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Original Article

Bezoars: A comprehensive review of the literature with analysis of 30 collected cases

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Abstract

Aim: The aim of the present study was to discuss the operated cases for bezoar and the treatment results in comparison to the literature.

Material and Methods: We retrospectively reviewed 30 cases operated due to bezoar in our hospital from 2008 to 2017. Demographic characteristics, comorbidities, obstruction locations, dietary habits, clinical findings, diagnostic and therapeutic methods, and the outcomes of the patients were recorded from the patient files.

Results: Thirty cases of bezoar were found. One patient was treated two times due to recurrence. The distribution of cases according to the monthly prevalence was observed as 4 patients in November, 10 patients in January, 9 patients in December, 3 patients in February (86.6% in autumn and winter). Twenty-one patients (70 %) had a history of abdominal surgery. Eighteen (% 60) patients also had gastric surgery. Surgery revealed 18 (%60) bezoar cases in the jejunum and ileum. Five (%16.6) patients had bezoars found concurrently in the stomach and ileum and in 7 patients (%23.3) had bezoars in the stomach. Fragmentation and milking were done to three patients, resection-anastomosis was performed to one patient, enterotomy was performed to 16 patients, gastroenterostomy was performed to 3 patients, enterotomy and gastrotomy were performed to 2 patients, gastrectomy was performed to one patient and gastrotomy was performed to 4 patients. The average days of patients stayed at the hospital were 12.83 ± 14.2 (6-84) days.

Conclusion: IBO caused by bezoar is still a rare diagnosis. This case must be considered for intestinal bowel obstruction encountered in patients with previously undergone gastric surgery and fibrous food consumption, especially in autumn and winter months.

Keywords: Intestinal Obstruction; Bezoar; Phytobezoar.

INTRODUCTION

Bezoar is a rare cause of small bowel obstruction. Even if the incidence increases by making gastric resection, truncal vagotomy and drainage in the treatment of gastroduodenal ulcers, it is about 4%. It is rarely diagnosed preoperatively. In this study, we aimed to discuss through the literature the cases we operated due to bezoar in Kocaeli, Derince Education and Research Hospital department of general surgery in between the years of 2008 and 2017.

MATERIAL and METHODS

In our study, patients admitted to Derince Education and Research Hospital department of general surgery between 2008-2017 were scanned by the computer data with 609700, 610110, 610100 operation codes. This scan results were arranged using keywords of small bowel obstruction (IBO) and bezoar. According to these results, 30 patients were included in the study. On the basis of records, operated patients who were diagnosed bezoar were retrospectively analyzed according to demographic characteristics, clinical findings, obstruction location, dietary habits, their surgery history and outcomes of the patients.

RESULTS

Between the years of 2008-2017 30 patients were hospitalized with the diagnosis of bezoar in our department. One patient was treated two times due to recurrence. Ten (33.3%) of the patients were females, 20 (66.6%) were males (1:2). Mean age was 62.73 ± 13.6 (29-89). The distribution of cases according to the monthly prevalence was observed as 4 patients in November, 10 patients in January, 9 patients in December, 3 patients in February, (86.6% in autumn and winter). Abdominal pain, tenderness and distension were common

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findings detected in all patients (100%, 100% and 92.3% respectively). Nausea and vomiting were seen with the rate of 80% and 66.6%, respectively (Table 1). Fourteen patients (46.7%) admitted to the hospital 24 hours after the onset of symptoms, while 12 patients admitted on the 2nd and 3rd day (40%). Four patients (13.3%) were operated on the first day and two patients were operated on 2nd,and4th day and three of case were operated on 3rd day of their hospitalization. Eighteen (60%) had a history of previous gastric surgery. One of them alsohad a previous history of appendectomy and totally abdominal hysterectomy+bilateralsalpingooferectomy (TAH + BSO), two patients had an unknown abdominal operation (Table 2). Standing directly abdominal radiography was taken from all patients. Computed tomography (CT) in 27 patients, ultrasonographic examination (US) in 12 patients, gastroscopic examination in 16 patients, gastroscopic and colonoscopy examination in 3 patients was performed.

