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Case Report

Survival without Total Parenteral Nutrition in Small Bowel Syndrome Following Near-Total Small Bowel Resection: A Case Report from Tirunesh Beijing General Hospital, Addis Ababa Ethiopia

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Abstract

Short Bowel Syndrome (SBS) is a condition characterized by insufficient small intestine length, often resulting from surgical removal due to disease or injury. It has potential complication like nutritional malabsorbation, dehydration and electrolyte imbalance, altered bile acid circulation and bacterial infection. A multidisciplinary approach involving dieticians, gastroenterologists, and surgeons is crucial for the comprehensive care of individuals with Short Bowel Syndrome. So patients with SBS managed for nutritional support, medication, surgical interventions and regular monitoring. Here our patient was presented with marked diffuse abdominal pain associated with failure to pass faces and flatus, and severe bouts of vomiting. Upon examination, there were signs of dehydration, abdominal distention, and rebound tenderness and guarding. For diagnosis of generalized peritonitis patient was operated and found to have gangrenous small bowel with only proximal and distal 10 cm segments of viable bowel for which end-to-end jejunoileal anastomosis was done. Due to economic constraints patient was not put on total parental nutrition rather he was put on small frequent oze feeding. Despite weight loss for the first few subsequent weeks follow up lately the patient fortunately started to gain weight and currently he is on follow-up with marked improvement and stable clinical condition.

Keywords: Short Bowel Syndrome; Mal-Absorption; Total Parenteral Nutrition

Introduction

The small intestine, typically measuring around 6.5 meters in length, comprises the duodenum (approximately 25 cm), jejunum (about 1.5 meters), and ileum, constituting the remaining three-fifths. Remarkably, individuals can undergo resection of up to a third or even half of their small intestine and still maintain a good quality of life [1]. Astonishingly, documented cases exist where individuals survived with as little as 45 cm of remaining small intestine [2].

It's essential to recognize that significant small intestine resections can lead to a complex condition known as "small gut syndrome," characterized by impaired absorption of both macronutrients and micronutrients [3]. Common symptoms include chronic diarrhea and various complications related to nutrient mal-absorption. For patients undergoing major resections, long-term survival is often enhanced with the use of parenteral nutrition, a method of receiving essential nutrients intravenously [4]. Notably, there is a scarcity of documented cases where individuals have survived without relying on parenteral nutrition.

Gangrenous bowel due to small bowel volvulus emerges as a primary reason for substantial small intestine resections [5]. In this case report, we aim to present a unique case where a patient underwent a major resection of the small intestine, subsequently developing "short bowel syndrome" (SBS). Our report seeks to not only highlight the patient's extraordinary survival but also shed light on the multifaceted challenges encountered in managing such cases.

Case Summary

History and clinical finding: A 13-year-old boy arrived at Tirunesh Beijing General Hospital, bringing with him a tale of 24 hours marked by diffuse abdominal pain, an inability to pass feces and flatus, and several bouts of vomiting. Initially seeking medical help at a local health center, he underwent a preliminary assessment, leading to a 12-hour observation period at the local facility. Subsequently, recognizing the need for specialized care, the patient was referred to our hospital for further evaluation and treatment. Upon reaching our facility, the patient's condition raised immediate concerns. Vital signs were documented as follows: Pulse Rate (PR): 120 beats per minute, Blood Pressure (BP): 90/70 mmHg,

Respiratory Rate (RR): 18 breaths per minute, Peripheral Capillary Oxygen Saturation (SpO2): 95%. Prominent clinical observations encompassed were: buccal mucosa displaying dryness, noteworthy findings during abdominal examination comprised moderate abdominal distension, diffuse direct and rebound tenderness, and guarding. Upon being admitted to our hospital, a series of investigations were initiated with the following results; White Blood Cell (WBC) count of 16,000 cells per micro liter, with 87% neutrophils predominance. All other blood parameters fell within the normal range; plain abdominal x-ray revealed the presence of multiple air-fluid levels depicted in the figure below (Figure 1).

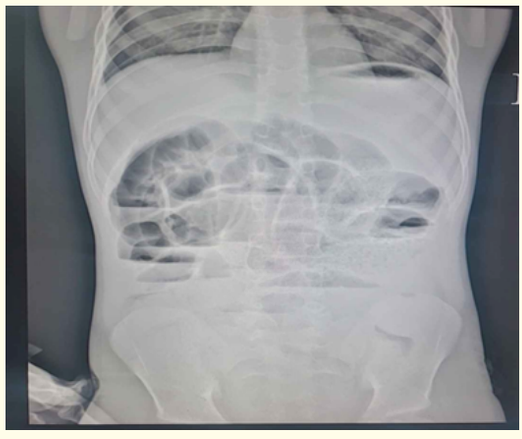

Figure 1: Plain Abdominal x-ray.

