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CASE REPORT

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Re-infusion of high output effluent from a loop jejunostomy into its distal limb through a subcutaneously implanted catheter in a patient with co-existing acute purulent peritonitis and acute small bowel obstruction: A case report

Ognyan Georgiev Milev* and Plamen Cekov Nikolov

Department of General Surgery, St Petka Multiprofile Hospital for Active Treatment, 119 Tsar Simeon Veliki St, 3700 Vidin, Bulgaria

Abstract

Diverting jejunostomy is almost always a last ditch effort in a situation of abdominal catastrophe. Although it is life-saving, it may adversely affect the patient's metabolic status and renal function. Consequentially an emergency jejunostomy should be a temporary measure and should be closed as early as possible. We present a unique case where the creation of a temporary loop jejunostomy was indicated. To prevent acute renal failure, we re-infused the stoma effluent into its distal limb through a Foley catheter. The latter was implanted subcutaneously which allowed us to re-feed the stoma without disturbing the appliance seal. The patient recovered on oral intake without the use of total parenteral nutrition.

Key words: *jejunostomy, diverting, high output, re-infusion, implanted, catheter.*

Abbreviations: *SBS: Short Bowel Syndrome; TPN: Total Parenteral Nutrition; CT: Computed Tomography*

Background

There are rare situations when the use of defunctioning jejunostomy is justified as a life-saving procedure. These scenarios include: multiple intestinal suture lines and anastomosis in septic abdomen [1], anastomotic leakage and/or fistula after primary jejunal anastomosis [2], enteral nutrition access [3], severe small bowel inflammation (Crohn's disease or radiation injury) [4]. Creation of a double barrel jejunostomy is reported in cases with extensive bowel resection in a severely contaminated abdomen and/or haemodynamic instability [5] and exteriorization of anastomotic leak [6]. An end jejunostomy was used in the setting of distal small bowel leaks [7]. Our case represents a unique inducation for creation of a loop jejunostomy, namely severe peritonitis causing small bowel obstruction at the site of previously patent intestinal adhesions from a resent laparotomy.

Surgeons are reluctant in doing a diverting jejunostomy because its high output induces short bowel syndrome (SBS). The latter presents a challenge in maintaining the patient's metabolic balance. The acute phase of this syndrome could be dramatic with stoma output of 6-8 liters per 24 hours [8]. Patients in this phase will need fluid and nutritional support, most often in the form of total parenteral nutrition (TPN).

Publications on re-infusion of the stoma effluent are scarce. Only four studies examine this method [9]. The infrequent use of this technique is governed by low aesthetic tolerance, difficulties with appliance management, and recurrent tube dislodgement. In addition, an unfounded fear of putting excretion back into the body. The output of a high jejunostomy is not a waste, conversely it is a rich mixture of digestive juices, nutrients, and electrolytes. Apart from maintaining the patient's nutritional balance during the acute phase, re-feeding the stoma prevents injury to the kidneys and liver as well as intestinal failure of the distal bowel segment. This method is a viable alternative to TPN in patients with an adequate length of distal small bowel and present ileocecal valve [10].

Case presentation

A 57-year old male was admitted 45 days after previous emergency surgery for acute colonic obstruction (recurrent rectal cancer). This resulted in right transversostomy being created. His presenting signs and symptoms were suggestive of concomitant acute peritonitis and small bowel obstruction. The abdomen was hugely distended and tender with muscle guarding and rebound tenderness throughout. Per rectum examination detected a mass

