95%) were shown to have phytobezoars and one (5%) had a trichobezoar; these were determined by endoscopic or surgical techniques. In five patients, an urgent laparotomy was performed based only on abdominal x-ray and physical examinations.

Most of the patients (17 of 20) had bezoars in only one site (seven in ileum, five in stomach, four in jeju-

num, and one in rectosigmoid colon); two patients had bezoars in two sites (one in stomach and jejunum, and one in stomach and ileum) and one in three sites (il-

eum, ascending and transverse colon). Most patients (16 of 20) had a single bezoar, including the patient with trichobezoar, and the other four patients (20%)

Table 1. Clinical data of 20 adult patients with bezoars

Age	Sex	Symptoms	Duration (days)	Location	Entity	Size	Past history	Treatment
71	M	Abdominal pain	2	Stomach	phyobezoar	2 cm	Perforated gastric ulcer s/p op	Extraction by a snare
18	M	N/V, abdominal distention	6	Stomach	phyobezoars	Multiple, Max: 4 cm	Constipation, uremia	Extraction by a snare
68	M	N/V, abdominal distention and pain, constipation	6	Stomach	phyobezoars	Multiple, Max: 3 cm	Gastric ulcer with pyloric stenosis s/p op	Extraction by a stone basket
21	M	Abdominal pain	4	Stomach	phyobezoar	4 cm	Gastric ulcer	Fragmentation by a biopsy forceps
51	M	Abdominal distention, LLQ mass, pain, diarrhea, tenesmus	4	Rectosigmoid colon	phyobezoar	6 cm	No	Fragmentation with a snare and biopsy forceps under colonoscopy
47	M	N/V, abdominal distention and pain, constipation	2	Ileum	phyobezoar	5 cm	Perforated gastric ulcer s/p op	Ileotomy with extraction of bezoar
74	F	N/V, abdominal distention and pain, diarrhea	2	Ileum, ascending and transverse colon	Phytobezoar	4 cm	Appendectomy	Ileotomy with extraction of bezoar
50	F	Abdominal pain and mass	1	Stomach, ileum	phyobezoars	10 cm, 4 cm	Gastric ulcer	Ileotomy with extraction of bezoar
70	M	Abdominal pain and distention	3	Ileum	phyobezoar	4 cm	No	Ileotomy with extraction of bezoar
49	F	Abdominal distention and pain	3	Ileum	phyobezoar	5 cm	No	Ileotomy with extraction of bezoar
50	F	Abdominal pain and distention	7	Jejunum	phyobezoar	8 cm	Duodenal ulcer	Ileotomy with extraction of bezoar
48	M	Abdominal pain and distention, diarrhea	2	Ileum	phyobezoar	7 cm	DM, hypertension	Ileotomy with extraction of bezoar
19	M	N/V, abdominal distention and pain, diarrhea	5	Terminal ileum	Trichobezoar	4 cm	Depressive disorder	Ileotomy with extraction of bezoar
42	M	Abdominal pain	3	Ileum	Phyobezoar	5 cm	Perforated gastric ulcer s/p op	Ileotomy with extraction of bezoar and introperative colonoscopy irrigation
68	F	Abdominal distention and pain	3	Jejunum	phyobezoar	9 cm	No	Jejunotomy with extraction of bezoar
48	M	Abdominal pain and distention	5	Jejunum	phyobezoar	9 cm	No	Jejunostomy with extraction of bezoar
69	M	N/V, abdominal distention and pain	7	Jejunum	phyobezoar	6 cm	No	Jejunostomy with extraction of bezoar
33	M	N/V, abdominal distention, pain and mass	7	Stomach, Jejunum	phyobezoar	Multiple, Max: 9 cm	Perforated duodenal ulcer s/p op	Jejunotomy with extraction of bezoar
54	M	N/V, abdominal distention	10	Stomach	phyobezoar	5 cm	No	Gastrotomy with extraction of bezoar
86	M	N/V, abdominal distention and pain	4	Terminal ileum	Phyobezoar	4 cm	Duodenal ulcer with bleeding s/p op	Laparotomy with milking of bezoar into the colon

N/V: nausea/vomiting; s/p op: status-post operation.

