An unusual association of gastroduodenal phytobezoar and malrotation of the midgut

V. Raveenthiran

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Abstract This report describes, for the first time, the association of phytobezoar and malrotation of midgut in an 18-month-old male child. He recovered after Ladd's operation, enterotomy removal of the bezoar and tapering duodenoplasty. Nowadays gastroduodenal phytobezoars are increasingly treated by non-surgical methods such as endoscopic disintegration or enzymatic dissolution. The case reported herein emphasizes that underlying anatomical malformations must be excluded before initiating medical management of gastroduodenal phytobezoars in children.

Keywords Phytobezoar · Intestinal obstruction · Malrotation of gut · Endoscopy

Introduction

Phytobezoars are gastrointestinal concretions composed of undigested or indigestible plant products such as seeds, fruit-skin and vegetables fibers [1]. Association of this uncommon entity with midgut malrotation and its therapeutic implications does not appear to have been reported earlier.

Case report

An 18-month-old male child presented with bilious vomiting, progressive abdominal distension, failure to thrive and constipation of one-month duration. He was emaciated weighing only 7.5 kg. Vague nodular masses were palpable in the abdomen. Visible gastric peristalsis was absent. Peripheral lymph nodes were not enlarged. Palpable nodules in abdomen were clinically mistaken for enlarged mesenteric nodes and hence abdominal lymphoma was suspected.

Investigations revealed anemia and hypoproteinemia. Imaging studies and hematological investigations ruled out the clinical suspicion of lymphoma. Ultrasonography and barium-meal study (Fig. 1) showed hugely dilated duodenum with multiple filling defects and obstruction at duodeno-jejunal junction. On retrospective questioning a history of tamarind seeds (*Tamarindus indica*) pica was obtained. Although a phytobezoar was diagnosed, endoscopy was not resorted for three reasons: (1) Endoscopic disintegration of the bezoar was contraindicated because of distal obstruction, (2) Endoscopic retrieval of multiple seeds was deemed to be technically demanding, (3) obstructed and hugely distended duodenum justified surgery on its own merits.

Laparotomy revealed malrotated midgut with duodenal obstruction by Ladd's band. Malrotation was corrected by Ladd's procedure. The hugely dilated redundant duodenum required tapering duodenoplasty. The phytobezoar was removed in piece-meal through duodenotomy. The bezoar was composed of undigested tamarind seeds, uncooked

V. Raveenthiran (✉)
Department of Pediatric Surgery,
Rajah Muthiah Medical College,
Annamalai University, Annamalai Nagar - 608 002
India

E-mail: vrthiran@yahoo.co.in

rice, pulses and nuts (Fig. 2). Subsequently, he was discharged in good health. On review after two years he was asymptomatic and had gained 5 kg weight.

Fig. 1 Barium meal study showing dilated stomach (Black arrows) and duodenum (White arrows) with multiple filling defects. Obstruction of contrast at duodeno-jejunal junction is evident. Despite the presence of malrotated midgut, the appearance of duodenum crossing the midline is an illusion created by hugely dilated redundant duodenum.

Fig. 2 A part of the removed phytobezoar showing tamarind seeds and other uncooked grains.

Discussion

In contrast to herbivorous animals, human beings cannot digest cellulose content of food due the absence of the enzyme *cellulase* in the human intestine [1]. Cellulose, which is the fiber content of food, is normally cleared by the motility of gut. Impaired bowel clearance as in patients with previous gastrointestinal surgeries, hypomotility syndromes (e.g. diabetic gastroparesis, hypothyroidism) and intestinal blind loops (e.g. Meckel diverticulum, duodenal diverticulum) are known to predispose bezoar formation [2]. However bezoar formation due to chronic obstruction of malrotated midgut has not been reported earlier.

The recommended treatment of phytobezoar varies according to its location. Small intestinal phytobezoars almost always require surgical (laparotomy or laparoscopy) removal [3]. Colorectal phytobezoars are treated with oral Polyethylene glycol-electrolyte solution (Golytely) or with enema. Gastroduodenal phytobezoars are increasingly treated by non-surgical methods [4, 5]. They include gastroscopic removal, destruction by Nd-Yag Laser and disintegration by snare or water jet of endoscope [4]. As absence of cellulase is a predisposing factor of phytobezoars, enzymatic dissolution has also gained widespread acceptance [5]. Enzymes such as cellulase, papain and pancreolipase have been used either with or without prokinetic agents (e.g. cisapride and metaclopramide), acetyl cystine or endoscopic lavage [5]. Strict abstinence of oral feeds for a few days is also said to cure this. Non-medicinal agents used in dissolution therapy include *coca-cola* [6] and pineapple juice.

Surgery is no longer recommended for gastroduodenal phytobezoars as they are easily treated by endoscopic disintegration or enzymatic dissolution. The case reported herein, however, is an exception to this modern trend. The child required laparotomy for the correction of coexisting malrotation of gut and for tapering the hugely distended redundant duodenum. Application of endoscopic or enzymatic treatment would have caused recurrence of phytobezoar in this patient due to uncorrected underlying malrotation of midgut.

Rare at any age, phytobezoar is extremely uncommon in children. A review, of pediatric literature in English language, revealed fewer than 30 cases being reported. Phytobezoars below the age of two-years are still rarer. The chance of gastrointestinal malformations predisposing the formation of phytobezoar appears to be inversely proportional to the age of the child. In the boy reported herein, luminal compression by Ladd's band of malrotated gut had caused duodenal obstruction. The combination of impaired bowel clearance as a consequence of duodenal obstruction and pica had led to phytobezoar formation in him. In conclusion, congenital malformations of gut, which require surgical correction, must be excluded before initiating non-surgical treatment of gastroduodenal phytobezoars in children.

Conflict of interest The author is an associate editor of this journal; but he was not involved in the review process of this manuscript.

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