

Idiopathic Small Bowel Gangrene in a Tropical Surgical Centre

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ABSTRACT

Background: Small bowel gangrene is an infrequent presentation of acute surgical emergency. The notable causes vary, as do the extent of bowel necrosis. Similarly, the options of the operative management and the post-operative outcome differ.

Case presentations: We present two curious atypical cases of small bowel gangrene of no specific identifiable causes which were seen and managed at a tertiary health institution in sub-Saharan Africa.

Conclusion: This experience is documented to highlight the presentations of acute small bowel gangrene of idiopathic origin in our environment, as well as stimulate further interest in the elucidation of the possible underlying factor(s).

Keywords: Idiopathic, Small bowel gangrene, Acute abdomen, Atypical, Laparotomy, Africa

INTRODUCTION

Acute surgical abdomen sometimes arises from the infarction of the small intestine. Small bowel gangrene or infarction is the irreversible end stage transmural necrosis of the bowel wall. It's caused by insufficient blood flow to the loops of small intestine. This is a surgical emergency because the sequelae can quickly result in life-threatening infection and death [1]. There are several causes of small bowel gangrene. The commoner ones are external or internal hernias, volvulus of the small and/or large bowel, intestinal adhesions, intussusception and mesenteric vascular occlusions. Other causes are non-occlusive mesenteric ischemia (NOMI), intestinal carcinomatosis, pancreatitis, hypercoagulable states and numerous congenital intra-abdominal anomalies such as congenital mesenteric defects, annular pancreas, congenital reduplication, peritoneal encapsulation syndrome etc. [2,3]. Idiopathic bowel gangrene is seldom, where there's no identifiable precipitating factor.

Essential to the successful management of gangrenous small bowel are an early hospital presentation, prompt clinical diagnosis and surgical resection of the dead bowel segment, followed by the successful restoration of adequate intestinal continuity capable of sustaining the nutritional requirements of the patient or enhanced by the use of parenteral nutrition.

CASE PRESENTATIONS

Case 1

Miss CN, a 19-year-old unmarried young woman, worked as an apprentice, was referred from a peripheral hospital with 1-day history of sudden onset of progressively increasing severe generalized abdominal pain, vomiting, absolute constipation and abdominal distension. The vomit was copious and consisted initially of recently ingested meal but later became bilious. Prior to the onset of the above symptoms, she was said to have consumed a bottle of local herbal liquid concoction over some days for an unspecified ailment. Otherwise, the patient's past medical and surgical history were unremarkable. She was on her menstrual period at the time of presentation and her pregnancy test was negative.

Clinically, the patient was acutely ill-looking and in painful distress. The temperature was 36.6°C and the BP was 110/80mmHg. She had tachycardia and tachypnea with the heart rate of 164/min and respiratory rate of 44/min respectively. Her SpO2 was 98%.

The abdomen was distended with generalized tenderness, guarding and rebound tenderness. Her hernia orifices

