Gastric phytobezoars may be treated by nasogastric Coca-Cola lavage
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Large gastric phytobezoars may occur in patients with gastric dysmotility disorders. Treatment options include dissolution with enzymes, endoscopic fragmentation with removal or aspiration, and surgery. We report our experience with nasogastric cola lavage therapy. Over an 8-year period, five consecutive patients were referred to our unit for endoscopic treatment of large gastric phytobezoars. They included one patient with lobectomy for lung cancer and four patients with diabetic gastroparesis. An initial attempt of endoscopic fragmentation and removal was unsuccessful. Patients were treated with 3 l of Coca-Cola nasogastric lavage over 12 h. Nasogastric lavage was very well tolerated by the patients. Complete phytobezoar dissolution was achieved in one session in all cases. There were no procedure-related complications. The dissolution of large gastric phytobezoars with cola nasogastric lavage is a safe, rapid and effective method. Patients may be treated in the medical ward, avoiding therapeutic endoscopy or surgery.


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Introduction
Phytobezoars are persistent concretions of plant and vegetable fibres in the stomach. The reported incidence is 0.4% [1]. They may occur in patients who have undergone gastric surgery [2] and delay gastric emptying because of diabetes mellitus, mixed connective tissue disease or hypothyroidism [3]. Gastric phytobezoars are usually asymptomatic. However, some patients may experience epigastric pain, nausea, vomiting, foul breath, diarrhoea, gastric ulceration, upper-gastrointestinal bleeding and perforation, anorexia and weight loss.

Before the 1960s, phytobezoars were treated surgically. Nowadays, therapy is still empirical. Treatment options include dissolution with proteolytic or cellulase enzymes [4], endoscopic fragmentation and extraction [5] or suction [6], and surgery for conservative treatment failures [7]. We report the results of nasogastric Coca-Cola lavage in five consecutive patients with large gastric phytobezoars. Until now, this mode of therapy has not been reported.

Patients and methods
During an 8-year period, we treated five consecutive patients with large gastric phytobezoars. They included four males and one female, aged 57–71 years.

The first case
A 57-year-old white male was referred to our endoscopy unit for phytobezoar endoscopic removal. His past medical history included lobectomy for lung cancer 6 months before the referral. He had completed his courses of chemotherapy, and he was disease-free at follow-up. However, over the previous few weeks he started complaining of epigastric fullness, nausea, anorexia and weight loss. The attending oncologist asked for a barium meal to be carried out, which showed multiple filling defects in the stomach (Fig. 1). The oncologist referred the patient to us for endoscopic evaluation and treatment.

Upper-gastrointestinal endoscopy was performed 3 days after the barium meal with an Olympus GIF–1T20 gastroscope, which has a 3.7 mm aspiration channel. The gastric lumen was full of a dark-green semisolid material. We tried to break the phytobezoar with a large (6 × 8-cm) Dormia basket. The procedure lasted about 15 min. The patient was admitted to our hospital, placed on water only by mouth and given an intravenous infusion of metoclopramide 20 mg over 16 h. Repeat endoscopy the following morning showed that treatment had failed. The stomach still contained copious phytobezoar material.
The idea of Coca-Cola nasogastric lavage therapy

A few weeks before treating this patient, while chatting about car services, one of our team said that a car engineer had told him that whenever he could not release a screw from a nut, he placed them overnight into a cup of cola. The following morning, the surface of the metallic material would be clean and would unscrew easily. In view of our inability to treat the phytobezoar endoscopically, we decided that gastric lavage with cola could possibly dissolve the bezoar.

A double-lumen nasogastric tube (12 F) was inserted into the stomach of the patient, and continuous gastric lavage was performed using 3 l of Coca-Cola over a 12-h period. During lavage, the patient remained in the recumbent position to prevent aspiration. Drainage of the Coca-Cola was done by gravity. No procedure-related complications occurred. The next morning, endoscopy was repeated. The phytobezoar had been dissolved completely, and the stomach contained only clear gastric juice.

Four cases with diabetic gastroparesis

Following this first case, we have treated four additional patients with large gastric phytobezoars. All four patients had a long-standing history of diabetes mellitus. They had been referred to our unit for endoscopy because of non-ulcer dyspepsia, nausea, early satiety, vomiting, anorexia and weight loss.

After endoscopic diagnosis of bezoars, no effort was made to remove the phytobezoars endoscopically. All patients were treated in the same way as the first case. The only difference was that the lavage of the stomach was carried out with Coca-Cola Light, which contains aspartame as a sweetener, because the patients were diabetic. One day after lavage, the patients were re-endoscoped. The phytobezoars had dissolved completely in each case, permitting precise endoscopic examination of the stomach and the duodenum. Mild gastric mucosa abnormalities consisting of patchy erythema and oedema were noticed, while the duodenum was normal to the second part.