Preoperative management

In anticipation of generalized peritonitis due to complicated small bowel obstruction, a decision was made to proceed with an exploratory laparotomy. The patient was placed on nil by mouth status, and intravenous antibiotics, specifically, ceftriaxone (1g, stat) and metronidazole (500mg, stat), were promptly administered. Pain management was addressed with intravenous tramadol (50mg, stat). Preoperative fluid resuscitation commenced with the administration of 2 bags of Ringer's lactate as a bolus. A nasogastric tube (NGT) was inserted to facilitate perioperative gastrointestinal management, and a urethral catheter was placed for monitoring and managing urinary output. Additionally, two units of cross-matched blood were prepared to ensure preparedness for potential needs during the procedure.

Operative management

After about an hour of resuscitative efforts, an emergency laparotomy was carried out through a midline incision, with the patient under ketamine anesthesia. Intraoperative exploration unveiled a critical situation involving the small bowel. The small bowel was discovered entwined by gangrenous omentum, with a volvulus twisting through 360 degrees at the mesentery root. Most of the small bowel, excluding 10 cm of the distal ileum and 10 cm of the proximal jejunum, exhibited gangrenous changes. Additionally, around 150 milliliters of dark brown peritoneal fluid were found within the abdominal cavity, and notably, no viscous perforations were identified. Given these findings, a decision was made to proceed with a near-total small bowel resection, sparing only 10 cm of the jejunum and 10 cm of the ileum. To restore gastrointestinal continuity, a meticulous jejunoileal anastomosis was performed. The intraoperative findings are shown on figures 2 and 3.

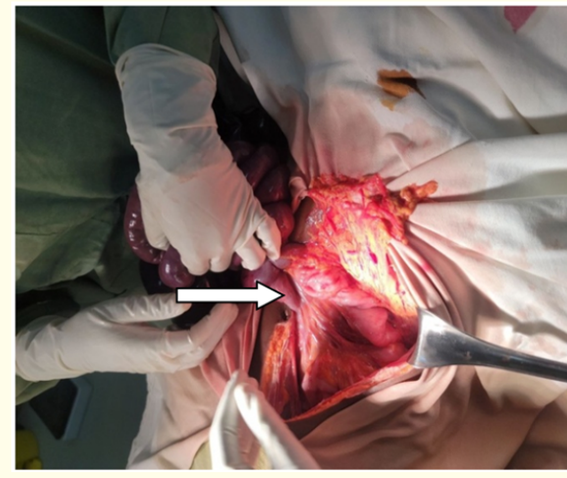

Figure 2: Arrow shows intra-operative picture of patient's distal viable small bowel.

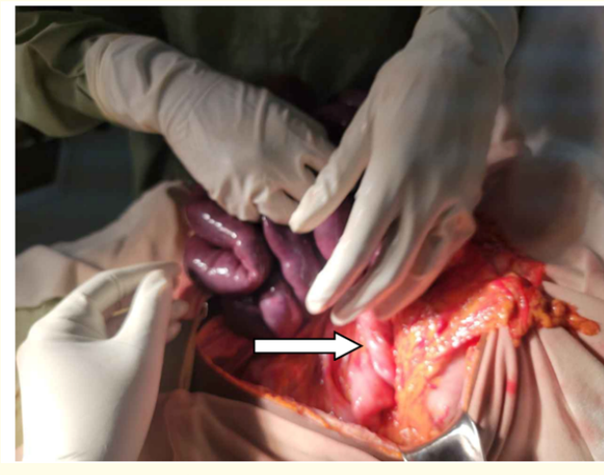

Figure 3: Arrow shows Intra-operative picture of the patient showing the proximal viable part of the small bowel.

Postoperative course

After surgery completed the patient quickly transitioned to the Intensive Care Unit (ICU) and was intubated. Extubation successfully took place the next day, marking the initial phase of postoperative recovery. Gastrointestinal decompression was facilitated by a nasogastric (NG) tube for 48 hours, followed by the initiation of a fluid diet. To prevent postoperative infections, the patient received

intravenous ceftriaxone (750 mg twice daily) and intravenous metronidazole (300 mg three times daily). However, on the fourth postoperative day, the patient experienced diarrhea with identifiable food particles, prompting the introduction of loperamide (4 mg daily). Antibiotics were discontinued on the seventh day. Due to financial constraints, Total Parenteral Nutrition (TPN) was not an option. Instead, a comprehensive dietary counseling approach recommended a regimen of small, frequent, and easily digestible dry foods. By the end of the seventh postoperative day, the patient was deemed fit for discharge.

