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• *BRIEF REPORTS* •

Gastrointestinal bezoars: A retrospective analysis of 34 cases

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Abstract

AIM: Bezoars (BZ) are the most common foreign bodies of gastrointestinal tract. Clinical manifestations vary depending on the location of BZ from no symptoms to acute abdominal syndrome. When located in small bowel, they frequently cause small bowel obstruction (SBO). We aimed to present our experience by reviewing literature.

METHODS: Thirty-four patients with gastrointestinal BZ were presented. The data were collected from hospital records and analyzed retrospectively. Morbidity and mortality rates were statistically analyzed between the subgroups according to SBO and endoscopic or surgical treatment modalities.

RESULTS: The 34 patients had phytobezoars (PBZ). Two patients with mental retardation and trichotillomania had trichobezoars (TBZ). More than half of them (55.88%) had previous gastric surgery. Also most of them had small bowel bezoars resulting in obstruction. Surgical and endoscopic morbidity rates were 32.14% and 14.28% respectively. The total morbidity rate of this study was 29.41%. Four patients in surgically treated group died. There was no death in endoscopically treated group. The total and surgical mortality rates were 11.76% and 14.28% respectively. The differences in morbidity and mortality rates between the subgroups were not statistically significant.

CONCLUSION: BZ are commonly seen in stomach and small intestine. SBO is the most common complication. When uncomplicated, endoscopic or surgical removal can be applied easily.

Key words: Bezoars; Phytobezoar; Trichobezoar

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INTRODUCTION

Since 1 000 BC, bezoars (BZ) in digestive tracts have been detected in some animals and humans. The first report of human trichobezoar was credited to Baudamant in 1779. In 1896 Stelzner reported the first preoperatively diagnosed trichobezoar (TBZ). The reported incidence was 0.4%[1,2].

BZs are classified according to their composition into phytobezoar (PBZ) (vegetable matter), TBZ (hair), lactobezoar (concentrated milk formulas), mixed medication BZ and food bolus BZs[1,3,4].

Most PBZs are composed of indigestible cellulose, tannin, lignin derived from ingested vegetables and fruits, especially persimmons and pineapples[4,5].

TBZs are most common in children and adolescents. In addition, more than 90% of patients are women with long hairs[2]. Lactobezoars have been noted mainly in the last two decades because of improved neonatal care during this period[1].

Clinical manifestations vary depending on the location of BZ from no symptoms to acute abdominal syndrome. Gastric BZs are occasionally associated with gastric ulcer formation but frequently cause small bowel obstruction (SBO)[6].

The ultimate goal of the treatment of BZs is their removal and prevention of recurrence. Although for TBZs, operative treatment is more commonly used[1], PBZs can be treated by several ways including gastric lavage, enzymatic dissolution, endoscopic disruption, endoscopic procedures, lavage, conventional and videolaparoscopic surgery[1,3,7-12].

In this study 34 cases of BZ are presented by reviewing literature.

MATERIALS AND METHODS

The hospital records of 34 patients were reviewed retrospectively. Twenty-seven cases began to receive surgical treatment and 7 cases were treated with endoscopic procedures in the last two years. The data were collected and analyzed as age - sex distrubution, clinical signs, BZs' size, nature and localization in gastrointestinal tract, effectiveness of diagnostic procedures, treatment modalities, morbidity and mortality rates. Patients who had SBO were divided into a subgroup, the remaining formed other subgroups. Also according to the treatment modalities, patients were divided into surgery (n = 28) and endoscopy

(n = 7) subgroups. One patient in endoscopy group was operated because of failure in removal of gastric BZ. Morbidity and mortality rates of two subgroups were investigated statistically by Fisher's exact test.

RESULTS

Female/male ratio was 20/14 (1.42/1). Mean age was 53.73±15.56 (range 17-78) years.

