Primary Jejunal Perforation Following Index Feeding Jejunostomy- A Rare Complication of a Common Surgical Procedure

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Main Article

Title:

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Abstract

Jejunostomy is considered one of the safest, least expensive, and most well-established methods for providing enteral feeding to patients who are unable to eat orally. It is a relatively standard procedure, and patients generally tolerate it well. The occurrence of major complications associated with this procedure is minimal, and primary jejunal perforation has only been reported twice in the medical literature. In our case report, we describe a 33-year-old woman with metastatic carcinoma of the stomach and gastric outlet obstruction who underwent a feeding procedure. Post-operatively, she experienced an extremely rare complication from this otherwise common surgical intervention.

Introduction

Percutaneous endoscopic gastrostomy (PEG) and feeding jejunostomy (FJ) are recognized techniques for facilitating enteral access in patients with neurological disorders, allowing for prolonged nutritional and medicinal support. Evidence suggests that FJ offers enhanced safety compared to total parenteral nutrition, effectively minimizing the risks of infections and metabolic complications. Despite being a technically straightforward procedure, it carries inherent risks. To date, only two case reports have documented postoperative complications associated with FJ [1, 2]. In this

communication, we present a rare third case of bowel perforation arising from FJ tube insertion during index surgery.

Case Report

A 33-year-old female presented with abdominal pain, progressive episodes of vomiting, and a loss of appetite and weight over the past 3 to 4 months. She had no history suggestive of distant metastasis or any significant family history. On examination, she was hemodynamically unstable, with a heart rate of 110 beats per minute and hypotension of 90/60 mm Hg. Blood gas analysis indicated metabolic alkalosis with paradoxical aciduria. She was diagnosed with frank gastric outlet obstruction and subsequently resuscitated with intravenous fluid supplementation, bicarbonate injections, and urine output monitoring.

As her metabolic condition improved, she underwent an elective Contrast Enhanced Computed Tomography scan of the thorax, abdomen, and pelvis (CECT TAP), which revealed metastatic carcinoma of the stomach along with retroperitoneal lymphadenopathy and peritoneal carcinomatosis (Figure 1). With treatment being of palliative intent, she was scheduled for a Feeding Jejunostomy (FJ) to ensure nutritional support, and the procedure was performed using a 16 French Ryle's tube.

Figure 1:

Title of figure 1: CECT TAP

Caption of figure 1: Yellow arrow- Gastric carcinoma

Post-operatively, she began FJ feeds on the first postoperative day (POD-1) after 12 hours and tolerated them well. On POD-3, she experienced severe abdominal pain, abdominal distension, obstipation, and signs of septic shock, including anuria and hypotension. An emergency Non-Contrast Computed Tomography (NCCT) of the abdomen suggested a primary jejunal perforation, with approximately 10 cm of the feeding tube located intraperitoneally (Figure 2). Consequently, she underwent an exploratory laparotomy, during which a 1 cm x 1 cm perforation was found on the antimesenteric side of the jejunum, 10 cm distal to the original enterotomy (Figure 3). A redo FJ was performed, and the perforation was primarily closed. Following the procedure, the patient had an uneventful recovery and was discharged with instructions for further follow-up at the palliative clinic.

