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Gastric phytobezoars: the therapeutic experience of 63 patients in Northern China

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ABSTRACT

Introduction: Sixty-three patients with gastric phytobezoars were reviewed.

Methods: forty-eight (76.2%) patients received endoscopic combined with chemical therapies and 15 (23.8%) received only chemical therapy initially. Fifty-one (81.0%) patients achieved complete removal (only chemical therapy 14/15), while 12 (19.0%) received further endoscopic therapies.

Results: finally, 62 (98.4%) patients achieved a complete removal. Considering only patients with combined treatment as a first approach, treatment success was associated with a softer phytobezoar consistency ($p = 0.023$).

Conclusion: in conclusion, most patients achieve a favorable outcome. Chemical therapy is useful in selected cases. Repeated endoscopic therapies may be needed in order to completely remove phytobezoars with a hard consistency.

Key words: Bezoar. Gastric phytobezoar. Treatment. Endoscopic therapy. Outcome.

INTRODUCTION

Gastric bezoars are rare and phytobezoar are the most common type (1), which are comprised of indigestible plant material. Persimmons, pineapples, prunes, celery and coconut fiber are representative causes of phytobezoars (2). Treatment includes chemical enzyme dissolution, endoscopic fragmentation and surgical removal (3). There is currently no optimal treatment strategy. The objective of this study was to review our experience with gastric phytobezoars and summarize therapeutic options for the clinical practice.

MATERIALS AND METHODS

Study design and setting

This retrospective study was carried out at the Department of Gastroenterology, Beijing Shijitan Hospital, Capital Medical University, China, from January 2008 to December 2018. Consecutive patients (≥ 18 years of age) with gastric phytobezoars diagnosed by upper endoscopy were enrolled into the study. Patients who were lost to follow-up were excluded. Initially, all patients received chemical therapy and some patients also received endoscopic therapy, which was performed according to empirical choices of endoscopists and patient preferences. Sodium bicarbonate solution (5%; range: 100~200 ml per day) or Coca-Cola® (range: 500~1,000 ml per day) was administered orally for chemical dissolution for seven days. Five endoscopists were responsible for the endoscopies performed to study the patients. Patients with a large-sized phytobezoar (over 5 cm) were recommended for endoscopic therapy. Endoscopic polypectomy snares, biopsy forceps, foreign-body forceps and/or baskets were used.

The following upper endoscopic findings were recorded: gastric phytobezoar (including location, number, size and consistency), ulcer, neoplasm and other diseases. Gastric phytobezoars were classified based on their consistency into three types: hard, soft and mixed (outer soft and inner hard).

Follow-up endoscopy or computed tomography (CT) scans were performed to confirm that the gastric phytobezoar had been completely removed after seven to ten days. Chemical therapy was maintained for seven more days for patients with residual phytobezoars and further endoscopic fragmentation was performed. Surgical removal was considered in cases of any severe complications.

Data of the following variables were collected: age, sex, main complaint, comorbidity, cause

of phytobezoar, upper endoscopic finding, treatment, endoscopic therapeutic devices and outcome.

This study was approved by the Research Ethics Committee of the Beijing Shijitan Hospital, Capital Medical University. All the data were anonymously collected and analyzed.

Statistical methods

The data were analyzed using Statistical Product and Service Solutions version 22.0 (SPSS, Chicago, IL, USA). Categorical variables were expressed as numbers and percentages (%) and compared using Chi-squared (χ^2) test statistics. Continuous variables were expressed as the means ± standard deviation (SD) and range and were compared using the Student's t test. All p values were two-tailed and the level of statistical significance was set at 0.05.

RESULTS

Sixty-eight patients were diagnosed with gastric phytobezoars, while 63 (92.6%) were enrolled for further evaluation. Initially, 48 (76.2%) patients received endoscopic combined with chemical therapy and 15 (23.8%) only received chemical therapy. The basic participant characteristics are shown in table 1.

The causes of phytobezoars included haws (43, 68.2%), persimmons (18, 28.6%) and black jujubes (2, 3.2%). Typical illustrations of phytobezoars are shown in figure 1 and the characteristics of phytobezoars and other upper endoscopic findings are shown in table 1.

Treatments and outcomes

The mean size of phytobezoars in the combined treatment group was larger than in the group with only chemical therapy as a first approach. The combined treatment group patients were older and had more comorbidities, except for a history of partial gastrectomy (Table 1).