Most of them (n = 19, 55.88%) had previous gastric surgeries including truncal vagotomy plus pyloroplasty (n = 9, 26.47%), distal subtotal gastrectomy or antrectomy with Billroth II anastomosis (n = 9, 26.47%), truncal vagotomy + gastroenterostomy (n = 1, 2.94%). Peptic ulcera (n = 4, 11.76%), diabetes mellitus (n = 4, 11.76%), cherrylaurel (Prunus Buricerasus) or persimmon (Diospyrus Lotus) intakes (n = 6, 17.64%), mental retardation-trichotillomania (n = 2, 5.88%), high dose intake of H_2 receptor antagonists (n = 1, 2.94%) were also found in patients' history. Gastrointestinal bleeding was detected in 1 (2.94%) case's history.

The risk factors and coincidental diseases are summarized in Table 1.

The presenting symptoms were epigastric or generalized abdominal pain in all cases (100%). Mild to severe nausea and vomiting were presented in 33 cases (97.05%), abdominal distention as a sign of intestinal obstruction was found in 16 (47.05%), weakness was found in 1 (2.94%) case.

Single BZ was found in 26 (76.47%) patients. Six patients (17.64%) had two BZs. The last two patients had three and four BZs respectively. The sizes were in range of 2 cm×3 cm-10 cm×30 cm. They were localized in stomach (n = 15, 44.11%), duodenum (n = 1, 2.94%), jejunum (n = 4, 11.76%), ileum (n = 8, 23.52%), stomach and jejunum (n = 2, 5.88%), stomach and ileum (n = 3, 8.82%), duodenum and jejunum (n = 1, 2.94%). Thirty-two of 34 patients had PBZs and 2 had mental retardations with trichotillomania and TBZs (Table 2).

SBO was detected in 18 of 19 cases (94.73%) with intestinal BZs.

Table 3 shows the results of diagnostic procedures. Plain radiography was done for 32 patients and it was found normal in 14 cases. Intestinal air and air-fluid levels were detected in 16 (47.05%) patients. Also 2 (5.88%) patients were suspected of nonhemogenous gastric mass.

Barium study was done in 13 cases and it was normal in 2 patients. In 11 (84.61%) patients a gastroduodenal filling defect was seen. One of them (7.69%) was thought to be BZ.

Table 1 Predisposing factors and coincidental diseases of the patients

Predisposing factors[1] (n = 32)	n	%
Previous gastric surgery (n = 19)		55.88
Truncal vagotomy+pyloroplasty	9	26.47
Distal subtotal gastrectomy (or antrectomy) + Billroth II anastomosis	9	26.47
Truncal vagotomy + Billroth II anastomosis	1	2.94
Peptic ulcus	4	11.76
Diabetes mellitus	4	11.76
Cherrylaurel (Prunus Buricerasus) or Persimmon (Diospyrus Lotus) intakes	6	17.64
Mental retardation-trichotillomania	2	5.88
High dose intake of H2 receptor antagonists	1	2.94
Total	36	
Coincidental diseases (n = 14) [2]		41.17
Diabetes mellitus	4	11.76
Mental retardation	2	5.88
Hypertension	4	11.76
Cardiac and coronary artery diseases	5	14.7
Chronic pulmonary disease	3	8.82
Parkinson's disease	1	2.94
Behcet's disease	1	2.94
Cerebro-vascular disease	1	2.94
Abdominal aortic aneurysm	1	2.94
Strangulated incisional hernia	1	2.94
Total	23	

[1]Four patients had 2 predisposing factors and 2 patients had none. [2]Five patients had two or more diseases.

Table 2 Locations of BZ

	n	%
Number		
1	26	76.47
2	6	17.64
3	1	2.94
4	1	2.94
Localisation		
Stomach	15	44.11
Duodenum	1	2.94
Jejunum	4	11.76
Ileum	8	25.32
Stomach+jejunum	2	5.88
Stomach+ileum	3	8.82
Jejunum-ileum	1	2.94
Phytobezoar	32	94.11
Trichobezoar	2	5.88