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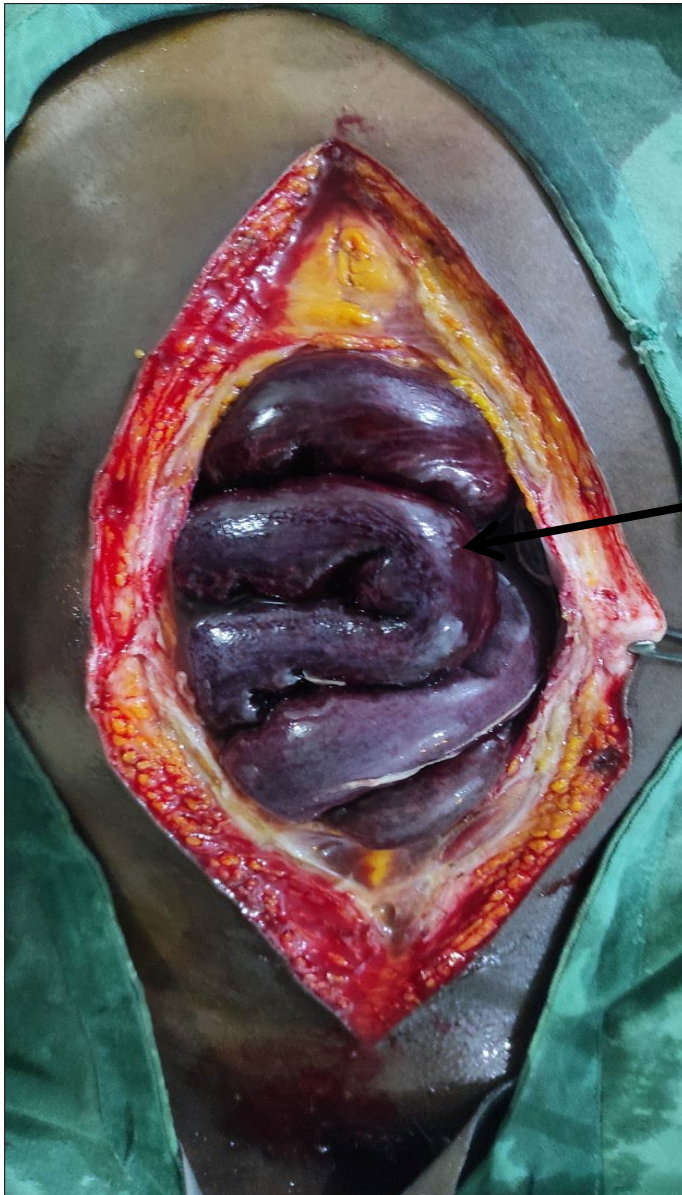
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were intact. A provisional diagnosis of acute abdomen with intestinal obstruction was made. She was suspected of having either perforated peptic ulcer disease or typhoid intestinal perforation.

The investigation results showed PCV 41%, WCC $14.1 \times 10^9/L$ and the retroviral screen was negative. The serum biochemistry profile showed features of dehydration with urea of 51mg/dl, otherwise the renal function test was normal. The urinalysis revealed slight proteinuria and glycosuria. Multiple air-fluid levels were seen on the erect

view of the abdominal x-ray film. The supine view showed distended gaseous bowel loops at both hepatic flexure & splenic flexure of the colon. The patient had emergency exploratory laparotomy. The intra-operative findings were 1-litre of hemorrhagic peritoneal fluid within the general peritoneal cavity, and a tangled 170cm length of gangrenous distal jejunum and ileum, which extended from 112cm distal to duodeno-jejunal junction and terminated at 12 cm proximal to the ileo-caecal junction (**Figures 1 & 2**). Meckel's diverticulum was absent. The vermiform appendix looked healthy.



Gangrenous Small Bowel Loops

Figure 1. Gangrenous small bowel loops.

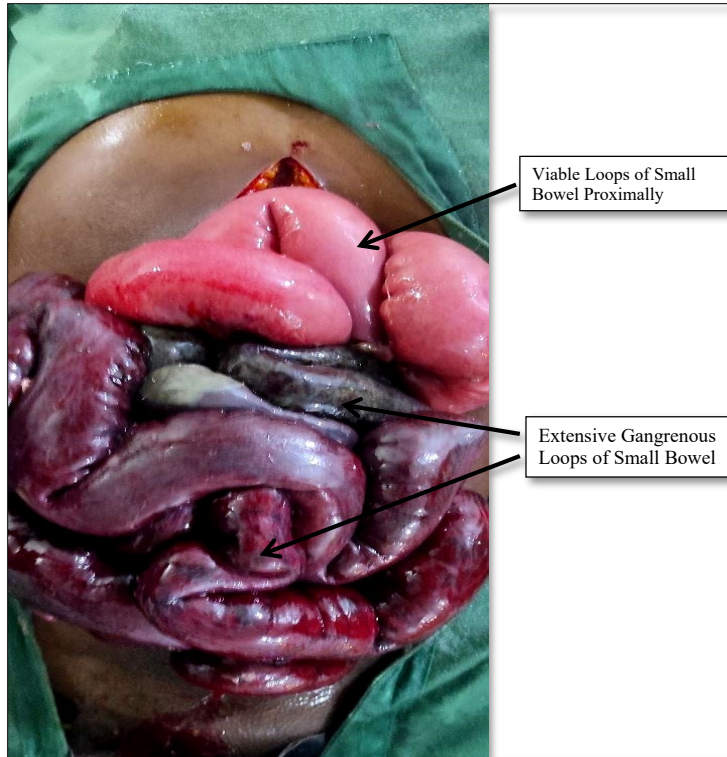


Figure 2. Viable loops of small bowel proximally, Gangrenous loops distally.

