

## Clinical and Demographic Characteristics of Patients with Gastrointestinal Bezoars with Treatment Outcomes; Our Experiences, and Suggestions

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**Abstract:** By examining our cases, we aimed to investigate the treatment modalities and to evaluate the efficacy of these treatment modalities, especially of the oral cola administration in our patients with gastrointestinal bezoars in the first approach. Bezoars are indigestible foreign bodies that form masses in the gastrointestinal lumen and can be treated surgically, endoscopically, or pharmacologically. Bezoars are classified into four major types according to their composition: trichobezoars, phytobezoars, pharmacobezoars, and lactobezoars. The incidence of gastrointestinal bezoars is about 0.4% and they are a rare cause of intestinal obstruction. In this study, we investigated 39 consecutive cases of patients with gastrointestinal bezoars. Data were obtained by retrospective review of the medical records of patients diagnosed with, and treated for, gastrointestinal bezoars who were followed up in the Department of General Surgery from October 2007 to March 2018. A total of 39 patients were included in the study; 26 of whom underwent surgery. The mean age of the patients was  $58.6 \pm 14$  years, and their initial complaints were intestinal obstruction and dyspepsia. The mean macroscopic diameter of the gastrointestinal bezoars was  $7.5 \pm 1.8$  cm. Many bezoars can be treated endoscopically or medically. A bezoar recalcitrant to medical or endoscopic treatments should be removed surgically. Treatment delay can lead to serious complications; therefore, if medical treatment fails, surgery should be performed immediately.

**Keywords:** Endoscopy, pharmacobezoar, phytobezoar, trichobezoar, gastrointestinal bezoars.

### INTRODUCTION

Bezoars are foreign bodies that form masses in the gastrointestinal lumen, typically after abdominal surgery, and particularly in the elderly and psychiatric patients [1]. The term "bezoar" originates from the Arabic word "bazahr", which means antidote or counter-poison, which were used in ancient medicine [2]. The most important risk factors for phytobezoar formation are excessive consumption of fruits rich in fiber, poor dental health, insufficient mastication, diabetic gastroparesis, kidney failure, hypothyroidism, use of drugs that affect gastric motility, and previous gastrointestinal surgery [3]. Elderly patients and those with diabetes mellitus or a history of gastrointestinal surgery are more likely to develop bezoars due to impaired gastric motility [3,4]. Trichobezoars are more commonly seen in intellectually disabled, elderly, or psychiatric patients.

Bezoars are classified according to their composition, such as trichobezoars (of hairs),

phytobezoars (of vegetable fibers), lactobezoars (of milk products), medication bezoars, and others containing medications or other foreign materials [2, 5]. Bezoars are classified into four major types: trichobezoars, phytobezoars, pharmacobezoars, and lactobezoars [1-3]. The incidence of gastrointestinal bezoars is about 0.4% [1,2,5], and they are a rare cause of intestinal obstruction. Treatment of bezoars involves their removal by endoscopic fragmentation and aspiration or dissolution with proteolytic enzymes, if possible. Bezoars recalcitrant to medical or endoscopic treatment should be removed surgically. In this study, we investigated 39 consecutive cases of patients with gastrointestinal bezoars.

### Aim

In this study, we investigated 39 consecutive cases of patients with gastrointestinal bezoars. By examining our cases, we aimed to investigate the treatment modalities and to evaluate the efficacy of these treatment modalities, especially of the oral cola

administration in our patients with gastrointestinal bezoars in the first approach.

## MATERIALS AND METHODS

The data were obtained by retrospective review of the medical records of 39 consecutive patients diagnosed with gastrointestinal bezoar at the General Surgery Units of Mustafa Kemal University, Sinop State Hospital and Bafra State Hospital from October 2007 to March 2018. This study was approved by the Ethics Committee of Mustafa Kemal University. Clinical, endoscopic, and radiological imaging findings were utilized in disease diagnosis and classification. The age, sex, history of surgery, type of surgery, time of bezoar formation after surgery, complaints before diagnosis, radiologically determined bezoar localization, size and type, treatment methods applied, surgical site infections, and lifestyle factors of the patients were investigated.

Gastric Cola administration was the first-line treatment in volunteer patients with gastric bezoars. The patients were first verbally informed about the procedure, which was not performed on patients who did not accept nasogastric tube application. Two nasogastric tubes of 16 French size were placed in the stomach. Through one of the tubes was supplied 3 L of Coca Cola<sup>R</sup> [The Coca Cola Company] for 12 h, and the other tube was released into free drainage.