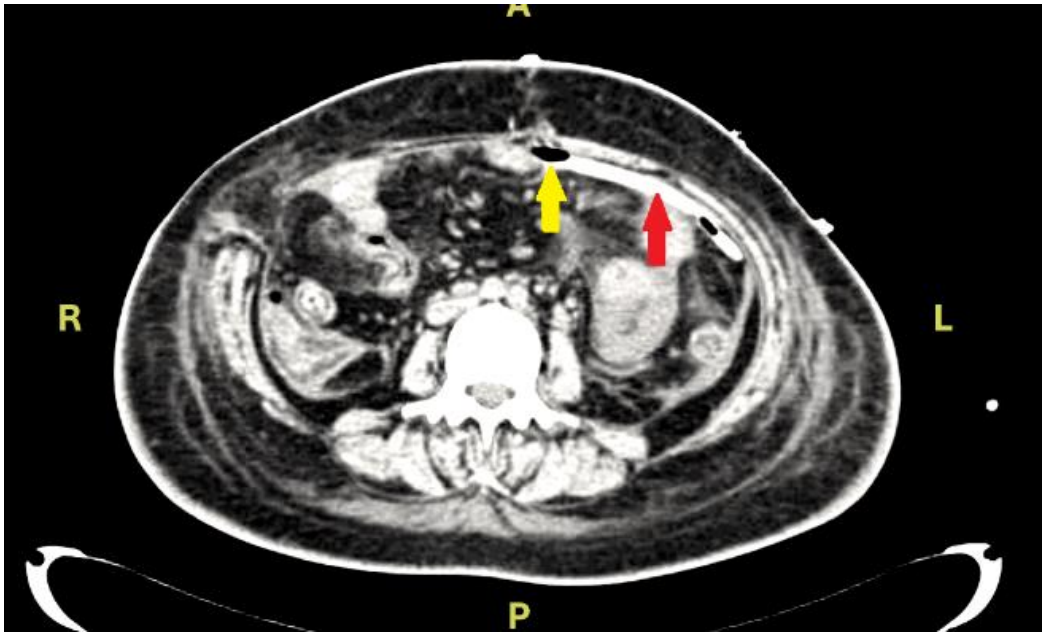

Figure 2

Title of Figure 2: Non contrast computed tomography of Abdomen

Caption of figure 2: Yellow arrow- Jejunal perforation, Red arrow- Intraperitoneal feeding tube

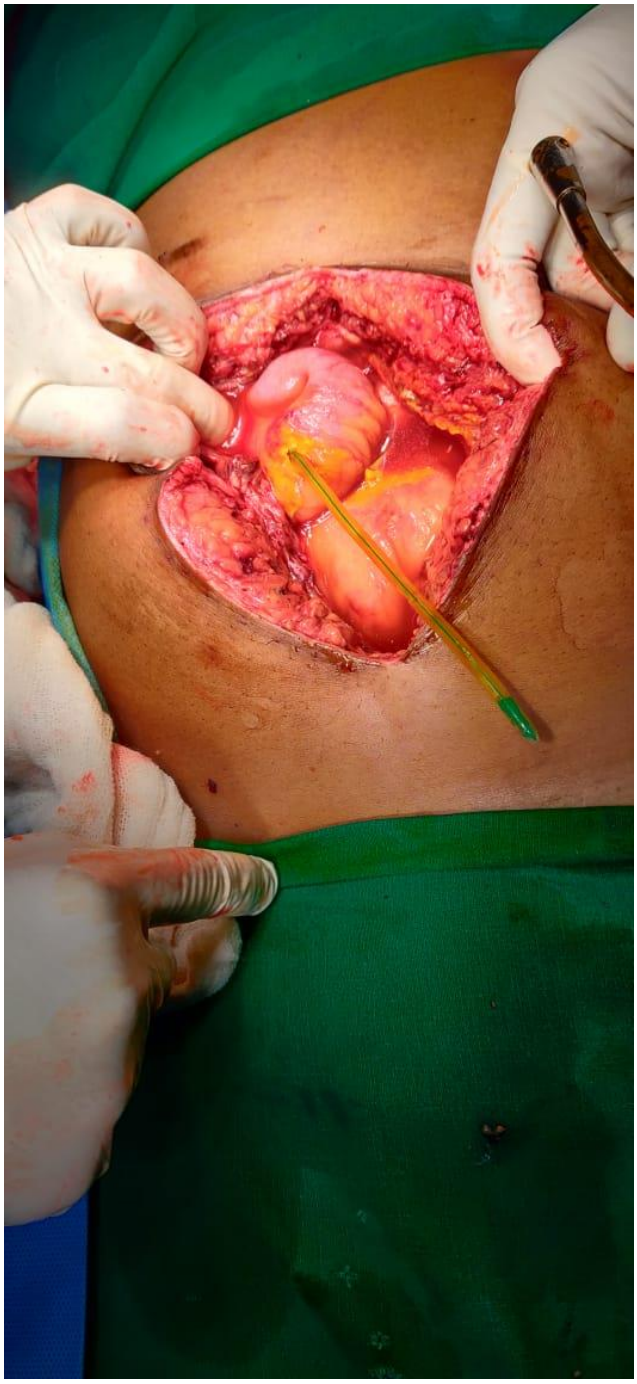

Figure 3

Title of figure 3: Intraoperative image showing the jejunal perforation and the feeding tube

Discussion

Over the last century, several feeding jejunostomy techniques have developed. Today, three primary procedures are most commonly used. Maydl first introduced the Roux-en-Y jejunostomy in 1888, followed by Eisenberg's description of the Witzel jejunostomy in 1895, and Hofmeister's description of the Stamm jejunostomy in 1905 [3]. The Roux-en-Y enterostomy has the highest complication rate at 21%, while needle-inserted catheters have the least complication rate at just 1%. The complication rates for other procedures are as follows: percutaneous jejunostomy has a rate of 2.1%, the longitudinal Witzel technique has 6.6%, and the transverse Witzel technique has a rate of 12.0% [3].