Table 2. Preoperative diagnostic studies

Procedure	No. of patients (n)	Percentage (%)	Accuracy (%)
Plain film of abdomen	20	100	*
Abdominal CT scan	13	65	84.6
Abdominal ultrasonography	5	25	40
Panendoscopy	5	25	80
Colonoscopy	2	1	50
Small bowel barium study	2	1	50
Barium enema	1	1	100

*No specific findings for a definitive diagnosis.

had more than two bezoars. The mean size of the bezoars was 6.1 cm (range 2-10 cm): the largest bezoar was found within the stomach.

Five patients (25%) were treated only by endoscopy with fragmentation by a snare extractor, a biopsy forceps and a stone basket. All the remaining patients underwent laparotomy, including milking the phytobezoar into the cecum if it was in the distal ileum. Either gastrotomy or enterotomy with removal of an obstructed bezoar was performed in 14 patients (70%).

Surgical complications included surgical wound infections in two patients, which were treated successfully. No operative death was noted.

Discussion

Phytobezoars are the most common type of

bezoar. They often form within the stomach in patients with predisposing factors such as previous gastric surgery, inadequate chewing, diabetic or aging-related gastroparesis in elderly, and an excessive vegetarian diet.⁷⁻⁹ According to the literature, persimmon is the most common cause of phytobezoars in certain parts of the world, especially Korea and Israel.^{3,10} Persimmon bezoars form due to the presence of shibuol, a tannin in the unripe fruit that forms a sticky coagulum entrapping the pulp and seeds when exposed to gastric acid.¹¹ Eight of our patients had a history of a relatively high vegetarian diet, but no persimmon. Seven of our patients had previous abdominal surgery and six of these had surgery for peptic ulcer. Most reports indicate a higher incidence of phytobezoars in males, as was observed in our series, but do not suggest an appropriate explanation for this.^{3,9,10}

Trichobezoars are the second most common bezoars, and occur principally in adolescent girls with long hair and emotional disturbance associated with trichophagia.^{9,11} The "Rapunzel syndrome" is an extreme example of trichobezoar formation, originally described by Vaughan et al. in 1968.¹² It refers to unusually long hairballs that extend from the stomach into the jejunum or ileum, and occasionally into the colon.¹³

The clinical manifestations of bezoars depend on the degree of gastric irritation and the development of complications such as ulceration or obstruction.^{8-9,14-15}

