BEZOARS IN CHILDREN: REPORT OF FOUR CASES

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Abstract: We reviewed the histories of four children (2 boys and 2 girls, aged 6 mo to 10 yr) with surgically proven bezoars, treated from 1991 to 1998. Two had gastric bezoars and two had intestinal bezoars. All four patients presented with gastrointestinal symptoms and none had undergone previous surgery. Three had a history of abnormal ingestion, including one who ate a pickled fruit from the Boraginaceae (locally known as Po-pu-tsu) plant for 1 year. Plain radiographs revealed intestinal obstruction in all four patients. Abdominal sonography disclosed a hyperechoic band-like lesion and acoustic shadow in both cases of gastric bezoar, and these bezoars were subsequently confirmed by gastric endoscopy. Lower gastrointestinal studies showed obstruction considered most likely to be due to bezoar in one case, while computed tomography (CT) revealed a characteristic small bowel mottled gas pattern in another. Surgical treatment relieved obstruction in all four patients. Bezoar should be suspected in patients with intestinal obstruction who have a history of ingestion of unusual substances. The findings of this report suggest that sonography and endoscopy are useful in the diagnosis of gastric bezoar, while CT is useful in the detection of intestinal bezoar.

Here, we describe a case of bezoar associated with consumption of pickled fruit from a plant called Boraginaceae (locally known as Po-pu-tsu), found in Southeast Asian countries and Australia, which had not previously been reported to contribute to bezoar formation. In addition, we describe another three children with bezoar who presented with unusual histories and characteristic imaging findings.

Case Reports

From November 1991 to July 1999, four patients with bezoar and gastrointestinal obstruction were admitted to the Department of Pediatrics of Chang Gung Children’s Hospital in Kaohsiung, Taiwan.

Case 1
An 8-year-old boy complained of occasional abdominal pain for 1 year, and was admitted to the hospital on 30 June 1993,
when the pain became aggravated. Physical examination revealed neither gross abnormality nor a palpable abdominal mass. The results of laboratory examinations were normal. A hyperechoic band-like mass with an acoustic shadow was found in the stomach on abdominal sonography (Fig. 1). Endoscopy disclosed two large, round, gray, solid masses in the stomach, and gastric bezoar was suspected. Two greenish-gray and firm gastric bezoars were removed via gastrotomy. The components of the bezoars remained unclassified, even after pathologic examination. The patient remained asymptomatic during a 6-year follow-up period.

**Case 2**
A 10-year-old girl with a history of pica complained of abdominal pain and vomiting for 1 day and was admitted on 14 November 1991. She had the habit of pulling hairs from her scalp and swallowing them when she became nervous. Stool passage containing hair was found before surgery. A palm-sized mass was palpable over the epigastric area. Sonography showed multiple bands of hyperechoic mass with acoustic shadowing in the stomach and the intestine. Endoscopy disclosed elongated material containing hair along the greater curvature side of the stomach, with a portion impacting the pylorus. Gastric trichobezoar with gastric outlet obstruction was diagnosed. A 7 x 3 x 2.7-cm trichobezoar was removed by gastrotomy. Additionally, a sigmoid trichobezoar was fragmented and pushed forward to the anus during laparotomy. Trichobezoar was confirmed by pathology. She was asymptomatic during 8 years of follow-up.

**Case 3**
A 6-month-old infant had suffered from chronic diarrhea since birth. He was fed a highly concentrated formula for 1 month because of diarrhea. He had fever and vomiting for 5 days prior to admission on 3 February 1994. On physical examination, he was ill-looking and dehydrated, with a distended abdomen. Sonography showed multiple dilated bowel loops, but no detectable mass. A lower barium enema series showed transcolonic obstruction, most likely due to bezoar (Fig. 2). During emergency laparotomy, lactobezoars were fragmented and pushed into the colon. He remained asymptomatic during a 5-year follow-up period.

**Case 4**
A 4-year-old girl was fed pickled fruit from the Boraginaceae plant every day for about 1 year to improve her appetite. In October 1997, she complained of vomiting and abdominal pain, and plain radiographs and sonography showed intestinal obstruction. Computed tomography (CT) of the abdomen demonstrated an ovoid mass with mottled gas in the distal small bowel and abrupt change in small bowel caliber, compatible with bezoar (Fig. 3). A 4 x 4-cm phytobezoar about 80 cm above the ileocecal valve was fragmented and pushed into the cecum during laparotomy. She remained asymptomatic during a 2-year follow-up period.