at 6 cm from the anal verge. Plain erect abdominal x-Ray showed massively distended small bowel loops with wall and mucosal thickening (valvulae conniventes), with air-fluid levels and a transition zone (Figure 1). The patient was hemodynamically unstable with low urine output. Notably, he was afebrile and with normal white blood count; it was due to immune paralysis secondary to malignancy and recent major surgery. After short intravenous fluid resuscitation the patient was operated on revealing a 'hostile abdomen'. Small bowel loops were tightly fused to the scar of the previous laparotomy as well as to each other in the form of bowel agglutinate positioned at the right. The latter served as a transition zone below which the cecum was empty, whereas the small intestine proximally was very enlarged with fresh fibrin deposits throughout. One liter of thick pus with rotten eggs odor was aspirated, the sample of which grew *E. coli* and *Candida albicans*; no obligate anaerobes were cultured. Meticulous exploration revealed a spot of serosal necrosis at the site of the rectal cancer which had invaded the pelvic peritoneum; there was no transmural perforation. No other source of infection was detected. No attempt for adhesiolysis was made because of the risk of bowel perforation. The small intestine was decompressed through a tube inserted via jejunotomy just above its tight adhesion to the residual sigmoid colon; this site was 200 cm below the Treitz ligament. The jejunotomy was exteriorized and transformed into a 'spout' loop jejunostomy at the left lower quadrant. The patient had a complicated post-operative period with wound infection and full thickness dehiscence. On the tenth postoperative day an intra-abdominal abscess located below the right transversostomy was detected on an abdominal and low chest Computed tomography (CT)-image (Figure 2), as well as free fluid below the left diaphragmatic dome and small pleural effusions bilaterally. The abscess was drained through a direct open access and the sample of it cultured E. coli and Streptococcus agalactiae. The subdiafragmatic fluid was left undisturbed because the patient did not show any symptoms and signs suggestive of suppuration. The patient resumed oral feeding. The effluent from the jejunostomy gradually increased and measured between 4 and 6 liters per 24 hours while the urine output dropped below 500 ml/24. A sample from the effluent was sent for microbiology testing for pathogen bacteria and Clostridium difficile toxins and returned negative. This was an unacceptably high stoma output from non-infectious origin, threatening the development of acute renal failure. Consequentially we decided to proceed to early stoma reversal on the fifteenth postoperative day. Prior to this we examined the patency of the distal bowel segment with soluble contrast, which we infused through a Foley catheter into the distal stoma limb. The exam showed incomplete bowel obstruction at the site of the bowel agglutination with the contrast slowly passing into the cecum and reaching the transversostomy on the 6th hour (Figure 3 and Figure 4). We agreed that restoration of the bowel continuity under these circumstances in a still septic patient would place him at risk of anastomotic leak. As a consequence of this we decided to re-infuse the stoma effluent into the distal limb. For this purpose, two stab incisions were made-the first one at 0.5 cm from the muco-dermal junction of the distal limb and the second one outside the circumference where the bag flange sealed. We tunneled the subcutaneous tissue between the two incisions with a long hemostat. The tip of a large bore Foley catheter was pulled through the tunnel, inserted deep into the distal stoma limb securing it to the skin incisions (Figure 5). This achieved a permanent access to the distal limb for alternated re-infusion of the stoma effluent and enteral feeding with solution without disturbing the bag seal (Figure 6). No TPN was started. The patient's wife was trained to perform this simple procedure at home.