The gangrenous small bowel was resected and removed intact (**Figure 3**). Primary end to end jejun-ileal anastomosis was created to restore intestinal continuity of

about 124cm in length (**Figure 4**). Two units of whole blood were transfused intra-operatively.



Figure 3. Resected extensive length of gangrenous small bowel of no identifiable cause.

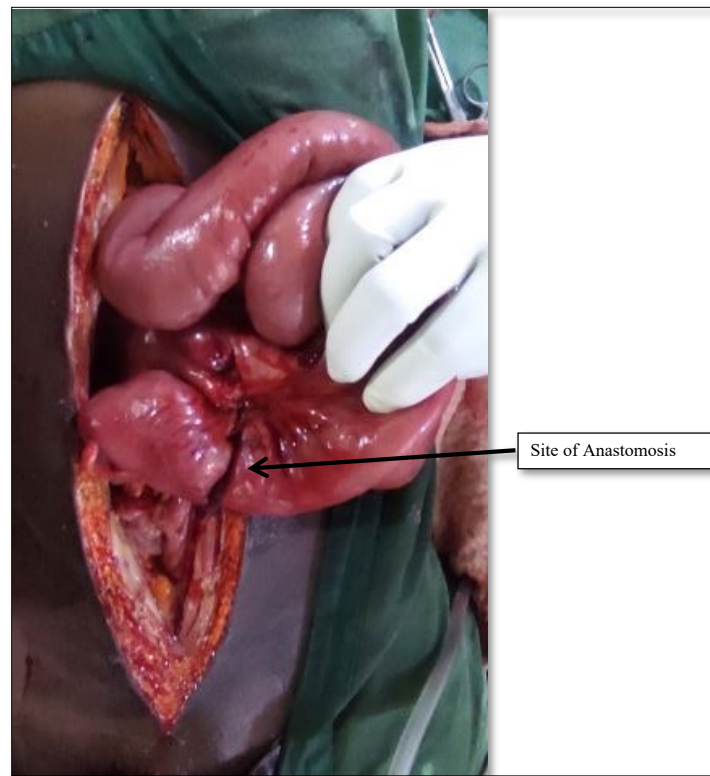


Figure 4. Site of primary end-to-end jejunio-ileal anastomosis.

On the 10th day after surgery, fecal discharge occurred from the abdominal drain site consistent with enterocutaneous fistula secondary to anastomotic dehiscence. She was also found to have low serum potassium level of 2.3mmol.

The hypokalemia was corrected and the patient was taken back to theatre during which an anastomotic leak was identified at the anti-mesenteric border of the previous jejunio-ileal anastomosis. The dehiscenced anastomotic segment was excised and a fresh 2-layered end-to-end small bowel anastomosis was performed.

The post-operative course was challenging. She developed facial puffiness and body swelling involving both arms and legs. The serum albumin was low (2.7g/l) as was the total serum protein (36g/l). The high-density lipoprotein (HDL) was also reduced to 21mg/dl. A diagnosis of functional nephrotic syndrome with hypoalbuminemia and dyslipidemia was made. The patient was jointly managed with the nephrology team. Daily intravenous infusion of amino acid solution was commenced initially. Later, oral statins were administered when she resumed food intake.

She developed frequent watery stools of up to 5 bowel motions daily, and a significant amount of weight loss. The patient was placed on complain, loperamide,

hyoscine bromide and cyproheptadine. Nutritional support was provided by the dieticians. She responded favorably to the above course of treatment.

She was subsequently discharged from hospital to outpatient follow up on the 18th day after the second laparotomy. Thereafter, she made steady progress with consistent weight gain and normalization of her bowel motions to 1-2 formed stools daily before she was finally discharged from outpatient follow up 5-months later.

Case 2

Mr. FHK, a 29-year-old unmarried young man, worked as a menial laborer, presented on referral from a peripheral hospital. He was said to have undergone an exploratory laparotomy at the referring private hospital on the clinical suspicion of intestinal obstruction. The intra-operative finding of gangrenous small bowel loops prompted his transfer to our center. The patient was received in our facility on the 5th day post-op. His symptoms on arrival included absolute constipation since the operation, vomiting, abdominal distension and offensive feculent discharge from the laparotomy wound site. He was not known to abuse illicit substances. Clinically, he was fully conscious but weak, looked emaciated, dehydrated, and moderately pale, but was anicteric. The temperature was

37.8°C, BP 130/90mmHg, the heart rate 106/min, the respiratory rate 24/min and SpO₂ 93%.