Table 1. Clinical findings

Findings	Number of patients
Abdominal pain + sensitivity	30
Abdominal distension	27
Vomiting	24
Nausea	20
Constipation	16
Peritonitis	3

Table 2. Patients demographic characteristics, operation type and postoperative complications

Parameters Patient Numbers	Age	Gender	Previous Surgery	Comorbidities	Operation Type	Postoperative Complications
1	60	K	Appendectomy, Tah+Bso	DM+CAD	Enterotomy+Milking	
2	63	E	Gastroenterostomy		Resection+Anastomosis	Enterocutaneus Fistula
3	61	E	Gastroenterostomy	Alzheimer	Enterotomy+Milking	Evisceration
4	74	E	Gastroenterostomy		Enterotomy+Milking	Wound Infection
5	88	E	Gastroenterostomy	AF	Enterotomy+Milking	Exitus (Po. 12. Day-Pneumonia)
6	60	K	Gastrostomy		Enterotomy+Milking	
7	89	K			Gastroenterostomy	Wound Infection
8	84	E	Gastroenterostomy		Gastrotomy	
9	61	E	Gastroenterostomy	TBC	Enterotomy+Milking	
10	66	E	Gastroenterostomy		Enterotomy+Milking	
11	58	E	Gastroenterostomy		Enterotomy+Milking	
12	60	K		Parkinson, COPD	Subtotally Gastrectomy	Exitus (P.O 33. Day-Mof)
13	29	E			Gastrotomy	
14	65	K			Enterotomy+Milking	Wound Infection
15	68	K	Gastroenterostomy		Enterotomy+Milking	Wound Infection
16	40	K			Milking	
17	74	E	Aortic Valve Replacement, Gastroenterostomy	COPD	Enterotomy+Milking	Exitus (P.O 12. Day-Pneumonia)
18	67	E	Gastroenterostomy	HT	Enterotomy+Milking +Cholecystectomy	
19	66	E		COPD	Gastroenterostomy	Exitus (P.O 8.Day-Myocardial Infarction)
20	73	E	Gastroenterostomy		Gastrotomy+Enterotomy	
21	62	E	Gastroenterostomy, Biliointestinal Diversion		Enterotomy+Milking	
22	60	E	Unknown Abdominal Operation		Gastrotomy+Enterotomy	Evisceration
23	69	E			MILKING	
24	72	K	Gastroenterostomy	HT	Milking	Exitus (P.O 30 Day-Mof)
25	39	K	Gastroenterostomy		Gastroenterostomy	Wound Infection
26	58	E		CAD	Enterotomy+Milking	
27	54	E	Unknown Abdominal Operation		Gastrotomy	
28	53	K	Gastroenterostomy, Appendectomy	DM	Enterotomy+Milking	
29	70	E	Gastroenterostomy		Gastrotomy	
30	39	E			Enterotomy+Milking	Wound Infection

DM; Diabetes mellitus, CAD;Coronery artery disesase, AF; Atrial fibrillation, TBC;Pulmonary tuberculosis, COPD;Chronic obstructive pulmonary disease, HT; Arterial hypertension, Mof: multi organ failure

The average onset of symptoms was 3.38 ± 2.25 (1-10) days. All patients were initially treated conservatively; nasogastric tube was inserted and intravenous hydration was provided. The average time from hospitalization of patients until surgery was 3.43 ± 1.9 (0-7) days. Laparotomy was performed within 24 hours to three patients who had peritoneal irritation findings. Bezoar was detected in 7 patients in the stomach, in 5 patients in distal ileum, in 5 patients in distal ileum and the stomach and also in 13 patients in jejunum (Table 3). Three (%10%) patients underwent fragmentation and milking. While segmented resection anastomosis was performed to one patient, enterotomy was performed to 16 (%53.3%) patients and gastrotomy was performed to 4 (%13.3) patients. Cholecystectomy was performed to one of the enterotomy performed patient at the same time. The average days of patients stayed at hospital were 12.83 ± 14.2 (6-84 days). Mean operation time was 82.5 (55-120) minutes. Five (23.3%) patients died because of myocardial infarction, multiple organ failure and ventilator-associated pneumonia. Evisceration was seen in 2 patients and wound infection was seen in six patients. Enterocutaneous fistula developed in one patient who was performed small bowel segmental resection.