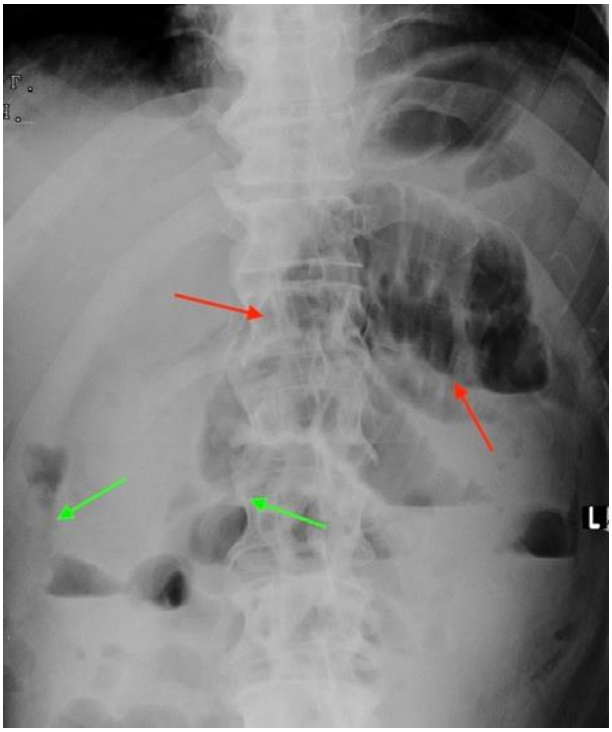

Figure 1. Erect plain abdominal X-ray on admission confirming acute small bowel obstruction. Dilated small bowel loops with wall and mucosal thickening (valvulae conniventes), and air-fluid levels (red arrows). Transition zone with paucity of gas distally (green arrows).

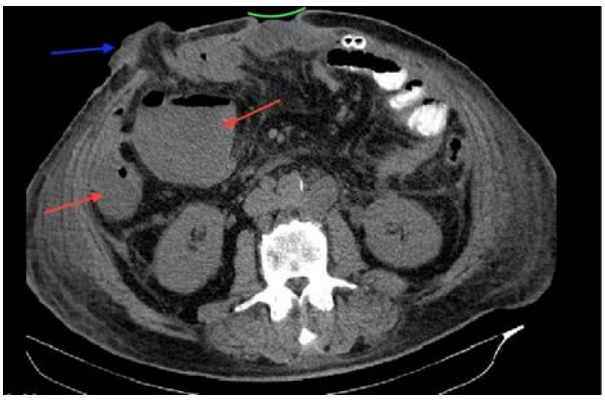

Figure 2. Abdominal CT (axial slice). Bi-lobulated intra-abdominal abscess with air bubbles (red arrows) positioned below the level and adjacent to the right transversostomy (blue arrow). Full thickness wound dehiscence bridged by a small bowel segment (green arc).

The patient was discharged on the 34th postoperative day. He was hemodynamically stable, with urine output of >1000 ml/24. Liver function tests, non-protein nitrogen (urea and creatinine), and electrolytes were within reference range. A follow up on the first and third month found that the patient had regained three kilograms of body weight. The distal transversostomy excreted normally the re-infused effluent without signs and symptoms of obstruction. The jejunostomy output gradually dropped below 1200 ml/24 (bowel adaptation-the second phase of SBS-had occurred).

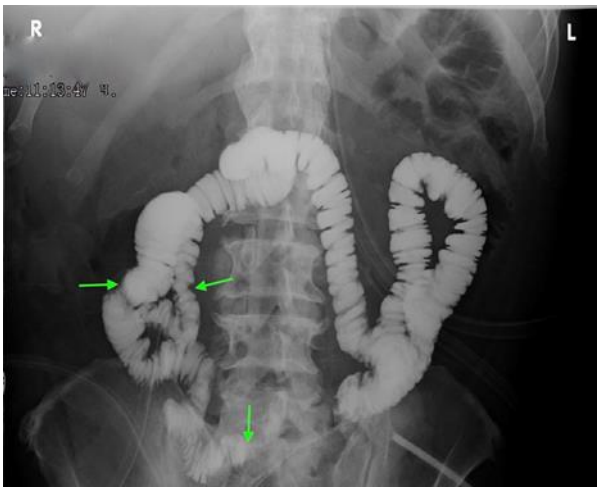

Figure 3. A follow-through image taken 1 hour after infusion of water soluble contrast into the distal jejunostomy limb. A marked transition zone of narrowed ileum and slowed contrast transit/sub occlusion at the site of the small bowel agglutination (green arrows).