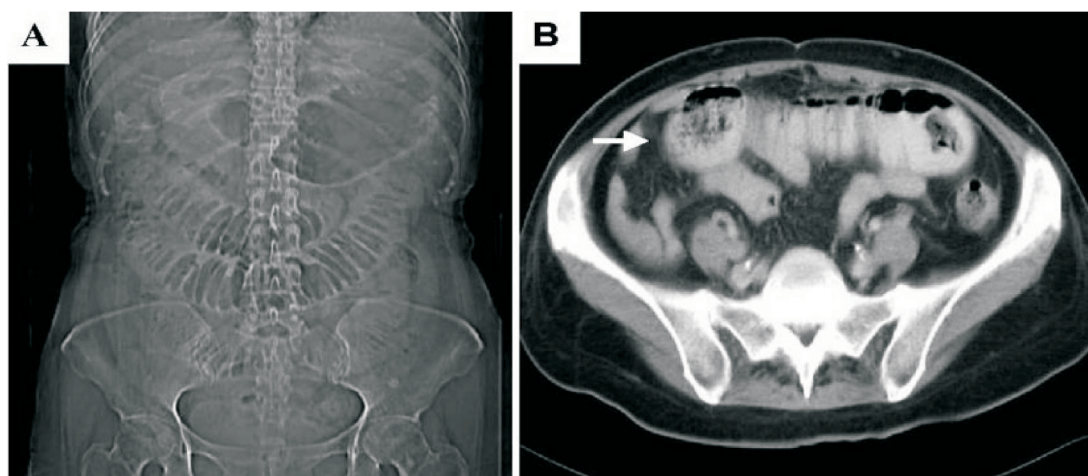


Fig. 1. A. The plain film of the abdomen revealed generalized ileus, fecal material retention in the course of small intestine and severe gastric distention. B. The CT scan of pelvis showed a well-defined, mottled mass (arrow) about 5 cm in diameter, impacted at the terminal ileum, which caused dilatation of proximal small intestine.

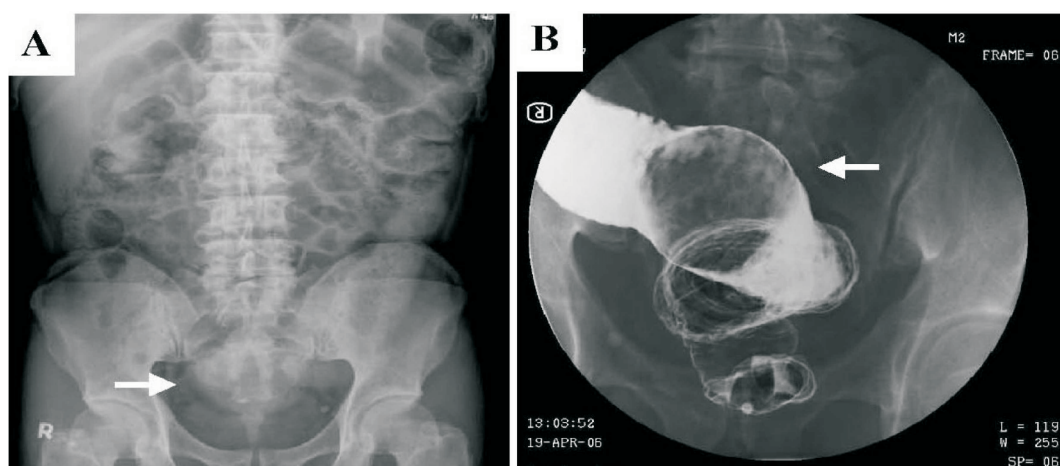


Fig. 2. A. The plain film of abdomen revealed generalized ileus, fecal material retention in the course of colon and increased pelvic density (arrow). B. The barium enema revealed a large filling defect (arrow), about six cm in diame-

Most of our patients (90%) presented with abdominal pain, and the most common constant finding on examination was tenderness. Nausea, vomiting and abdominal distension are other common symptoms in our series. Following fragmentation of a gastric bezoar and its migration into the small bowel, it may become impacted, leading to mechanical obstruction. Some series have reported that phytobezoars are responsible for 0.3% to 6% of all intestinal obstruction.^{10,14,16}

Gastric phytobezoar can often be managed without an operation. Nonsurgical treatment of bezoars is usually based on endoscopic procedures with the use of overtubes, baskets, lithotriptic equipment, paraffin, cellulose, acetylcysteine,¹⁷ Coca-Cola lavage,¹⁸ and even lasers.¹⁹ The newly reported methods, such as acetylcysteine and Coca-Cola lavage, should be attempted when removal with a snare or a stone basket or even using streams of water during gastroscopy fails.

Surgical gastrotomy is usually reserved for patients with large phytobezoars or those that are symptomatic. Small bowel phytobezoars are treated surgically if obstruction supervenes. Surgical treatment is via laparotomy or laparoscopy under general anesthesia with enterotomy or milking when bezoars are located in the distal ileum. A phytobezoar in the terminal ileum can be treated by milking and advancing into the colon at laparotomy and then being passed, as occurred for one of our patients. However, if this fails, enterotomy and extraction are necessary. Trichobezoars are usually found in the stomach, are difficult

to treat, and should always be managed surgically, as conservative methods are of little use.^{11,14}

As most of the laparotomies performed on our patients were actually exploratory, it is possible that upper gastrointestinal endoscopy, gastrointestinal barium study or abdominal CT scan could have been diagnostic before operation. However, exploratory laparotomy was often performed because of clinical and radiological evidence of intestinal obstruction. In our series, five patients were treated endoscopically and 15 patients were treated surgically, including one patient with a trichobezoar.