Endoscopic devices used initially

Most patients (42, 87.5%) were treated with endoscopic polypectomy snares, while six also used biopsy forceps, two foreign body forceps, one with a basket and one with a net. Four (8.3%) patients were treated only with biopsy forceps and two (4.2%) patients were treated

only with foreign body forceps.

Outcomes

Gastric phytobezoars were completely removed in 51 (81.0%) patients after the first approach (combined treatment 37/48 and only chemical therapy 14/15). Twelve (19.0%) patients received further endoscopic therapies due to a partial removal. One patient who refused endoscopic therapy at first only received chemical therapy and did not achieve a complete removal. The characteristics of the phytobezoars were as follows: single, at the body, longest diameter of 7 cm, mixed consistency and haws. However, a complete removal was finally achieved after endoscopic therapy. Finally, 62 (98.4%) patients achieved a complete removal. Only one patient with intestinal obstruction (caused by fragments of phytobezoars) underwent further surgery. The flow diagram is shown in figure 2.

Considering only patients with combined treatment as a first approach, treatment success (complete removal) was associated with a softer phytobezoar consistency (complete removal: eleven soft, ten hard, and 16 mixed; partial removal: one soft, eight hard, and two mixed [$\chi^2 = 7.587$, $p = 0.023$]).

DISCUSSION

In this study, haws were the most common cause of phytobezoars (68.3%) and persimmons were the second most common cause (28.6%). According to the literature, persimmons are the most common cause (4). The Hawthorn (*Crataegus pinnatifda* Bunge) belongs to the family Rosaceae and is a widespread fruit tree in China (5). The fruits are used for food and medicine. Similar to persimmons, haws are also rich in tannins. Upon digestion, agglutination occurs between tannins and dietary proteins, leading to the formation of phytobezoars (6).

In our study, patients were treated with different methods according to empirical choices of our endoscopists and patient preferences. Chemical therapy is the basic treatment method. In previous studies, Coca-Cola®, diet soda, sodium bicarbonate solution, cellulase, papain, pancreatin, traditional Chinese medicine purgative and even ursodeoxycholic acid have all played positive roles in the dissolution of gastric phytobezoars(4,7-9). Cellulase is not available in our department, while papain, pancreatin, ursodeoxycholic acid and TCM

purgative have not been used to treat phytobezoars. Initially, 15 patients (23.8%) received only chemical therapy and 14 patients (93.3%) with smaller phytobezoars achieved complete removal. This indicates that chemical therapy could play a crucial role for the complete removal of phytobezoars in selected cases. Most patients (76.2%) received endoscopic combined with chemical therapy as the first approach. Endoscopic devices, including endoscopic polypectomy snares, forceps and basket for fragmentation were also used to treat phytobezoars. These patients had larger sized phytobezoars and more comorbidities than who received only chemical therapy, indicating that endoscopists would recommend endoscopic fragmentation for patients with larger phytobezoars and/or more comorbidities. Most patients (81.0%) achieved a favorable outcome with complete removal after a first approach. Meanwhile, one patient with a large mixed consistency phytobezoar did not achieve a complete removal after only chemical therapy, but achieved complete removal after endoscopic therapy. Considering only patients with combined treatment as a first approach, treatment success was associated with a softer phytobezoar consistency. This suggests that endoscopic therapy must be associated with chemical therapy in cases of larger phytobezoars and continuous chemical and endoscopic therapies could be necessary for harder phytobezoars. In our study, one patient with intestinal obstruction underwent further surgery, and complete removal (98.4%) was achieved with different treatments that did not lead to further complications.

The limitation of the study includes the retrospective single-center design and the probable clinical practice variability among different clinicians.

In conclusion, haws and persimmons are both common causes of phytobezoars in Northern China. Most patients achieve a favorable outcome. Chemical therapy is useful in selected cases. Repeated endoscopic therapies may be needed to completely remove phytobezoars with a hard consistency.