**Discussion**
Bezoar is a large conglomerate of vegetable fibers, hair, or milk curds, or a concentration of other substances, located in the stomach or the intestine [5]. Because bezoars arise in various locations, they can cause vague symptoms including epigastric distress, fullness, bloating,
nausea, vomiting, dysphagia, early satiety, weight loss, upper gastrointestinal hemorrhage, indigestibility, gastric outlet obstruction, or intestinal stasis [2, 6]. Treatment procedures depend on the type and location of bezoars [2]. Previous gastric surgery, especially truncal vagotomy and pyloroplasty, may predispose the patient to bezoar formation. This explains why most bezoars occur in adults [3, 4].

There have been an increasing number of reports of phytobezoar in the recent medical literature [7, 8]. Phytobezoars can be formed by at least 50 foods including persimmons, grapes, oranges, prunes, raisins, figs, cherries, coconuts, peaches, apples, bran, oats, celery, pumpkins, cabbage, collard greens, sauerkraut, and peanuts [9]. Persimmons are most frequently implicated as a source of phytobezoar [4]. It is customary in certain areas of Taiwan to eat the pickled fruit of the Po-pu-tsu plant as an appetizer. The sticky pulp and indigestible seeds of this fruit may form a phytobezoar if ingested excessively. This form of phytobezoar (Boraginaceae-induced) has not previously been reported.

Lactobezoars are frequently found in low-birthweight or premature neonates fed a highly concentrated formula within the first weeks of life [2, 7]. Precipitating factors include dehydration and poor neonatal gastric motility [10]. Most lactobezoars are found in the stomach rather than the intestine and respond to conservative treatment that includes cessation of feeding for 24 hours, gastric lavage, and the use of less concentrated formula [5, 7, 10]. Small bowel obstruction rarely occurs, particularly in term infants. If it does, it may be complicated by perforation [5, 11]. Cook and Rickham described eight cases of lactobezoar among 600 cases of neonatal intestinal obstruction [11]. To the best of our knowledge, case number 3 in our series is the first reported case of intestinal lactobezoar without perforation occurring in a child older than 6 months.

A history of trichophagia is important in the diagnosis of trichobezoar, although the incidence of trichobezoar in trichotillomania is low [12]. Trichobezoars are usually found in the stomach and less frequently in the intestine [6]. The clinical presentation may be either variable gastrointestinal symptoms or asymptomatic, with a characteristic mass on physical examination [7]. The risk factors for pica include female sex, mental retardation, age less than 30 years, and underlying behavior disorder [6, 7]. The term “Rapunzel syndrome” refers to the extension of a hairball from the stomach into the distal bowel [5, 7]. In our patient, there was no significant connection between the two trichobezoars, which were located separately in the stomach and the sigmoid colon.

Plain radiographs, ultrasonography, barium enema, gastric endoscopy, and CT are helpful in the preoperative diagnosis and localization of bezoars [2, 8]. Plain abdominal radiography is helpful in the diagnosis of intestinal obstruction but contributes little to the confirmation of bezoar [8]. Barium studies may help to detect bowel obstruction but the retained barium may interfere with other imaging studies [8]. Recently, abdominal ultrasonography has been used frequently to detect foreign bodies, but a definitive diagnosis is difficult to establish with this diagnostic modality alone [13]. A hyperechoic band-like lesion with an acoustic shadow in the stomach may lead to the tentative diagnosis of gastric bezoar. Gastric endoscopy can then confirm this finding. The latter may be the diagnostic tool of choice to identify gastric bezoar, but is of no value in the detection of intestinal bezoar [13]. The value of CT in the detection of lesions underlying small bowel obstruction is supported in one of our cases in which a characteristic mottled gas pattern led to the diagnosis of intestinal bezoar [8].

The ultimate goal of bezoar treatment is removal and prevention of recurrence [7, 12]. The principles of treatment depend on the location and type of bezoar [2, 5]. Conservative treatment, enzymatic methods, and endoscopic management are helpful in some cases, but exploratory laparotomy is indicated if these are unsuccessful [2, 7, 13]. Gastrotomy is the surgical treatment of choice to remove a gastric bezoar [4]. Enterotomy should be avoided and an intestinal bezoar should be fragmented and milked to the cecum [5]. In addition, the rest of the stomach and the intestine must always be checked for residual bezoars during surgery [3, 5].

Major complications associated with bezoar include intestinal obstruction, gastroduodenal ulceration with
hemorrhage, gastritis, perforation, and anorexia with weight loss[2]. Early diagnosis and the use of appropriate diagnostic tools can minimize the occurrence of these complications.

References