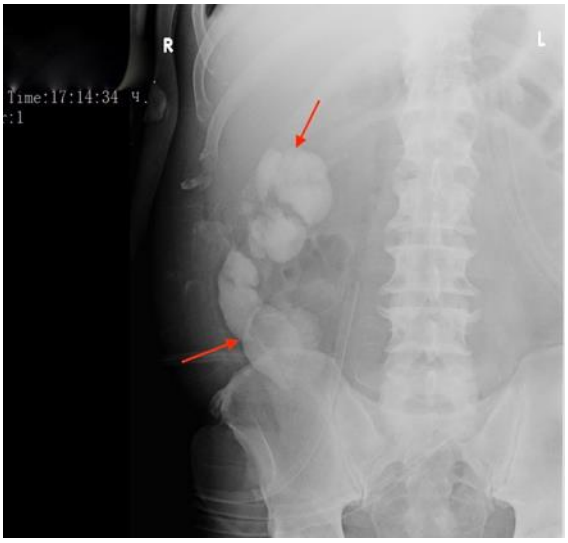

Figure 4. A follow-through image taken 6 hours after the contrast infusion. The contrast had reached the cecum, the ascending colon and the transversostomy (red arrows).

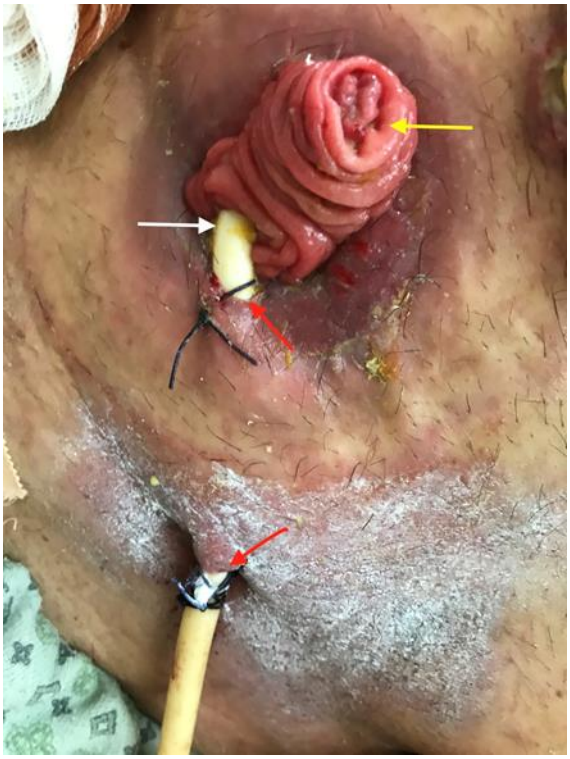

Figure 5. The subcutaneously implanted Foley catheter (picture taken from the patient's left side). The two stab incision to which the catheter is secured (red arrows). The catheter has been pulled through the subcutaneous tunnel between the incisions and inserted deep into the distal stoma limb (white arrow). The spout of the proximal stoma limb (yellow arrow).

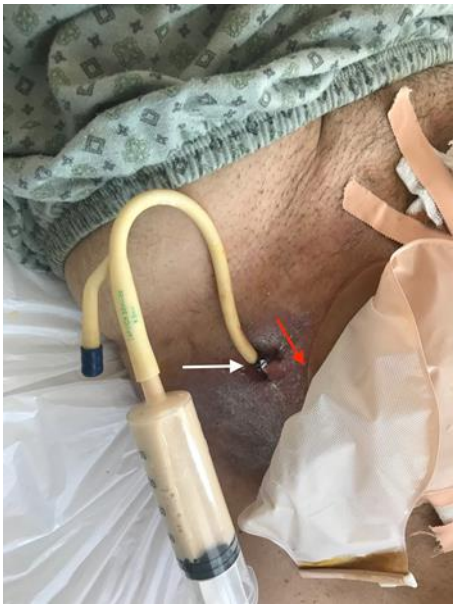

Figure 6. Re-feeding the stoma without disturbing the appliance seal *(picture taken from the patient's left side).* Catheter entry point (white arrow) which is outside the circumference of the stoma bag flange (red arrow).