Twenty-four hours after completion of the Cola procedure, all of the patients underwent an endoscopic examination. Patients who were found to have lost their bezoar were discharged. After the first Cola procedure, if the diameter of the bezoar had decreased, a further Cola procedure was performed. Endoscopic fragmentation was performed in patients still having a bezoar at the end of the procedure (Figure 1). Endoscopic fragmentation was performed using biopsy or polypectomy forceps, and disintegrated bezoars were removed using a basket or by aspiration with a large-sized cannulated endoscope. Patients who failed the Cola treatment and endoscopic fragmentation underwent surgery (Figures 2,3).

Olympus GIF Q 260 and H 260 (Olympus, Tokyo, Japan) endoscopes were used in this study, and endoscopic fragmentation was performed using a

lithotripsy basket (GML-90-26-180, Medi-Globe, Achenmuhle, Germany) or a polypectomy snare. Fragmented bezoars were crushed and retrieved using biopsy forceps or pentagon grasping forceps. All endoscopic procedures were performed by two specialist endoscopists.

## RESULTS

During this study, 48.7% (n = 19) men and 51.3% (n = 20) women were diagnosed with gastrointestinal bezoars. Their clinical and demographic characteristics are shown in Table 1.

The mean  $\pm$  SD age of the male patients was  $59.3 \pm 14.5$  years (range 24–93 years) and that of female patients was  $57.8 \pm 13.5$  years (range 21–78 years). Twenty-six of the thirty-nine patients had available histories of surgery; eight had undergone Billroth-2 surgery, nine vagotomy, and nine had not undergone abdominal surgery. The mean time to bezoar development after surgery was  $21.5 \pm 7.5$  years.

Regarding the initial complaints, 19 patients had intestinal obstruction, 18 had dyspepsia, and two had intestinal obstruction and dyspepsia. The radiologically determined localizations of the bezoars were the jejunum in 18 patients, stomach in 16 patients, ileum in two patients, and stomach and jejunum in three patients.

In 13 of the patients, medical and/or endoscopic treatment of bezoars was successful (one Cola procedure [n = 6], two Cola procedures [n = 1], and two Cola procedures + endoscopic fragmentation [n = 6]); the remaining 26 patients underwent surgery (small intestinal milking [n = 11], enterotomy [n = 7], gastric milking [n = 3], gastrotomy [n = 3], and segmental small-bowel resection [n = 2]).

Surgical-site infections developed in 11 patients; all were treated successfully using appropriate medications. As a result, healing was achieved by all of the patients. The mean diameter of bezoars was  $7.5 \pm 1.8$  cm. The majority of bezoars were phytobezoars (n = 32), followed by trichobezoars (n = 2), pharmacobezoars (n = 2), fossil bezoars (n = 2), and rag bezoar (n = 1).



**Fig-1: Gastric phytobezoar**

**Table-1: Distribution of demographic and clinical characteristics of patients by gender**

		Male	Female	Total
Gender n (%)		19 (48.7)	20 (51.3)	39
Age: Mean±SD (min-max)		59.3±14.5 (24-93)	57.8±13.5 (21-78)	58.6±14 (21-93)
Bezoar type (n)	Phytobezoar	15	17	32
	Others	4	3	7
Bezoar size (cm)		7.3±1.6	7.8±2	7.5±1.8
Previous surgery (n)	Billroth 2	3	5	8
	vagotomy	4	5	9
	None	6	3	9
	Unknown	6	7	13
Time after surgery: Mean±SD (year)		21.9±8.4	21.7±7.5	21.5±7.5
Applied complaint (n)	Intestinal obstruction	9	10	19
	Dyspepsia	10	8	18
	Intestinal obstruction + Dyspepsia	0	2	2
Radiological localization (n)	ileum	2	0	2
	jejunum	10	8	18
	Stomach	6	10	16
	Stomach + jejunum	1	2	3
Treatment method (n)	surgery	13	13	26
	Medical, endoscopic	6	7	13
medical, endoscopic surgery	2 sessions cola + endoscopic fragmentation	3	3	6
	1 session cola	3	3	6
	2 sessions cola	0	1	1
	Small bowel milking	6	5	11
	stomach milking	2	1	3
	Enterotomy	3	4	7
	Gastrotomy	1	2	3
	Segmental small bowel resection	1	1	2
Surgical field infection (n)	occured	7	4	11



**Fig-2: Jejunal bezoar during open surgery**



**Fig-3: Extracted jejunal bezoar**

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## DISCUSSION

We describe here the characteristics and outcomes of patients with gastrointestinal bezoars. The most common type of bezoar is the phytobezoar, followed in order by trichobezoar, lactobezoar, and pharmacobezoar. In this study, phytobezoars predominated (82%), in agreement with a previous report [6].