Table 3 Diagnostic procedures in the study

	n	%
Plain abdominal graphy (n = 32)		
Gastric nonhomogenous mass	2	6.25
Intestinal air and air-fluid levels	16	50
Ultrasonography (n = 10)		
Intestinal dilatation and wall thickeness	10	100
Hyperechogenous gastric mass	1	10
Barium studies (n = 13)		
Filling defect in stomach or small intestines	11	84.61
(One of them diagnosed as bezoar)		
CT-scan (n = 8)		
Dilated intestinal loops	6	75
Intraluminal masses with gas bubbles and hypodense areas		
-Stomach	2	25
-Duodenum	1	12.25
-Duodenum+jejunum	1	12.25
Endoscopy (n = 16) Bezoar is seen	13	81.25

Ultrasonography was done in 10 patients. Intestinal dilatation (up to 7 cm) and intestinal wall thickeness (range of 5-13 mm, in diameter) were found in all of them. In a case (10%) a hyperechogenous gastric mass was seen.

Computed tomography was carried out in 8 cases. Intestinal dilatation was seen in 6 cases (75%). Four (50%) of them showed gastric (n = 2, 25%) and intestinal (n = 2, 25%) masses with gas bubbles and hypodense areas.

Gastroduodenoscopy was performed in 16 cases. BZs were seen in 13 cases (81.25%), while 3 (18.75%) were found normal.

Intraoperatively, 38 BZs were found in 28 patients. Sixteen BZs were found in stomach or duodenum in 14 patients. Also, 20 BZs in 12 patients were found in small intestines with proximally dilated loops. Two patients had ileal BZs resulting in intestinal perforation and generalized peritonitis.

Two patients with gastric BZs and gastric ulcers were treated by removal of BZs and subtotal gastrectomy plus Billroth II anastomoses. Four cases of intestinal BZs were treated by intestinal resection and anastomoses. The other cases of gastrointestinal BZs were treated by BZs removal via gastrotomy and/or enterotomy.

Endoscopic removal of gastric BZs was carried out in 7 patients. In one case, because of incomplete removal of BZ, surgical treatment was needed. The procedure was done completely with snare basket in 6 patients. In 5 patients, endoscopic procedure was successful in the first attempt. In the remaining two cases endoscopy was necessary in duplicate or in triplicate.

In this study 9 complications were seen in surgically treated patients. In a patient intraabdominal bleeding was seen and required receliotomy on the first postoperative day. Surgical morbidity rate was 32.14%. There was no complication of endoscopic treatment, except incomplete removal of BZ (14.28%). The total morbidity rate of this study was 29.41% (Table 4).

Four patients in surgically treated group died due to multiple organ failures and sepsis. There was no death in endoscopically treated group. The total and surgical mortality rates were 11.76%, and 14.28% respectively. Tables 4 and 5 summarize the morbidity and mortality.

The differences in morbidity and mortality rates between the subgroups of SBO-non-SBO and surgery-endoscopy, were not statistically significant (Table 6).

The former seven cases had not been followed up since 1997. The last 23 cases except that four cases died in early postoperative period were followed up for 1-72 mo (mean 23.13±21.11 mo) without any recurrence.

Table 4 Morbidity and mortality in this study

	n	%
Morbidity		
Wound infection	5	14.7
Wound dehiscence	1	2.94
Incisional hernia	2	5.88
Intraabdominal bleeding	1	2.94
Failure in endoscopic treatment	1	2.94
Total	10	29.41
Mortality: Due to sepsis and multiple organ failures	4	11.76

Table 5 Objectivies of mortality

Age (yr) and sex	Coincidental disease	Localization of bezoar	Complication	Postoperative day of death
70 M	No	Ileum with perforation	No	Early postoperative death
63 M	Cardiac arrhythmia	Ileum	Intraabdominal bleeding	10
50 M	Diabetes mellitus	Ileum		5
70 F	Wound dehiscence	Duodenum	Evantration	28

DISCUSSION

Previous gastric surgery, poor mastication, overindulgence of foods with high fiber contents are common factors predisposing to BZ formation[5,13-17].