Discussion

We performed a comprehensive PubMed, Google Scholar and Wiley Online Library search and did not find a case similar to ours where acute peritonitis and acute adhesive small bowel obstruction coexisted. Given the intraoperative findings of no detection of an obvious source of infection, we concluded that bacterial translocation from the peritumoral inflammation was responsible for the development of the severe peritonitis in the background of immune deficit. In turn, the subsequent bowel edema caused acute obstruction at the site of a previously patent small bowel adhesions. In our opinion, the best option to temporary deal with such a high bowel blockage is the Bishop-Kooper jejunostomy or its mirror variant-the Santuli jejunostomy. Although these stomas were originally designed for neonates with meconium ileus, they can be used in adults as well [11]. In this case by creating a termino-lateral anastomosis (these stomas are by the nature of their disighn) in the severely contaminated peritoneal cavity was contraindicated. This situation dictated that we had no choice other than creating a defunctioning loop jejunostomy. Data from publications claim that a diverting stoma located at 200 cm distally from the Trietz ligament would not cause short bowel syndrome [8]. In our case the cited length of jejunum turned out to be insufficient in preventing this syndrome. Ideally, a temporary defunctioning jejunostomy should be reversed before life-threatening physiologic disturbances had occurred. As stated above, this tactic would be hazardous in our patient. Instead, we proceeded to re-feeding the jejunostomy. The method described by Kittscha [9] of insertion of the catheter through a cut of the stoma bag carries the drawback of leakage from it and catheter displacement. Our technique of subcutaneous implantation of a Foley tube outside the appliance seal makes its change and reinfusion independent of one another and prevents leakage from the bag. The two points of attachment of the catheter to the skin makes its dislodgement impossible. Further, the deep insertion of the its tip into the distal limb does not allow a back flow even in bolus infusion and without balloon insufflation; the latter eliminates the risk of pressure necrosis of the bowel. In addition, this method avoided the use of TPN. No complications related to the implanted catheter were noted. Our method was accompanied by general measures for managing a high output stoma in accordance with The British Intestinal Failure Alliance (BIFA) guidelines [12].

A PubMed, Google Scholar and Wiley Online Library data base revealed only one article where a similar access for re-feeding of jejunostomy was used [3].

We did not make any attempt to evacuate the liquid collection under the left diaphragmatic dome because the patient did not exhibit any symptoms and signs of sub diaphragmatic abscess throughout the hospital stay. Consequently, we concluded that it was a sterile residual lavage fluid [13] and accepted the same tactic as for sterile peripancreatic collections in acute pancreatitis that is ‘wait and observe’ which time proved right.

Conclusion

The creation of diverting jejunostomy should be considered as a last resort in patients with severe abdominal sepsis. It should be temporary and reversed as soon as indicated. If early closure is not possible, re-infusion of high output stoma effluent into the distal limb should be initiated once the amount exceeded 1500ml/24. This can be safely accomplished through our technique of subcutaneous implantation of a Foley catheter. Re-feeding of jejunostomy will prevent acute renal injury and intestinal failure, and minimize the use or completely avoid TPN. We believe that this case study will add the limited literature on the problem discussed.

Authors’ contributions

Ognyan Milev (OM) performed the primary and subsequent re-operations, conducted the literature review, drafted the article, and carried out the follow-up of the patient. Plamen Nikolov (PN) admitted the patient and performed the preoperative diagnostic and therapeutic activities, participated in the primary and subsequent re-operations, and participated in drafting the article and revising it critically. All authors read and approved the final manuscript.

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Correspondence: Ognyan Georgiev Milev, Department of General Surgery, St Petka Multiprofile Hospital for Active Treatment, 119 Tsar Simeon Veliki St, 3700 Vidin, Bulgaria, E-mail: milev.o@abv.bg

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