Table 3. Bezoar place

Place	Number of patients (n=30)
Stomach	7
Distal ileum+stomach	5
Distal ileum	5
Proximal jejunum	6
Distal jejunum	7
Peritonitis	3

DISCUSSION

The word “bezoar” derives from the Arabic origin word “badzehr” or “panzer” in Persian meaning antidote (1). Bezoar occurs by eating materials causing intestinal stasis or clogging the gastric output, non-digestible and accumulated in the gastrointestinal system due to its large sizes. Gastric bezoars are classified according to their content (2). Lactobezoar is seen in neonatal; trichobesoars are seen in children and usuallyin mentally retarded young women chewing and swallowing hair; phytobezoars caused by vegetable fibers typically occurs in the elderly and patients with postgastrectomy (3). Whereas the persimmon fibers are the reason for dispyrobezoar, concentrated drug formulas (cholestyramine and kayexalate) are the reason for pharmacobezoar. That trichobezoar extends from pilor to small bowel like a tail is called Rapunzel Syndrome and this case is rarely seen (4). Phytobezoars are the most common type of bezoars, formed by excessive consumption of herbal nutrients. Celery, grape, prune, Diospyros Lotus and pineapple are the main nutrients responsible for phytobezoars. Such nutrients contain high amounts of indigestible fibers, such as cellulose, hemicellulose, lignin and fruit tannins (2).

Consumption of phytonutrients containing high amounts of indigestible fibers, pyloric disfunction, a decrease in gastric motility and acid secretion and adhesions after abdominal surgery, inadequate chewing are the most important predisposing factors in the formation of the gastrointestinal phytobezoars (5). In addition, diabetic neuropathy, hypothyroidism and connective tissue diseases trigger the formation of phytobezoars by causing delayed gastric emptying (6). Ertugrul et al. reported in his retrospective study that Diospyros lotus consumption was seen in 13 patients (100%), previously gastric surgery was seen in 4 patients (30.7%), diabetes mellitus was seen in 4 patients (30.7%) and three (23%) had a historyof using dental implants. In a retrospective study of Krausz et al. on 113 patients, showed that 106 (93,8%) patients hadundergone gastric surgery, whereas 103 (91.1%) had a history of persimmon consumption (7). In our study, 18 patients (60%) had undergone gastric operation and 3 patients (10%) also had a history of previous abdominal operations. We have detected a history of eating persimmon in eighteen patients (60%).

Abdominal pain, epigastric discomfort, nausea and vomiting are the main clinical presentations. In addition, a feeling of fullness, dyspepsia, dysphagia, anorexia, weight loss and gastrointestinal bleeding may occur. While upper abdominal pain and abdominal distension are often at the forefront in gastric bezoars, abdominal pain, abdominal distension, nausea and vomiting are often detected in small bowel bezoars. In complicated cases, decreased bowel sounds, rebound, rigidity, diarrhea, constipation may occur (8). Nausea, vomiting and epigastric pain are the most commonly detected findings as in our series.