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Table 1. Clinical and upper endoscopic characteristics of patients

Variables	*Chemical and endoscopic therapies (n = 48)*	*Chemical therapy only (n = 15)*	*Total (n = 63)*
Male gender (%)	23 (47.9)	7 (46.7)	30 (47.6)
Age, years, X ± SD (range)	64.8 ± 10.7 (32~82)	59.2 ± 15.2 (25~88)	63.5 ± 12.0 (25~88)
Main complaint			
Epigastric pain (%)	48 (100)	14 (93.3)	62 (98.4)
Vomiting (%)	18 (37.5)	9 (60.0)	27 (42.9)
Melena (%)	8 (16.7)	2 (13.3)	10 (15.8)
Hematemesis (%)	4 (8.3)	2 (13.3)	6 (9.5)
Comorbidity			
Hypertension (%)	20 (41.7)	3 (20.0)	23 (36.5)
Diabetes mellitus (%)	17 (35.4)	2 (13.3)	19 (30.2)
Coronary heart disease (%)	14 (29.2)	1 (6.7)	15 (23.8)
History of partial gastrectomy (%)	7 (14.6)	3 (20.0)	10 (15.8)
Gastric phytobezoars			
Location (%)			
Fundus	12 (25.0)	4 (26.7)	16 (25.4)
Body	26 (54.2)	7 (46.7)	33 (52.4)
Antrum	2 (4.1)	0	2 (3.2)
Gastric remnant	7 (14.6)	3 (20.0)	10 (15.8)
Duodenal bulb	1 (2.1)	1 (6.6)	2 (3.2)
Single (%)	42 (87.5)	13 (86.7)	55 (87.3)
Longest diameter, cm, X ± SD (range)	5.3 ± 1.7 (1~10)	4.2 ± 1.4 (2~7)	5.1 ± 1.7 (1~10)
Consistency (%)			
Soft	12 (25.0)	2 (13.3)	14 (22.2)
Hard	18 (37.5)	8 (53.4)	26 (41.3)

Mixed	18 (37.5)	5 (33.3)	23 (36.5)
Other endoscopic findings (%)			
Gastric ulcer	33 (68.8)	12 (80.0)	45 (71.4)
Duodenal ulcer	3 (6.2)	0	3 (4.8)
Pyloric obstruction	1 (2.1)	0	1 (1.6)
Reflux esophagitis	1 (2.1)	1 (6.7)	2 (3.2)
Gastric cancer	0	2 (13.3)	2 (3.2)
Others	10 (20.8)	0	10 (15.8)
Complete removal (%)	37 (77.1)	14 (93.3)	51 (81.0)

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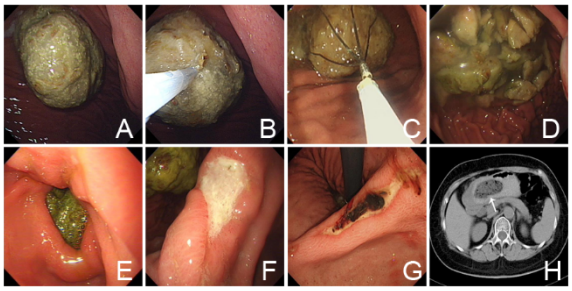

Fig. 1. Illustrations of gastric phytobezoars. A. A phytobezoar located at the body. B. Endoscopic polypectomy snares for endoscopic fragmentation. C. Endoscopic basket for endoscopic fragmentation. D. Small fragments of phytobezoars after endoscopic fragmentation. E. A phytobezoar located at the duodenal bulb. F. A pressure ulcer of the angulus. G. A pressure ulcer of the angulus, with signs of bleeding. H. Computed tomography scan of the abdomen showing a gastric outlet obstruction due to a mass (phytobezoar).

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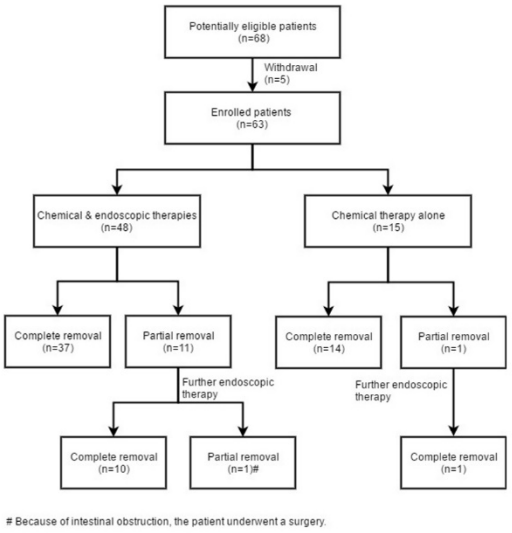

Fig. 2. Flow diagram showing the different treatments and outcomes of patients with gastric phytobezoars.