Bezoars can be asymptomatic or can cause gastrointestinal symptoms such as intestinal obstruction, dyspepsia and, rarely, bleeding and perforation. Symptoms vary according to bezoar size and location. The main symptom of esophageal bezoars is reflux and retrosternal pain; while pain, nausea and vomiting, weight loss, ulcer development, and pyloric obstruction are seen in patients with gastric bezoars. The main symptom of intestinal bezoars is intestinal obstruction, predominantly complete intestinal obstruction, especially for bezoars at distal ileal sites [2, 7, 8]. In this study, all patients were symptomatic, and the incidences of intestinal obstruction and dyspepsia were similar.

Bezoars can be detected by X-ray, oral barium intestine graphics, ultrasonography, and endoscopy, but clinical use of these radiological modalities is limited [1, 2]. Abdominal CT has an accuracy rate of 73–95% for small-bowel obstruction caused by bezoars. On abdominal CT, a bezoar appears as a round or ovoid intraluminal mass with abdominal gas distal to the obstructed area [3,4]. In cases of intestinal ischemia, strangulation, and perforation caused by bezoars, abdominal CT reveals free fluid within the abdomen. In this study, abdominal CT enabled accurate bezoar localization in all of the patients.

Symptomatic bezoars should be treated medically or endoscopically and, if unsuccessful, surgery is required. Endoscopic and surgical treatment of bezoars has declined in popularity; in the last 15 years, treatment methods that break down the chemical structure of a bezoar, such as administration of Cola, have been used increasingly frequently, particularly for gastric phytobezoars [9]. For example, Ladas *et al.* reported that oral Cola administration obviated the need for surgery in 13 bezoar patients, as no bezoar was found at follow up [10]. In our study, Cola administration was not successful in six of 13 patients with gastric phytobezoars; these patients subsequently underwent endoscopic fragmentation. In recent years, chemical disintegration of the bezoar, especially destroying the structure of the crusty hard portions of phytobezoars, has also become widespread [8, 9].

In gastrointestinal obstructions, when the symptoms are less intense and subacute, many surgeons wait 3-5 days for conservative treatment, then they make a definite decision about surgical intervention [11]. Medical treatment should be applied in patients without acute abdominal findings, but those with acute abdominal symptoms require immediate gastrotomy, enterotomy, small-bowel milking, or segmental small-intestine resection [5, 7, 12]. Surgical treatment should involve first intestinal decompression and proper fluid and electrolyte replacement, followed by open or laparoscopic abdominal exploration [2, 5, 13]. Altintoprak *et al.* reported that milking during laparotomy was successful in the vast majority of patients and that patients who could not be milked should undergo gastrotomy, enterotomy, or segmental small-bowel resection [1, 5, 7, 8]. Lack of, or delayed, treatment of bezoars may lead to sepsis, bleeding, perforation, organ failure, and death [2, 7, 14]. In extreme cases, such as concomitant ischaemia and secondary intestinal gangrene, an appropriate surgical intervention may affect the survival of the patient [11]. In our study, medical treatments were unsuccessful in two-thirds of the patients; these patients subsequently underwent surgical interventions and achieved good outcomes. Our findings do not replicate the high success rates of medical treatments in previous reports.

## CONCLUSIONS

Gastric bezoars are typically initially treated by oral Cola administration and/or endoscopic fragmentation; however, treatment options vary according to bezoar location and size. As a result of our study, we observed that oral cola administration was effective in approximately one third of patients in the first approach to gastrointestinal bezoars. But for more precise results, we think that larger scale studies should be done. It should also be noted that delay in treatment can lead to serious complications; for this reason, if medical treatment fails, surgery should be done immediately.

## ACKNOWLEDGMENTS

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