**Case Report**

**Intestinal Obstruction Due to Phytobezoars of Banana Seeds: A Case Report**

Volker Schöffl, Rergchai Varatorn, Oleg Blinnikov and Virak Vidamaly, Surgery Clinic, Klinikum Bamberg, Bamberg, Germany, and 1Department of Surgery, Lao-Luxembourg Hospital, Ban Phonemy, Laos.

Phytobezoars are a well-known, though rare, cause of mechanical alimentary tract obstruction. They occur mainly in patients who have undergone abdominal surgery, where most literature reports describe the causes as persimmons and oranges. We report four cases, seen within a period of 19 months in Laos, with intestinal obstruction caused by phytobezoars from jungle banana seeds. They had no history of previous gastrointestinal surgery. The recommended therapy in total obstruction is laparotomy, “milking” through the ileocaecal junction, or enterotomy and direct extraction. As recurrence and presentation at multiple sites are possible, all of the gastrointestinal tract should be thoroughly examined intraoperatively. [Asian J Surg 2004;27(4):348–51]

**Introduction**

Phytobezoars are a well known, although uncommon, cause of mechanical alimentary tract obstruction. They mainly occur in patients who have undergone abdominal surgery, mostly gastric operations or surgery for gastric dysmotility. In patients without previous surgery, literature reports mostly describe the causes as persimmons and oranges, although a small number are caused by nuts, coconuts, cherry tomatoes and raisins. This report is about four patients seen within a period of 19 months (June 2001 to January 2003) in Laos with intestinal obstruction caused by phytobezoars from jungle banana seeds. To the best of our knowledge, this is the first report about jungle banana seeds causing phytobezoars.

A MEDLINE search of studies published between 1965 and 2003 showed 235 publications about phytobezoars, but none contained information on jungle bananas.

The jungle banana (Musa ensete, Ensete ventricosum or wild forest banana) grows in tropical mountain forests in the shade of trees. The trunk appears to be covered in a white powder while the whole plant gives a dark purple impression. It can reach up to 10 metres or more and is found in Laos, Yunnan Province and other mountainous regions of Asia. The jungle banana’s fruit is smaller than the common banana, while the flesh contains a number of large seeds (± 1.2 cm). The flesh also has a higher glucose level than that of the normal banana, so there is a danger of seeds adhering together if swallowed, causing phytobezoars.

**Case reports**

**Case 1**

A 15-year-old male was admitted complaining of abdominal pain for 4 days. He had developed abdominal pain after ingesting jungle bananas including seeds. He experienced constipation for 2 days and developed severe generalized abdominal pain associated with vomiting, guarding and rigidity. Exploratory laparotomy was performed for “acute abdomen – peritonitis”. It showed evidence of small-bowel dilatation 50 cm proximal to the ileocaecal junction, and an oval intraluminal mass of $6.5 \times 3.5 \times 2.5$ cm (Figure 1). The mass was hard, and it was not possible to “milk” it through. The small intestine was congested for its whole length and lymphangitis mesenterialis was present. Ileotomy was performed along the...
longitudinal axis, the mass removed and retrograde decompression performed. The postoperative course was uneventful. Final diagnosis was intraluminal small-bowel obstruction due to a phytobezoar of jungle banana seeds.

Case 2
A 16-year-old male was admitted with mid-abdominal pain for 7 days and nausea but no vomiting. He had had no bowel movement for 3 days. The patient had ingested two jungle bananas, including seeds, 2 days before developing abdominal pain. Physical examination showed a distended abdomen with guarding and rigidity. Abdominal roentgenography revealed a dilated loop of the small bowel. The patient underwent exploratory laparotomy for a diagnosis of “acute abdomen – peritonitis”. Intraoperatively, there was 1,000 mL of straw-coloured ascitic fluid and a palpable soft mass of 6.0 × 3.5 × 3.5 cm in the distal ileum, with multiple black seeds that could be seen through the bowel wall. The mass could be dissipated and decompressed through the ileocaecal junction. There was also evidence of multiple white nodules (2 mm) over the distal half of the ileum. The mesenteric nodes were enlarged to various sizes between 0.5 × 0.5 × 1.0 cm and 2.0 × 2.0 × 1.0 cm. One lymph node was removed for microscopic examination. The postoperative course was uneventful and the diagnosis was intraluminal small-bowel obstruction due to a phytobezoar of jungle banana seeds as well as tuberculous enteritis.

Case 3
A 22-year-old male was admitted after 5 days of abdominal pain and vomiting. Clinically, he had an acute abdomen with guarding and rigidity; roentgenography showed a mechanical small-bowel obstruction. Exploratory laparotomy revealed a hard mass in the terminal ileum, which was uncrushable. At enterotomy, an 8.0 × 3.0 × 2.5 cm phytobezoar containing jungle banana seeds was extracted and retrograde decompression of the small intestine was performed. Postoperatively, the patient developed acute obstruction on the third day and repeat laparotomy was necessary. A congestion of banana seeds was found in the area of the previous enterotomy; some leftover seeds in the stomach were the cause of the recurrence. This time, “milking” through was possible. The further course was uneventful. The postoperative diagnosis was intraluminal small-bowel obstruction due to a phytobezoar of jungle banana seeds and postoperative re-obstruction at the level of the enterotomy due to remaining seeds in the stomach.