Gastric operations may reduce gastric motor activity [14]. Twenty percent to 90% of 132 cases were found to be induced by previous gastric surgery (Truncal vagotomy plus pyloroplasty or subtotal gastrectomy plus gastroenterostomy). The interval between gastric operation and BZ detection was 9 mo-30 years[6,7,18,19].

Loss of pyloric function, gastric motility and hypoacidity play important roles in BZ formation[3,20]. Delayed gastric emptying because of diabetes mellitus, mixed connective tissue disease or hypothyroidism were also reported as predisposing factors of BZ formation[6,20-22]. Our results (previous gastric surgery, 55.88% and diabetes mellitus, 11.76%) are comparable with the literature.

Bolus intakes of indigestible vegetable foods, due to either dental problems or chewing habits are also predisposing factors[19]. There are many reports of BZ cases secondary to persimmon, pineapple and cherrylaurel in literature. In 1986, Krausz[6] reported that, 91.2% of 113 patients with PBZs had a persimmon intake history. Six of our 34 cases (17.64%) had a persimmon or cherrylaurel intake history.

TBZs are most common in children and adolescents. Mental retardation and trichotillomania are risk factors[2].

Table 6 Morbidity and mortality rates according to the subgroups

	Morbidity	%	Mortality	%
SBO (n = 18)				
Total				
Intraabdominal bleeding	7[1]	38.88	3[1]	16.66
Wound dehiscence	1			
Wound infection	4			
Incisional hernia	1			
Non-SBO group (n = 16)				
Total				
Wound infection	3[1]	18.75	1[1]	5.55
Failure of endoscopic procedure	1			
Incisional hernia	1			
Surgery treatment (n = 28)	9[1]		4[1]	
Endoscopy (n = 7)	1[1]		0[1]	
(Failure in endoscopic procedure)				

[1]P>0.05 (Fisher's exact test).

In this study there were two cases of TBZs. Both of them were females and had mental retardation.

Major complications of BZs include intestinal obstruction, gastric perforation, gastric ulcer, gastritis[6,23-25]. SBO is the most common complication and requires surgery[3]. It has been reported that 60% of PBZs cause SBO. In addition, BZs accounted for 4.5% of all SBOs[19]. In a study of 49 patients, PBZs were detected either in stomach (46.93%) or in small bowel (44.89%) or in both (8.16%). Small bowel BZ might be single (68%) or multiple (32%) in ovoid, round and tubular forms. Clinically, the length of the involved segment could be longer than 10 cm[9].

SBO resulted from BZ is usually due to migration of gastric BZ[6,14], however the obstruction could also be caused by primary BZs formed in small bowel in association with underlying diseases such as diverticulum, stricture or tumor[9,26-28]. Previous gastric surgery resulting in widened gastric outlet might permit BZ migration into the small bowel[11]. Small bowel BZ was seen more frequently in patients with a large gastric outlet (pyloroplasty) and an intact vagus nerve[24] than in patients with gastric remnant[1].

Although small bowel diameter is the smallest at 50-75 cm proximal to ileocecal valve and peristaltic wave is not strong enough in this area, because most of the cases (up to 63%) had large BZs, obstruction occurred at the upper part of small intestine[19,21]. In this study 19 (55.88%) patients who had BZs in their intestines, 13 (38.43%) had it in ileum. SBO was found in 94.73% of them.

Abdominal pain (49-100%), epigastric distress (80%), vomiting and nausea (35-78%), SBO (94.73%) were the main clinical symptoms. Feelings of fullness or bloating, dysphagia, anorexia with weight loss and even gastrointestinal hemorrhage could be seen[1,21,24,25]. When complicated, diminished peristaltic sounds, rebinding and tenderness, distention, diarrhea, constipation, vomiting, abdominal pain could be found clinically[6]. Elevated leukocyte count up to 28.000/mm^3 and fever could also be detected[1,6]. In this study, abdominal pain, nausea and vomiting were the main symptoms. Abdominal distention was 47.05%.

In the cases of SBO about 50-75% were diagnosed by plain radiography[4,18,29]. Dilated intestinal loops, air-fluid levels, thickened bowel wall could be found in all, 89%, 76% of the cases respectively[9]. Also gastrointestinal masses could be suspected.