Small bowel obstruction (IBO) is the most obvious complication of phytobezoar and the incidence has been reported in the literature as 4%. 60% - 80% reason of IBO is postoperative adhesions (9). Small bowel phytobezoar often happens as a result of the gastric phytobezoar extension. However, the small bowel phytobezoar occurs in cases like diverticulitis, stricture and tumor (10). IBO connected to the phytobezoar occurs in the narrowest place of the small bowel such as the terminal ileum and jejunum (11). Ertugrul et al. reported that the place of phytobezoar is stomach in 3 cases (23%), the stomach and jejunum in two cases (15.3%), only jejunum in 2 patients (15.3%) and only the ileum in 6 cases (46.1%) (2). Krausz et al. reported the stomach in 13 cases (11.5%), small bowel and stomach in 20 cases (17.6%), the small bowel in 80 patients (70.7%) as the place (7). In our series, IBO rate connected to phytobezoars was found to be 4.7%. Phytobezoars was detected; in the stomach in 7 cases (23.3%), in stomach and distal ileum in 5 cases (16.6%), in distal ileum in 5 cases (16.6%), in proximal jejunum in 6 cases (20%) and in distal jejunum in 7 cases (23.3%).

At diagnosis, suspicion based on clinical and physical examination is important. Upper gastrointestinal system endoscopy and radiological examination method, such as plain abdominal radiography in the standing position (ADBG), barium enema radiograph, abdominal ultrasound and computed tomography (CT) can be used in the diagnosis of small bowel obstruction (2). In plain abdominal

radiography, dilatation and thickening in intestinal wall and air-fluid levels can be seen in dilated intestinal segments (10). Examinations with barium contraindicated in patients with suspected complete obstruction or perforation (2). The intraluminal echogenic mass and obvious posterior acoustic shadowing was detected at abdominal ultrasound (12). The most common finding on CT is the ovoid mass image containing gas in the form of mottling caused by phytobezoar at the obstruction area. A dilated bowel loop is seen near this obstructed area (13). While all gastric bezoars can be detected by means of upper gastrointestinal system endoscopy, 12% of small bowel as phytobezoar can be diagnosed (14). Plain abdominal radiograph was taken from all of our patients and obvious air-fluid levels were seen. Ileus was diagnosed in 6 of 12 abdominal USG performed patientsand 22 of 27 abdominal CT with contrastperformed patients.

The first treatment options in IBO are adequate fluid and electrolyte replacement, gastric decompression and proton pump inhibitors (15). The exact treatment depends on the underlying etiology. Gastric lavage and endoscopic or surgical methods can be used in the treatment of gastric phytobezoars. L-cysteine, metoclopramide and cellulose, papain and cellulose, saline solution, pineapple juice, sodium bicarbonate, hydrochloric acid, pancrelipase, pancreatin, 1-2% zinc chloride, and Coca-Cola was used to fragment bezoars during gastric lavage (2). Hayasi et al. detected a significant decrease in the size of phytobezoar and a significant softening in the structural density by giving 500-1000 ml Coca-Cola for three weeks before each meal. And then, they removed the mass endoscopically (16). Nelson et al treated bezoars of the persimmon and papain without operation (17). Gastric phytobezoars can be removed endoscopically in the presence of normal pyloric function and in the absence of duodenal obstruction (18). If bezoar is not in large sizes, it can be attempted to be removed by using basket catheter or by direct aspiration (19). Open or laparoscopic surgical methods can be used for the removal of bezoars. The main aim of the surgical procedure is the fragmentation of bezoar manually and milking towards cecum, gastrotomy, enterotomy, resection and anastomosis in complicated cases (2). In our series, 7 patients (4 togastrotomy, 2 togastroenterostomy and one togastrectomy)operated forisolated gastric bezoarwho were followed up with medical treatment for 3 weeks before surgery but whose remaning bezoars were not removed with endoscopy. During surgery, since the simultaneous prevalence of gastric and small bowel phytobezoar is 17-21%, one must be careful not to leave any residue behind [20]. In the present study, 5 of 30 patients (16.6%) had simultaneously gastric and small bowel bezoars. DeBakey and Osch reported operative mortality as 10.4% (21). In our series, five patients (16.6%) died, after the operation.

CONCLUSION

In conclusion, IBO caused by bezoar is still a rare diagnosis. This case must be considered for IBO encountered in patients with previously undergone gastric surgery and fibrous food consumption, especially in autumn and winter.

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