Multiple phytobezoars are common, so examination of the stomach and the entire small and large intestine is required. Preoperative endoscopy is valuable in cases of small bowel obstruction to identify unsuspected gastric or duodenal phytobezoars that may be missed upon palpation at laparotomy, especially when there has been previous gastric surgery.²⁰ Phytobezoars in the large bowel are uncommon, and are usually located in the rectosigmoid colon. Most of these could be removed by transanal enema, digital disimpaction or endoscopic extraction.²¹

Two unusual cases of bezoars, one involving a trichobezoar in the terminal ileum and the other a large seed phytobezoar in the rectosigmoid colon, were noted in our series. Trichobezoars are uncommon in general and usually present in the stomach of patients with a psychiatric history or mental retardation. Our patient had a history of depressive disorder

for five years. Laparotomy with ileotomy and removal of the trichobezoar was performed because it was firm and could not be manually fragmented during the operation. Another interesting case was a 51-year-old man with a large seed phytobezoar in the rectosigmoid colon (Fig. 2). Although Arie reported that 30 patients with seed bezoars impacted in the rectum were successfully treated with distal impaction and enema,²¹ this method was not successful in our patient because the bezoar was too high to be reached manually. Retroflexed colonoscopy was performed to immobilize the bezoar, making a tunnel, and it was partially fragmented with biopsy forceps, followed by piece-by-piece fragmentation with repetitive use of snare forceps. We believe this technique can be easily performed and can be useful in fragmenting any phytobezoars located in the colon that are accessible through colonoscopy, thus avoiding colotomy. However, we need more experience to confirm the efficacy of this method.

Conclusions

Diagnosis of a bezoar in an adult should always be considered in cases of gastrointestinal obstruction, especially in patients with a history of previous gastric operation. The possibility of trichobezoars should always be considered in psychiatric and developmentally disabled patients with such symptoms. Our series shows that, with careful history-taking and radiological examinations, most uncomplicated cases of bezoar could be treated successfully by endoscopic or surgical methods.

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病例分析

成人腸胃道結石的臨床特性與治療： 單一醫院 20 位病例的經驗

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目的 腸胃道結石是少見因攝食不易消化的物質所造成的結果。本篇報告統計分析三軍總醫院 20 位診斷為腸胃道結石的成人病患，並探討其臨床特性、診斷方式與治療方法。

方法 我們從十六年的病歷資料庫中搜尋出三十七位診斷為腸胃道結石的病患。其中二十位病患是年滿十八歲的成人病患。我們統計這二十病患的年齡、性別、臨床徵候、影像特性、結石位置、治療方式及手術情形，然後做進一步的分析與討論。

結果 這二十位病患中，七位有曾經接受腹部手術的病史。十九位病患是纖維結石，另一位則是毛髮結石。在大多數的病患（十七位），腸胃道結石只發生在一處；另有兩位病人有二處；而其餘一位病患則有三處發現有腸胃道結石。此外，大多數的病患（十六位），腸胃道結石只有一個，包括一位毛髮結石；其餘四位病患則有兩個以上的結石。十五位病患接受手術治療，而其餘五位病患則接受內視鏡治療。在十五位病患接受手術治療中，有兩位有術後腹部傷口感染的情況。

結論 成人腸胃道結石雖然少見，卻是造成腸阻塞必須排除的原因之一。我們統計本院十六年，計二十位病患的病歷資料，藉由分析此資料讓我們能夠進一步了解成人腸胃道結石的臨床特性及徵候，以利早期診斷及治療。

關鍵詞 腸胃道結石、腸阻塞、剖腹術、纖維結石、毛髮結石。