# Volvulus of the small bowel

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## Summary

**Over two years in a major hospital in northern Uganda 12 cases of primary volvulus of the small bowel were seen out of a total of 65 cases of intestinal obstruction which did not include external hernias. This relatively high incidence was associated with drinking large amounts of local "kongo" beer. General systemic symptoms of circulatory collapse were conspicuous by their absence. The kongo beer was found to have a high concentration of serotonin, and this substance may have caused the volvulus of the small bowel in three-quarters of the cases.**


## Introduction

Intestinal obstruction is perhaps the commonest non-traumatic surgical emergency that is encountered across the middle third of Africa. Although the relative incidence may vary from place to place, most cases of intestinal obstruction are due to obstructed external hernias, intussusception, volvulus of the sigmoid, band, and adhesions. In some places, however, volvulus of the small bowel may be an additional important group, as was seen at the Lira Hospital in Lira, northern Uganda. This hospital is the largest and busiest hospital in northern Uganda and serves the district of Lango, which has a population of 375 000, the main inhabitants being people of Nilo-Hamitic origin.

## Incidence

In the two years from November 1962 to October 1964 12 cases of volvulus of the small bowel were seen, out of a total of 65 cases of intestinal obstruction which did not include external hernias.[1] This was an extremely high incidence; the only other report from Uganda described three cases in three years at Mulago Hospital, Kampala.[2] White encountered 13 cases in three years at the Mpilo Hospital, Bulawayo, Rhodesia,[3] and McWatters reported 12 cases in about 12 years in the former United Provinces, India.[4] The only comparable figures are those from Nairobi, Kenya, 19 cases being reported in three and a half years[5] and six cases in one year.[6]

Of the 12 patients seen in Lira, eight had volvulus of the small bowel, one volvulus of the small bowel and caecum, and three volvulus of the small bowel, caecum, and proximal ascending colon. One of these patients may have had a secondary volvulus, as a mesenteric cyst, measuring 12 cm by 9 cm, was present close to the bowel.

## Unusual features

Kerr and Kirkaldy-Willis[6] and White[3] have ascribed this type of volvulus to intake of large quantities of maize-meal gruel or mealie-meal porridge, which results in sudden distention of the small bowel. The Lango diet consists basically of a millet preparation comparable to unleavened bread, which is eaten with lentils or vegetables, and may include cassava, sweet potatoes, or groundnuts and occasionally fish or meat. A meal of this type and variety does not cause a sudden distention of the small bowel, nor is the meal as coarse and indigestible as maize preparations. At laparotomy the small bowel was found to contain no semi-solid food. The distention in each case was only moderate. Further study of these 12 cases showed two unusual features: (*a*) the patients had drunk large quantities of the local beer before the onset of symptoms, and (*b*) there were no general systemic manifestations of circulatory collapse.

At least nine of the 12 patients had drunk the local "kongo" beer before the abdominal symptoms appeared. Kongo is drunk in moderate amounts fairly widely, both among friends and in family circles, but during feasts or important events it is drunk in large quantities; 12 pints (6·8 l) or more may be drunk in four to six hours. Kongo is prepared by fermentation of millet or occasionally other grain.

Seven of the nine patients had drunk large amounts of the beer (table I), averaging about seven and a half pints (4·3 l) per person over about four hours. One man (case 5) had drunk 12 pints, whereas two others (cases 6 and 7) had drunk 2 and 3 pints (1·1 and 1·7 l) respectively but from the bottom of the pot, where the kongo is most concentrated and all the sediment collects. The first abdominal symptom of pain appeared on an average about three hours after the last drink.

TABLE I—*Amount of beer drunk by each patient and time relations between beer drinking and onset of symptoms*

| Case No | Sex | Age (years) | Amount of beer consumed (pints) | Period (hours) | Interval between first symptom and last drink (hours) |
|---|---|---|---|---|---|
| 1 | M | 45 | 6 | 4 | 2½ |
| 2 | M | 28 | 6 | 5 | 3 |
| 3 | M | 18 | 6 | 2½ | 10 |
| 4 | M | 33 | 10 | 5 | 2 |
| 5 | M | 22 | 12 | 7 | 1 |
| 6 | F | 23 | 2 | ½ | 2 |
| 7 | F | 40 | 3 | ¾ | 1½ |
| 8 | F | 40 | 6 | 3 | 3 |
| 9 | M | 55 | | | |
| 10 | M | 40 | | | |
| 11 | M | 38 | | | |
| 12 | M | 28 | 6 | 2½ | 2 |

*Conuersion:* 1 pint ≈ 0·6l

In these nine cases a history of beer drinking was obtained from the patient. In the patient with the mesenteric cyst (case 9) who died immediately after operation, a similar beer-drinking history was later obtained from his relatives. In the remaining two cases (cases 10 and 11), both of whom died postoperatively, no history was obtainable.

Except in two patients with gangrenous bowels (cases 10 and 11) general systemic effects were conspicuous by their absence, which was unusual because circulatory collapse is generally accepted[7] as being "the significant finding"[8] in acute volvulus of the small bowel. The pulse rate, blood pressures, and haemoglobin values were normal; there was no drop in body temperature, and neither sweating nor dehydration was noted. In fact, the general condition remained remarkably stable, even in cases in which the whole length of the small bowel was affected but viable.