His abdominal examination revealed dark colored offensive feculent discharge from the proximal site of an

extended lower midline laparotomy wound, with the skin sutures still intact. A gangrenous piece of bowel tissue partially eviscerated through the lower parts of the sutured abdominal wound (**Figure 5**). The anterior abdominal wall demonstrated generalized tenderness with guarding.

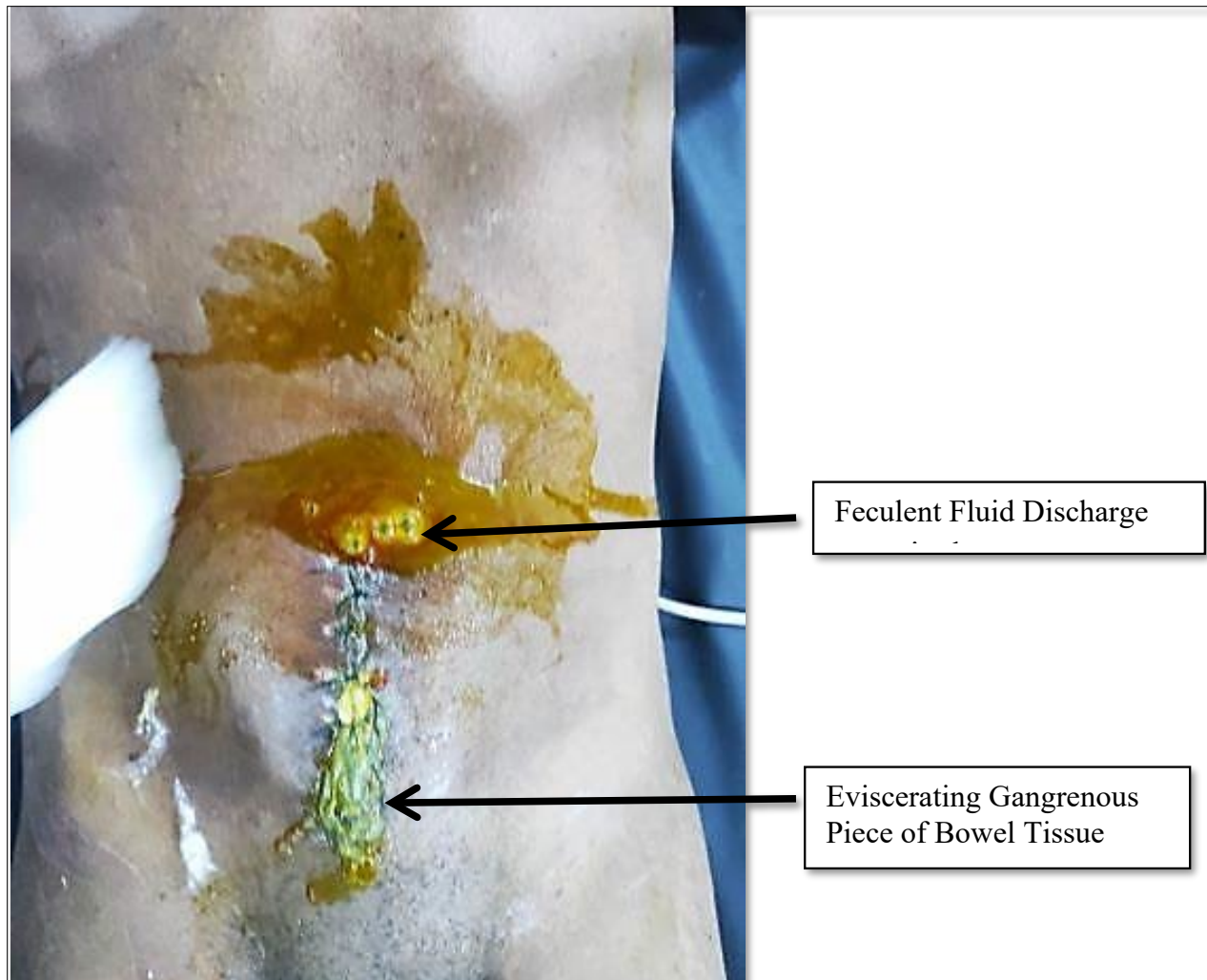


Figure 5. Feculent fluid discharge and eviscerating gangrenous piece of bowel.