Follow-up

All five patients were advised to drink two glasses (500 ml) of Coca-Cola every other day after discharge from hospital. On follow-up endoscopy (4/5 cases), no bezoar recurrence was noticed 3–15 months after Coca-Cola lavage therapy.

Discussion

Our clinical report shows that gastric phytobezoars could be treated successfully using gastric lavage with cola. This phytobezoar conservative therapy is rapid (12 h) and has no side effects. To the best of our knowledge, phytobezoar therapy with cola lavage has not been reported previously. Data sources obtained by PubNet search using the keyword 'phytobezoar' identified 212 publications from 1965 to the present day. Ten per cent of the papers reported biliary bezoars, about 50% were cases of intestinal obstruction by phytobezoars, and 40% reported the results of various treatment modalities of gastric phytobezoars. They also included a few reviews on the topic, the most recent published in 1993 [4]. When we used 'Coca-Cola' as a keyword, PubNet data identified one paper [8] and one letter/comment [9] reporting successful Coca-Cola therapy of cases with meat bolus obstruction in benign oesophageal strictures.

Conservative treatment of phytobezoars includes endoscopic fragmentation or administration of dissolution agents. Surgery is reserved for conservative treatment failures. To break up bezoars into pieces and remove
them, various endoscopic methods and accessories have been used, including directed water jets [5], biopsy forceps [10], polypectomy snares [11], Dormia baskets [12], endoscopic electrohydraulic lithotripsy [13], neodymium yttrium aluminium garnet (Nd:YAG) laser [14], and enzyme injections directed into the bezoars [3,15]. Subsequently, bezoars were extracted or left to clear spontaneously.

Although these endoscopic methods were successful in most patients, they have two major disadvantages. First, they are time consuming, requiring 1–2 h per session, with complete evacuation of the stomach from the phytobezoar requiring up to three sessions [7]. Second, in most cases, large-diameter overtubes were used to facilitate the procedure and prevent aspiration. However, overtubes may cause complications, such as ulceration, bleeding, haematomas and visceral perforation [7]. Recently, successful direct endoscopic succion of phytobezoars with a 6.0-mm channel endoscope (Olympus GIF XT30) has been reported [6]. This procedure is safe and fast, but it requires an experienced endoscopist, and the GIF XT30 gastroscope is available in only a few endoscopy units.

Various medical therapies for phytobezoar dissolution have been reported, including lavage with acetylcysteine [16], metoclopramide administration [17], and oral therapy with a multienzyme preparation [18], papain [4] or cellulase [19]. In a recent review [4], papain was effective in treating 13/15 patients, but therapy lasted for up to 6 months. Besides this, papain may cause gastric ulceration, oesophageal perforation and hypernatraemia [4]. Today, the only available source of papain is Adolph’s Meat Tenderizer, which is mixed with clear liquid and administered orally or with lavage [20]. Cellulase was first used to treat postgastrectomy phytobezoars in 1968 [19]. A review of the published cases (n = 19) [4] showed a 100% success rate. The length of therapy was 2–7 days; there were no side effects. Although cellulase therapy is effective and safe, products containing cellulase are available.

We have shown that Coca-Cola lavage is a safe, quick and effective treatment for dissolution of gastric phytobezoars. However, other cola beverages could be equally effective. Coca-Cola is cheap and available worldwide. Coca-Cola Light, a sugar-free product, may be consumed by diabetics. The procedure is simple, could be carried out at the bedside, and does not require endoscopic intervention. It is worth noting that all our patients were bezoar-free after only one lavage with cola, which lasted for only 12 h, and that they remained bezoar-free at follow-up. Whether drinking two glasses of cola beverages every other day as maintenance treatment helps the patients to remain bezoar-free remains to be clarified.

After gastric surgery for peptic ulcer disease, besides gastric dysmotility, patients also have low gastric acid secretion. Similarly, patients with long-standing diabetes mellitus have autovagotomy because of autonomic neuropathy. Autoimmune chronic gastritis and gastric atrophy may also be seen with long-standing diabetes. Therefore, diabetics may have gastric hypomotility and low gastric acid output. Acid is important to digest fibre. Coca-Cola contains carbonic and phosphoric acid and has a pH of 2.6 [21], which is close to the pH 1–2 of normal gastric secretions. We therefore suggest that Coca-Cola acidifies the gastric contents and liberates carbon dioxide bubbles into the stomach, which disintegrate phytobezoars.

In conclusion, our findings support the efficacy and safety of cola treatment for gastric phytobezoars, but our observations need further clarification by a controlled trial including a larger number of patients.

References