Patient Follow up

While the patient discharged follow-up appointments were diligently arranged. In the initial week, the patient continued to grapple with loose stools, coupled with noticeable weight loss. A follow-up a week later disclosed a two-kilogram reduction compared to the initial preoperative weight of 31 kg. Subsequent follow-up sessions occurred monthly, revealing significant weight loss totaling 7 kg in the first two months. Under continuous observation for a year, the latest assessment indicates persistent loose stools without identifiable food material. Encouragingly, incremental progress is evident, with a 2 kg weight gain from the lowest point reached. Presently, the patient's weight stands at 26 kg.

Discussion

It is established that individuals who undergo major resections of the small bowel are predisposed to the development of Short Bowel Syndrome which manifests with a constellation of distressing symptoms, including diarrhea, vomiting, abdominal pain, substantial weight loss, and profound fatigue [6]. Small bowel syndrome itself is associated with a reduced quality of life and an approximate mortality rate of 10-15% within 5 years [7]. The near-total resection of the small intestine in our patient resulted in the development of SBS leaving less than 20 cm of small bowel remnant. Notably, the survival prospects of patients with SBS who do not receive Total Parenteral Nutrition (TPN) and/or small bowel transplant remain unknown.

There are several factors influencing patient outcomes like length of remnant bowel, type of resection and ileocecal valve presentation. Patients with a greater length of remnant bowel generally experience better outcomes. Those who retain less than one-third of the jejuno-ileal segment (≤200 cm) tend to exhibit symptoms of SBS. Furthermore, patients without a functional colon whose remnant small intestinal length falls below 100 cm, as well as those with a functional colon and less than 60 cm of small intestine remaining, typically rely on parenteral nutrition and/or intravenous fluid for sustenance. Jejunal resections are associated with more favorable outcomes compared to ileal resections. The ileum exhibits structural and functional adaptability, whereas the jejunum primarily adapts functionally. The integrity of the ileocecal valve plays a pivotal role. The valve acts as a regulator of intestinal transit speed and acts as a physical barrier, preventing anterograde flow of chyme from the large to the small intestine [8-11].

Our patient's case aligns with some of these factors; he has an intact ICV and a functional colon but a notably short length of small bowel, measuring only about 20 cm. It's worth noting that previous studies have reported cases of individuals with residual intestines as short as 11 to 13 cm who have survived in a clinically stable condition. However, in most of these cases, the patients were reliant on TPN support, and the complete elimination of PN support proved elusive. In our pursuit of medical literature, we encountered only one similar case report from South Sudan, which described the management of a 15-year-old female patient. In her case, a near-total resection of the small bowel was performed, and remarkably, she achieved survival without reliance on TPN [14-17].

What renders our patient's case particularly intriguing for discussion is his ability to not only survive but also experience clinical improvement without the requirement for total parenteral nutrition. The noteworthy challenges and intricacies of managing such a case are pertinent topics for discussion and warrant further exploration.

Conclusion

Surgical interventions on the small bowel, prompted by disease or injury, can lead to Small Bowel Syndrome (SBS). In developing countries such as Ethiopia, treating SBS poses significant challenges, often resulting in the unfortunate demise of survivors due to insufficient intervention. These challenges typically arise from diagnostic limitations, causing delays in necessary interventions, as well as economic constraints that profoundly impact the treatment trajectory for patients. Factors such as the cost and availability of Total Parenteral Nutrition (TPN) become critical issues. In our specific case, the challenges manifested as delayed intervention and affordability issues related to total parenteral nutrition.

Authors' Contributions

- Dr Eyosiyas: Analyzed and interpreted of data, wrote main manuscript text, approved the summated version and agrees for publication
- Dr Tsedalu: Developed the concept and designed it, approved the summated version of the article and agreed for the contribution of the article
- Dr Wondwossen: Analyzed and interpreted of data, wrote revised main manuscript text, approved the summated version and agrees for publication

- Dr Michael: Developed the concept and designed it, approved the summated version of the article and agreed for the contribution of the article.

Consent

In adherence to ethical standards, verbal consent was obtained from the patient's parents for the publication of this case report and the utilization of images captured during the intraoperative phase.

Competing Interests

There are no competing interests that could potentially influence the objectivity and integrity of this case report.

Acknowledgments

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