## Other findings

Other findings are detailed in table II. The length of time from onset of symptoms to operation ranged from 13 hours to four days. The bowel was twisted clockwise in seven cases and anticlockwise in five; it was rotated to about 180° in most cases, the maximum rotation being 540°. Four patients died.

## Analysis of kongo and comments

Late in 1971 kongo beer was analysed at the department of clinical pathology, New Mulago Hospital, Kampala, Uganda. A large amount of serotonin was found in the beer even without any attempts at concentrating it. It was identified by both paper and thin-layer chromatography. Quantitative estimations were

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TABLE II—*Details on duration of symptoms before operation, general condition of patient, state of bowel, and outcome*

| Case No | Duration of symptoms before operation (hours) | General condition | Extent of bowel affected; direction and degree of rotation | State of bowel | Outcome |
|---|---|---|---|---|---|
| 1 | 22 | Stable | Proximal jejunum to distal ileum; clockwise rotation through about 180° | Moderately distended, viable | Died suddenly 30 hours after operation |
| 2 | 22 | Stable | Distal half of small bowel, caecum, and proximal half of ascending colon; anticlockwise rotation through about 180° | Moderately distended, viable | Uneventful recovery |
| 3 | 14 | Stable | Distal half of small bowel; clockwise rotation through about 360° | Moderately distended, viable | Uneventful recovery |
| 4 | 18 | Stable | Distal half of small bowel; clockwise rotation through about 540° | Moderately distended, viable | Uneventful recovery |
| 5 | 96 (Initially treated conservatively elsewhere) | Stable | Distal half of small bowel, caecum, and proximal half of ascending colon; clockwise rotation through about 180° | Moderately distended, viable | Uneventful recovery |
| 6 | 13 | Stable | Distal half of small bowel; anticlockwise rotation through about 360° | Moderately distended, viable | Uneventful recovery |
| 7 | 96 | Dehydrated | Middle half of small bowel; clockwise rotation through about 180° | Moderately distended, viable | Uneventful recovery |
| 8 | 40 | Stable | Distal half of small bowel, caecum, and proximal one-third of ascending colon; clockwise rotation through about 180° | Moderately distended, viable | Uneventful recovery |
| 9 | 72 | Circulatory collapse (shocked) | Proximal jejunum to distal ileum; anticlockwise rotation through about 540° | Non-viable, mesenteric cyst (12 cm × 9 cm) 90 cm distal to duodenal-jejunal flexure and adjacent to bowel | Died 12 hours after operation |
| 10 | 18 | Circulatory collapse (shocked) | Proximal jejunum to distal ileum; clockwise rotation through about 180° | Non-viable, gangrenous | Died 7 hours after operation |
| 11 | 72 | Dehydrated | Distal half of small bowel and caecum; anticlockwise rotation through about 180° | Moderately distended, viable | Cardiac arrest at operation, died 8 hours later |
| 12 | 17 | Stable | Distal half of small bowel; anticlockwise rotation through about 450° | Moderately distended, viable | Uneventful recovery |

underway by gas-liquid chromatography but could not be completed.

Most studies now indicate that the small bowel is stimulated to greater motility by serotonin. Shepherd[9] found local increase of the activity of an ileal loop when serotonin was injected into its supplying artery, and Fishlock and Parks[10] showed that circular muscle strips from the ileum contract in the presence of serotonin. Free serotonin is, however, readily metabolised by intestinal enzymes, mainly monoamine oxidase. But when large amounts of beer, containing inordinately large amounts of serotonin, are drunk these enzymes are probably diluted to such an extent that appreciable amounts of serotonin are absorbed, thereby causing increased tone, contraction, and twisting of the bowel.

Further investigations are certainly warranted, but the present findings indicate that volvulus of the small bowel in this series was related to the presence of serotonin in the kongo beer. It is therefore reasonable to suggest, in the absence of any other known factor, that the large amount of serotonin in the beer, which was drunk mostly in large quantities, caused volvulus of the small bowel in at least three-quarters of these patients.

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# SHORT REPORTS

## Rebound hypertension after acute methyldopa withdrawal

Although clonidine has been known to cause rebound hypertension on withdrawal[1] there are no cases reported of this occurring with methyldopa. We report such a case.

### Case report

A 65-year-old man was incidentally found to have hypertension (180/110 mm Hg on three occasions) by his general practitioner. He was started on methyldopa, gradually increasing to a total daily dose of 1·5 g with control of his blood pressure (140-160/80-100 mm Hg). Six months later he was admitted to hospital with nausea, headaches, nervousness, and giddiness. He reported that he had omitted his methyldopa for 48 hours; also that he had acted similarly in the past, but then when he became anxious, nervous, and nauseated he restarted his treatment and these symptoms disappeared.

Physical examination showed a well-covered countryman with a blood pressure of 300/170 mm Hg, pulse 120/min. Fundoscopy showed no papilloedema, haemorrhages, or exudates, just considerable arteriovenous nipping. Examination of the central nervous system showed nystagmus and other systems were unremarkable. Electrocardiograms showed left ventricular hypertrophy; there was no proteinuria; creatinine clearance was 78 ml/min and urinary vanillylmandelic acid excretion was not in excess.

Treatment with diazoxide bolus (300 mg intravenously) and methyldopa 250 mg thrice daily together with propranolol 40 mg thrice daily produced a well-controlled blood pressure (140-160/80-100 mm Hg) both lying and standing. Two months later his blood pressure remained controlled but he still had residual nystagmus.