He was anemic with PCV of 24%, the WBC was $16.2 \times 10^9/L$ which indicated leukocytosis. The liver and kidney function tests were essentially unremarkable, but for elevated serum urea levels of 161mg/dl due to dehydration. He had low serum albumin (14g/l). His retroviral screen was unreactive.

Our clinical diagnosis was iatrogenic entero-cutaneous fistula with small bowel gangrene post recent laparotomy. His ASA score was III^E.

He received 3 units of blood transfusion to correct his anemia before a re-laparotomy at our center.

The intraoperative findings were the complete disruption of deeper layers of the abdominal wound beneath the sutured overlying skin, extensively gangrenous collapsed jejunal and ileal loops all of which were curiously devoid of small bowel mesentery (**Figure 6**). There were copious feculent fluid collections in different parts of the peritoneal cavity. No viable segment of small bowel was visualized. The patient's relatives were invited into the operating room, shown the above findings and informed of the unfavorable prognosis. Thereafter, the peritoneal cavity was irrigated with warm normal saline solution before the gangrenous small bowel loops were reduced back into the abdominal cavity. The wound was repaired by mass closure over an indwelling abdominal drain.

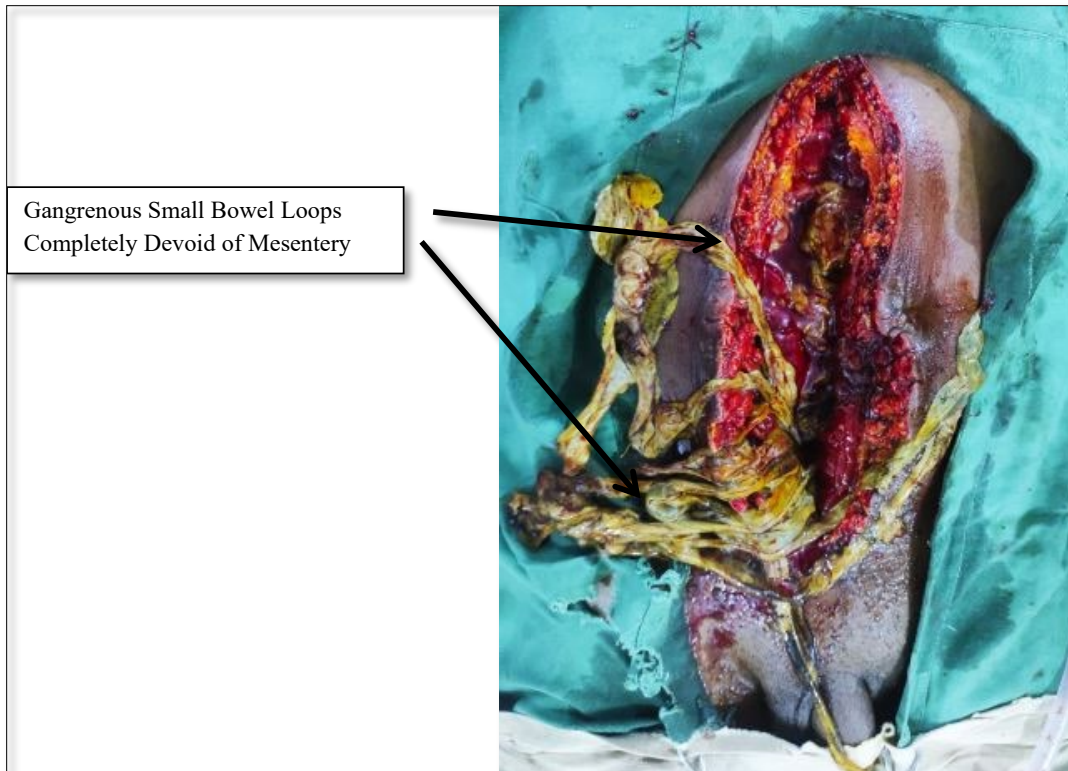


Figure 6. Gangrenous collapsed small bowel loops completely devoid of mesentery.

