

# Small Bowel Obstruction Caused by Bezoars

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The aim of the present study was a clinical analysis of small bowel obstruction caused by bezoars surgically treated. Seven patients with small bowel obstruction caused by bezoars were retrospectively reviewed. Two patients had undergone gastric surgery. The symptoms before surgery lasted from 1 to 3 days in the non-ileus tube group and from 9 to 30 days in the ileus tube group. Four patients were preoperatively diagnosed with bezoar ileus, and one had intestinal tumor. The remaining two patients were diagnosed with postoperative adhesive ileus. The operative procedure was evacuation of bezoars for all patients. One patient needed incisions of the small intestine and the stomach for the complete evacuation of bezoars. The site of the small bowel obstruction was the ileum in all patients, and bezoars ranged from 30 to 60 mm in diameter. Morbidity was present in one patient who underwent insertion of ileus tube for a long-term treatment. Small bowel obstruction caused by bezoars is not uncommon in patients without any gastric surgery. It is important, preoperatively and intraoperatively, to examine the entire gastrointestinal tract for the presence of bezoars. When bezoars ileus was suspected, insertion of ileus tube should be avoided.

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## Introduction

The term bezoars (BZs) refers to masses of indigestible materials that form in the stomach. BZs are classified according to their contents as phytobezoar (PBZ), trichobezoar (TBZ; hair), lactobezoar (concentrated milk formulas), mixed medication BZ, and food bolus BZ.<sup>1-3</sup> PBZs are gastric concretions composed of indigestible matter such as skins, seeds, and fibers of fruits and vegetables. BZs are uncommon causes of mechanical small bowel obstruction.<sup>4,5</sup> We treated 7 patients with small bowel obstruction caused by PBZs in 5 and food bolus BZs in 2, and discuss these rare entities.

## Subjects and Methods

The subjects were 7 patients (3 men and 4 women) with small bowel obstruction caused by bezoars who were surgically treated at Department of Surgery of Nagasaki Prefectural Shimabara Hospital between December 1998 and December 2005. Their age at surgery varied from 48 to 91 years with the median of 71.7 years. We compared the duration of symptoms before surgery and morbidity be-

tween the non-ileus tube group and the ileus tube group; the former group consisted of patients without insertion of ileus tube preoperatively, while the latter group consisted of patients with insertion of ileus tube preoperatively.

## Results

The individual clinical details are summarized in Table 1, including age, sex, the duration of symptoms before surgery, past history, clinical symptoms, preoperative diagnosis, operative procedures, site of obstruction, size of BZs, type of BZs, and morbidity.

Three patients had received abdominal surgery in the past. Of these patients, two (Case 3 and Case 7) had undergone gastric surgery for gastric ulcer and gastric cancer, respectively. The interval between symptoms and gastrectomy was 43 years and 4 years in Case 3 and Case 7, respectively. Appendectomy and left lobectomy of the thyroid for thyroid cancer had been carried out in one patient each.

The symptoms observed were abdominal pain, abdominal fullness and vomiting. The duration of symptoms before surgery ranged from

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**Table 1.** Clinical details of the subjects

Case No.	Age (years) <sup>a</sup>	Sex <sup>b</sup>	Duration (days)	Previous surgery	Symptoms	Preoperative diagnosis	Ileus tube	Method of operation	Site	Maximum size (mm)	Type	Morbidity	Outcome
1	82	M	2	-	Abdominal pain Abdominal fullness Vomiting	Bezoar ileus	-	Evacuation	Ileum	30	Phytobezoar	-	Recovered
2	48	F	1	Appendectomy	Abdominal pain Vomiting	Adhesive ileus	-	Evacuation	Ileum	38	Phytobezoar	-	Recovered
3	73	F	2	Gastrectomy	Abdominal pain Abdominal fullness	Adhesive ileus	-	Evacuation	Ileum	60	Food bolus	-	Recovered
4	67	F	3	Left lobectomy of thyroid	Abdominal pain Vomiting	Bezoar ileus	-	Evacuation	Ileum	40	Phytobezoar	-	Recovered
5	91	F	30	-	Vomiting	Ileus caused by intestinal tumor	+	Evacuation	Ileum	44	Phytobezoar	Pneumonia Heart failure	Recovered
6	51	M	2	-	Abdominal pain Abdominal fullness Vomiting	Bezoar ileus	-	Evacuation	Ileum Stomach	Not detected	Food bolus	-	Recovered
7	90	M	9	Gastrectomy	Abdominal pain Vomiting	Bezoar ileus	+	Evacuation	Ileum	45	Phytobezoar	-	Recovered

<sup>a</sup>Age at surgery.<sup>b</sup>M=Male; F=Female.