Case 4
An 18-year-old male was admitted after 3 days of abdominal pain, vomiting and nausea. Examination showed an acute abdomen and roentgenography revealed a mechanical obstruction of the small intestine (Figure 2). Laparotomy showed a mechanical obstruction due to a hard intraluminal mass 10 cm proximal to the ileocaecal junction. There was also mas-
Phytobezoars are described as a rare cause of intestinal obstruction,\textsuperscript{3,9} so their frequent appearance in our patients was surprising. Since the surgical service was started in the Laos Luxembourg Hospital, which is a joint venture of the Laos Government and the Luxembourg Development Program (Lux-Development S.A.), we have seen four cases over a 19-month period (June 2001 to January 2003). During the same period, we performed exploratory laparotomy for acute abdomen in a total of 62 patients (excluding gynaecological cases and appendicitis), mostly caused by peritonitis due to typhoid, intra-abdominal tuberculosis or other tropical infectious diseases. Common causes of acute abdomen and intestinal obstruction in Western populations (coprostasis, adhesions, tumour, diverticulitis, mesenteric arterial infarction) were rare. The four cases of phytobezoars represented 6.5\% of all laparotomies for acute abdomen. This high number is made more remarkable as none of the patients had undergone prior abdominal surgery. Chittmittrapap and Tanphiphat reported 11 cases of phytobezoars, seven in adults and four in children.\textsuperscript{1} All adult patients had undergone previous laparotomy, six of which were gastric operations. Rubin et al reported 14 patients with gastrointestinal laparotomy due to phytobezoars within a period of 7 years.\textsuperscript{3} Eleven (79\%) had undergone previous gastric operations. A similar finding was made by Lee et al, who reported 31 patients during a 6-year period.\textsuperscript{6} Eighteen patients (58\%) had a history of previous gastric surgery. Serour et al found that 34 of 41 (83\%) patients with phytobezoars had a history of previous gastric surgery.\textsuperscript{2} These numbers, as well as others, suggest that gastric surgery predisposes to intestinal obstruction by phytobezoar.\textsuperscript{5}

One of our cases (Case 3) had recurrence caused by multiple locations of bezoars. As intestinal decompression was performed during surgery, it is probable that some seeds were left in the stomach, causing recurrence. Lou et al also reported phytobezoars at multiple locations in three of 11 cases,\textsuperscript{7} while Lee et al found that 16\% of their cases presented with a synchronous site.\textsuperscript{6} Recurrence as seen in Case 3 was also described by Serour et al, who reported a recurrence rate of 3/41 (7\%).\textsuperscript{2} To avoid further recurrence, complete decompression of the whole gastrointestinal tract is mandatory.

All of our phytobezoars were located in the terminal ileum, between 10 and 50 cm proximal to the ileocaecal junction. This conforms with similar reports.\textsuperscript{3,6,8} The relatively high age of our patients (mean, 18.8 years; range, 15–22 years) compared to other reports is unusual. While patients with a history of previous gastrointestinal surgery are commonly adults,\textsuperscript{1,2} most authors report a younger age in patients who have not undergone any prior surgery.\textsuperscript{1,7–10}

The surgical technique does not vary much. If the phytobezoar is soft, it can be “milked” through the ileocaecal junction; otherwise, longitudinal enterotomy and transverse re-approximation should be performed.\textsuperscript{1,2,5–9} Only Lee et al reported small-intestine resection because of necrosis.\textsuperscript{5} Ladas et al present another therapeutic option, though only for gastric location, using nasogastric Coca-Cola lavage.\textsuperscript{4} The general approach for gastric bezoars is endoscopic removal.\textsuperscript{11–13}

We present a new cause of phytobezoar, the jungle banana. Various fruits, nuts and seeds are cited as causes in most reports,\textsuperscript{7–10} persimmons and oranges in particular.\textsuperscript{2,3,5,7} Nevertheless, the seeds of the jungle banana (±1.2 cm) and the sticky consistency of its flesh increase the risk of phytobezoar.

**Conclusions**

The phytobezoar caused by jungle banana seeds causes intestinal obstruction in a considerable number of patients in Laos, even if they have no history of previous gastrointestinal surgery. The recommended therapy in total obstruction is laparotomy, “milking” through the ileocaecal junction, or enterotomy and direct extraction. As recurrence and simultaneous presentation are possible, all of the gastrointestinal tract should be thoroughly examined intraoperatively.

**References**

4. Ladas SD, Triantafyllou K, Tzathas C, et al. Gastric phytobezoars...