Major complications occur in 8% to 20% of cases, while jejunostomy-related mortality ranges from 2% to 10% [4]. Various complications have been reported, including mechanical issues such as accidental catheter withdrawal, obstruction (0.74%), migration into the abdominal cavity, entero-atmospheric fistulas (0.14%), ischemia (0.14%), and intestinal necrosis (0.2%). Infectious complications include subcutaneous abscess, abdominal wall infection, and pneumonia due to contamination and aspiration of enteral feeding. Gastrointestinal complications may present as abdominal distension, colic, diarrhea, constipation, nausea, or vomiting. Metabolic disturbances are also common, including hypocalcemia (50%), hyperglycemia (29%), hydroelectrolytic and acid-base imbalances, hypoglycemia, hypercalcemia, hypo- or hypernatremia, hypophosphatemia, and hypomagnesemia [3,5].

Some complications, such as cellulitis and subcutaneous abscesses, can often be managed without the need for catheter removal. However, necrosis, pneumatosis, minor bowel obstructions, and perforations are rare [6]. The most serious complication is ischemia, which may lead to small intestinal perforation. Although the incidence of ischemia is generally less than 1%, rates as high as 3.8% have also been reported [6]. Early diagnosis remains challenging when this complication occurs.

The underlying mechanism remains unclear, though multiple hypotheses have been proposed. Intraluminal factors, such as hyperosmolarity, hypertension, bacterial overgrowth, or enteral feeding retention leading to dehydration, may contribute. Additionally, factors that reduce mesenteric blood flow—including low cardiac output,

inadequate fluid resuscitation, hypotension, atherosclerotic vascular disease, and congestive heart failure—can impair bowel perfusion, potentially resulting in ischemia. Vasoconstriction further exacerbates this by reducing mucosal blood flow [6,7].

Enteral tube feeding, following elective upper gastrointestinal or trauma surgery, is often associated with non-occlusive small bowel necrosis (NOSBN), a potentially fatal complication. It has been suggested that the incidence of severe complications is lower in patients undergoing elective surgery, as they do not experience the systemic consequences of repeated trauma [8]. Early and aggressive enteral feeding has been implicated in the development of NOSBN, which likely has a multifactorial pathogenesis in surgical patients. Although systemic hypoperfusion is considered a risk factor for intestinal necrosis, NOSBN remains relatively uncommon in unfed patients who survive resuscitation after hemorrhagic shock. Contributing factors NOSBN may include low cardiac output, inadequate fluid resuscitation, hypotension, atherosclerotic vascular disease, and congestive heart failure [9]

Clinically, the presentation is nonspecific. The earliest signs and symptoms include abdominal distension, colicky pain, and the absence of bowel sounds. These are followed by more severe manifestations, such as paralytic ileus, pneumatosis intestinalis, transmural necrosis, and, ultimately, septic shock. Abdominal X-rays and CT scans typically reveal pneumatosis intestinalis in 88% of cases, a thickened intestinal wall in 38%, and the presence of free intraperitoneal fluid and air in 38% and 25%, respectively [7].

Mechanical complications in patients are challenging to identify clinically due to the absence of distinctive pathognomonic symptomatology. This increases the likelihood of the condition remaining undiagnosed for extended periods, thereby contributing to increased morbidity and mortality [2]. In such cases, the threshold for imaging and surgical intervention should be kept low. Despite repeated attempts, we were unable to diagnose a tube-related issue until a surgical investigation was conducted. This case underscores the importance of sound clinical judgment and a low threshold for suspicion, particularly when clinical assessment and diagnostic tests fail to provide conclusive evidence of the problem [2].

The breach in our case may be attributed to localized pressure necrosis of the intestinal wall, resulting from sustained pressure exerted by the tip of the feeding tube

on a specific area of the intestinal wall. Furthermore, early feeding may have exacerbated a subclinical form of NOSBN, which subsequently worsened the pathology, ultimately leading to luminal perforation. Efforts are made to mitigate this risk by using properly designed soft-tipped tubes and securing the intestinal wall to the anterior abdominal wall to prevent rotation [10]. As a precaution, postoperative jejunostomy feeding should be delayed for at least 48 hours to allow for a thorough evaluation of risk factors for small bowel necrosis [9]. Feeds with low osmolality should be administered at a slow rate. Any signs of insufficient enteral feed tolerance should prompt consideration of parenteral nutrition. Total parenteral nutrition (TPN) should be initiated in patients exhibiting enteral feed intolerance or signs of compromised gut function.

Conclusion

In conclusion, we recommend maintaining a low threshold for both contrast radiological investigations and further operative management in the postoperative period. Given the rarity of such cases, surgeons must maintain a high level of clinical suspicion to ensure an accurate diagnosis. Prompt diagnosis and immediate surgical intervention are crucial, as the complication can progress rapidly and become fatal.

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