1 day to 3 days in the non-ileus tube group, while it was 9 days and 30 days in the ileus tube group (Case 5 and Case 7).

Four patients were preoperatively diagnosed with PBZ ileus based on computed tomography (CT) findings (Figures 1, 2 and 3) and an upper gastrointestinal series by Gastrografin<sup>®</sup>. One patient (Case 5) was preoperatively diagnosed with intestinal tumor by Gastrografin<sup>®</sup> enterography through ileus tube (Figure 4). The remaining two patients (Case 2 and Case 3) were diagnosed with postoperative adhesive ileus.

The operative procedure in all patients was evacuation of BZs under incision of the intestinal wall. One patient (Case 6) required

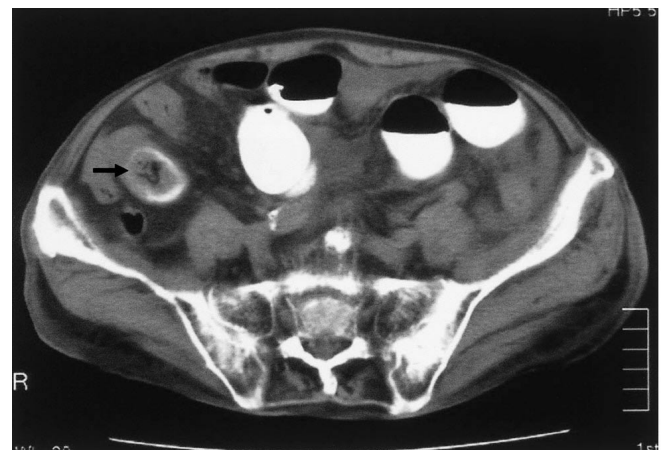
incisions of the small intestine and the stomach for complete evacuation of BZs (Table 1).

The site of small bowel obstruction was the ileum in all patients, and BZs ranged from 30 to 60 mm in diameter. Of the 7 patients with BZs, 5 were PBZs and 2 were food bolus BZs. Food bolus BZs included "konnyaku," which is a gelatinous food made from devil's tongue starch (Case 3), and indigestible "bulbul," taken 2 weeks before admission (Case 6).

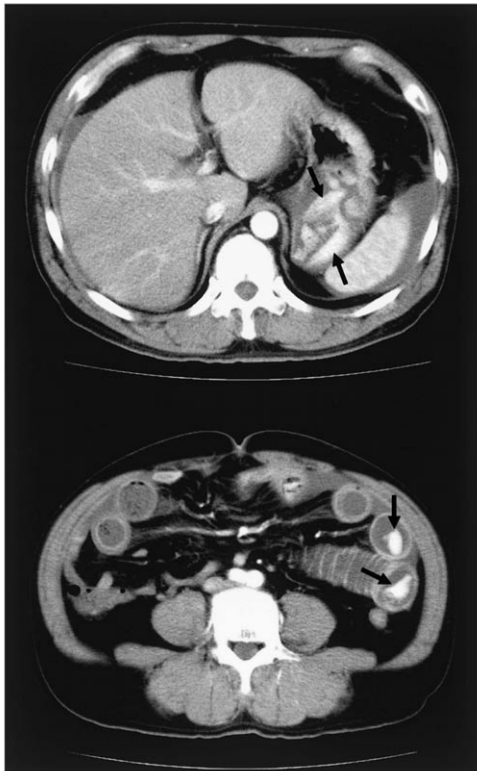
Morbidity was present in one patient (Case 5) who underwent insertion of ileus tube for a long-term treatment.



**Figure 1.** Case 1. Pelvic CT showing a phytobezoar (arrow) in the small intestine.



**Figure 2.** Case 7. Pelvic CT showing a phytobezoar (arrow) in the terminal ileum after Gastrografin<sup>®</sup> enterography.



**Figure 3.** Case 6. Abdominal CT showing multiple food bolus (arrows) in the stomach and the small intestine.



**Figure 4.** Case 5. Gastrografin® enterography showing a phytobezoar (arrow) in the small intestine, which was misdiagnosed as intestinal tumor.