Upon the family's request, the patient was subsequently discharged the next day.

DISCUSSION

Gangrenous small bowel presents as acute surgical emergency often in association with features of intestinal obstruction and peritonitis. Although a definitive pre-operative diagnosis is possible from meticulous clinical examination of the abdomen, in conjunction with the pathognomonic findings on contrast enhanced abdominal CT scan and raised lactate levels on arterial blood gas chemistry, most cases of small bowel gangrene are confirmed on table in the operating room. Unfortunately, a few others are diagnosed at autopsy [2].

The initial patient (**Case 1**) in this report was diagnosed with extensively gangrenous small bowel intra-operatively. The second case (**Case 2**) was referred from another hospital with a segment of the dead small gut partially protruded through the lower part of his recent laparotomy wound, thereby revealing the diagnosis preoperatively. As both patients had established features of intestinal obstruction and peritonitis, emergency laparotomy was the definitive option of treatment. When the diagnosis of bowel gangrene is clinically suspected, preoperative blood lactate determination, as well as contrast enhanced computed tomography (CECT) scan of

the abdomen could be useful confirmatory investigations [4-6].

Intra-operatively, our frantic search for the possible causative factors of bowel infarction such as band adhesions, mesenteric defects, internal herniation etcetera was abortive in both cases under presentation. Both patients were young, were not known to abuse illicit substances and none had any underlying pre-existing cardiovascular condition or sickle cell disease. Case 2 was even more intriguing. Not only were the entire loops of the small gut collapsed and gangrenous, they were also completely devoid of any trace of mesentery the cause of which was elusive. The medical literature contains reports of congenital mesenteric windows associated with segmental bowel gangrene and intestinal atresia in children [7]. However, the reason behind the complete absence of the small bowel mesentery along the entire length of our patient's small gut is unknown. It's difficult to speculate the cause of this atypical and curious abnormality.

The two patients in this report were of the low social class and were of meager income. It's not uncommon in sub-Saharan Africa, particularly in Nigeria, for people from poor economic background to patronize street vendors who indiscriminately hawk various local herbal concoctions for unspecified ailments. This rampant

practice is borne out of the superstitious belief in some spiritual causes behind their illnesses, as well as economic considerations, as these products are cheaper than conventional medications. However, the chemical content and tissue toxicities of such herbal remedies are unknown. Both patients conceded to have consumed these products at the onset of their ailments prior to hospital presentation. Could there be any relationship between the oral intake of these locally produced herbal preparations and the development of extensive small bowel gangrene, akin to the sympathomimetic effect of amphetamines on the superior mesenteric vasculature? [8]. This should be the task for the Nigerian national agency for food and drug administration (NAFDAC) and allied establishments to investigate.

A major intestinal resection which leaves behind a third or more of viable small bowel length is compatible with normal life if supported with parenteral nutrition. A previous report elsewhere from Africa documented the short-term post-operative survival of a 15-year-old girl after a near-total resection of the extensively gangrenous small bowel which left a viable residual 5cm segment of the jejunum for the creation of a jejuno-transverse colonic anastomosis [9]. The Case 1 in this report had more than 1-metre of viable small intestine salvaged, which in conjunction with her young age favored her recovery and survival despite the absence of parenteral nutrition. The mild form of short gut syndrome which ensued responded well to the use of anti-motility agents, oral nutritional supplementation and hematinics.

Conversely, the instance in Case 2 when the entire loops of small bowel were gangrenous and also completely devoid of mesentery was considered incompatible with survival. In sub-Saharan Africa where the prospect of lifelong total parenteral nutrition is not yet feasible due to cost and sometimes unavailability, the prognosis is even worse. Therefore, the current surgical management of such case types in the sub region is that of resignation. However, close relatives of the patient should be duly informed of this decision for their awareness and closure.

CONCLUSION

Extensive small bowel gangrene presents an enormous surgical challenge. The cause could seldom be idiopathic. Surgical resection of the gangrenous portion and restoration of intestinal continuity would be indicated if there's any viable residual segment of the small gut. There's need for the relevant authorities to thoroughly investigate the tissue toxicities of the indiscriminately hawked and rampantly consumed herbal concoctions on the streets of Nigeria to ensure health safety and forestall avoidable bowel catastrophes.

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