Barium studies are helpful in the cases of non-obstructive BZs but are time-consuming at SBO, because the barium column may be diluted by the intraluminal fluid obscuring the detail of obstruction. Classic appearance of BZs on barium studies is an intraluminally-filling defect. Barium study could show a mottled appearance similar to that of villous tumor. Dilated segments could be seen proximally[15,16,21]. Also, barium studies are useful in detecting residual gastric BZ.

BZs appear on US as an intraluminal mass with a hyperechoic arclike surface and marked posterior acoustic shadow[15,16,29]. CT-scan demonstrating dilated small bowel loop and a well-defined round, heterogeneous intraluminal mass in distal segment is completely diagnostic. The mass could be outlined by the bowel wall and presented characteristic internal gas bubbles-soft tissue appearance of BZ[9,20,30,31]. Endoscopic investigations could show all of gastric BZs and only 12% of small bowel BZs[8,32].

In our experience, plain abdominal graphy, ultrasonography, barium studies, CT-scan, and endoscopy could diagnose 52.94-100% and 84.61-100% of BZs.

Gastrointestinal BZs can be treated by endoscopy or conventional surgery.

In the endoscopic procedures the first step is to determine whether the pylorus appears anatomically normal and to verify the absence of a duodenal stricture before fragmenting BZ[7]. If BZ is not too large, it can be extracted by a basket or direct suction[31].

If the BZ is large and pylorus is normal, fragmentation can be performed with a large polypectomy snare[7,33], electrosurgical knife[34], lithotriptor[33,35,36], both electrohydraulic and endoscopic lithotripsy[35,36], drilling[37], endoscopic laser destruction[32], dormia basket or mechanical lithotriptor[7].

Once the BZ is fragmented, patients can be treated by combination of L-cystein, cellulase and metoclopramide, cellulase and papain, water jet and pineapple juice[7,28]. Also, gastric lavage has been reported using saline solution, 0.1 N hydrochloric acid, sodium bicarbonate, Adolph's meat tenderizer, pancrealipase, pancreatin, 1-2% zinc chloride, pancrealipase with ascorbic acid[3,38]. In the literature, the most interesting report is the successful coca cola lavage for a gastric PBZ[10].

Although successful endoscopic disruption of small bowel BZs has been reported[39], these procedures can only be alternatives to surgery[11,40,41]. Intravenous administration of antispasmodic agents and small bowel enema can result in evacuation of terminal ileum BZ into the colon, then colonoscopic evacuation would be easy[11]. On the other hand, enzymatic dissolution and fragmentation of PBZs can result in distal migration of daughter fragments[11,28].

In 1999, from the literature in English, Blam[8] collected the complications of conservative treatment of BZs. According to this study, the complications reported to be associated with the usage of enzymatic and biochemical disruptions were gastric ulcer, SBO, hyperosmolar natremia, hemorrhagic pulmonary edema, pharyngeal abscess, endo-tracheal tube obstruction, esophago-gastric iatrogenic injuries (perforation, including laceration, hematoma, submucosal blebs and tears, bleeding tear, disconnection, ulceration, rings), vocal cord damage, overtube migration into the stomach, variceal rupture.

In conventional surgery BZ removal is commonly done by gastrotomy and/or enterotomy. If complicated, a few percent of cases can be treated by gastric and/or intestinal resections. In this study 7 cases of gastric BZs were treated by endoscopic disruption and removal. One of the endoscopic procedures was insufficient. So conventional surgery was performed. This case was similar to Kilam's report[42]. A total of 28 cases were treated by conventional surgery. Most of them (85.71%) had gastrotomy and/or enterotomy. Only four cases (14.28%) were treated by subtotal gastrectomy or intestinal resections.

In conclusion, most of the BZs are PBZs. Plain radiography, barium studies, US, CT-scan and endoscopy are helpful in the diagnosis. When uncomplicated, endoscopic or surgical removal of BZs can be done effectively.

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