## Discussion

Patients with gastric surgery have a greatly increased risk of BZs formation. Mir and Mir<sup>6</sup> first reported the small bowel obstruction caused by PBZs in patients with previous vagotomy and gastroenterostomy for duodenal ulcer. Some factors, including vagotomy, ingestion of foods with high fiber contents, reduced gastric secretions, and diminished gastric motility and emptying after gastrectomy, are considered responsible for PBZs.<sup>7,8</sup> Krausz et al.<sup>9</sup> reported that 106 of 115 patients with gastrointestinal complications due to persimmon PBZs had undergone gastric operation for duodenal ulcer such as vagotomy and pyloroplasty, and Vellar et al.<sup>10</sup> reported 9 patients with various PBZs, all of whom have had previous vagotomy and drainage procedures for duodenal ulcer.<sup>10</sup> Vagotomy may promote the formation of gastric BZs, and drainage operation may enhance the passage of BZs into the small intestine.<sup>6,10</sup> In our series, only 2 patients previously underwent partial gastrectomy. Small bowel obstruction caused by BZs also occurred in 30-42% of patients with intact gastrointestinal tract.<sup>11-14</sup> In our series, 4 patients (57%) had intact gastrointestinal tract.

The majority of the contents in PBZs reported was orange pulp, followed by figs, apples, grapefruit, persimmons, coconuts, cabbage, beans, and potatoes.<sup>15</sup> Indigestible "konnyaku" and "bulbul" seen in our patients indicated their habit of poor mastication of food.

The operative procedure commonly includes fragmentation of BZs and milking them into the colon through the ileocecal valve, and if these are impossible, enterotomy and evacuation of BZs are performed.<sup>10,13,16</sup> Bowel resection should be avoided, except for a case of perforation or circulatory disturbance of the intestine. Preoperatively and intraoperatively, it is important to entirely examine the stomach, duodenum and small intestine, because multiple BZs are often present. In our series, only one patient had multiple food bolus BZs. Our patients with BZs ileus have experienced no recurrent disease after surgery.

In conclusion, small bowel obstruction caused by bezoars is not uncommon in patients without any gastric surgery. It is important, preoperatively and intraoperatively, to examine the entire gastrointestinal tract for the presence of bezoars. When bezoars ileus is suspected, insertion of ileus tube should be avoided.

## References

- Andrus CH, Ponsky JL. Bezoars. Classification, pathophysiology and treatment. *Am J Gastroenterol* 83: 476-478, 1988
- Saeed ZA, Rabassa AA, Anand BS. An endoscopic method for removal of duodenal phytobezoars. *Gastrointest Endosc* 41: 74-76, 1995
- Gürses N, Gürses N, Özkan K, Özkan A. Bezoars-analysis of seven cases. *Z Kinderchir* 42: 291-292, 1987
- DeBakey M, Oschner A. Bezoars and concretions. *Surgery* 4: 934-963, 1983
- DeBakey M, Oschner A. Bezoars and concretions. *Surgery* 5: 132-160, 1983
- Mir AM, Mir MA. Phytobezoar after vagotomy with drainage or resection. *Br J Surg* 60: 846-849, 1973
- Calabuig R, Navarro S, Carrio I, Artigas V, Mones J, Puig LaCalle J. Gastric emptying and bezoars. *Am J Surg* 157: 287-290, 1989
- Verstandig AG, Klin B, Bloom RA, Hadas I, Libson E. Small bowel phytobezoars: detection with radiography. *Radiology* 172: 705-707, 1989

9. Krausz MM, Moriel EZ, Ayalon A, Pode D, Durst AL. Surgical aspects of gastrointestinal persimmon phytobezoar treatment. *Am J Surg* 152: 526-350, 1986
10. Vellar DJ, Vellar ID, Pucius R, Steedman PK. Phytobezoars—an overlooked cause of small bowel obstruction following vagotomy and drainage operation for duodenal ulcer. *ANZ J Surg* 56: 635-638, 1986
11. Goldstein SS, Lewis JH, Rothstein R. Intestinal obstruction due to bezoars. *Am J Gastroenterol* 79: 313-318, 1984
12. Swift RI, Wood CB, Hershman MJ. Small bowel obstruction due to phytobezoars in the intact gastrointestinal tract. *J R Coll Surg Edinb* 34: 267-269, 1989
13. Lo CY, Lau PW. Small bowel phytobezoars: an uncommon cause of small bowel obstruction. *ANZ J Surg* 64: 187-189, 1994
14. Lee JF, Leow CK, Lai PB, Lau WY. Food bolus intestinal obstruction in a Chinese population. *ANZ J Surg* 67: 866-868, 1997
15. Buchols RR, Haisten AS. Phytobezoars following gastric surgery for duodenal ulcer. *Surg Clin N Am* 52: 341-352, 1972
16. Escamilla C, Robles-Campos R, Parrilla-Paricio P, Lujan-Mompean J, Liron-Ruiz R, Torralba-Martinez JA. Intestinal obstruction and bezoars. *J Am Coll Surg* 179: 285-288, 1994