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Strangulated Internal Hernia with Ischemic Enteropathy of the Terminal Ileum 12 Years After Cesarean Section: A Diagnostic Challenge

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1. Abstract

Postoperative adhesions remain the leading cause of small bowel obstruction (SBO), yet late presentation with internal herniation and bowel strangulation many years after caesarean section is uncommon. Diagnostic difficulty arises when clinical presentation is severe but imaging and laboratory findings are non-specific. We report a case of a 46-year-old woman with a history of two caesarean sections who presented with acute abdomen. Despite inconclusive CT findings and normal inflammatory markers, persistent severe pain prompted diagnostic laparoscopy. An internal hernia caused by internecinal adhesions with strangulation and gangrene of the terminal ileum was identified. Segmental resection and primary anastomosis were performed. Histopathology confirmed ischemic enteropathy. This case highlights the importance of clinical judgment and early surgical exploration in preventing catastrophic outcomes.

2. Introduction

Small bowel obstruction accounts for a significant proportion of surgical emergencies worldwide. In developed countries, postoperative adhesions are responsible for up to 70% of SBO cases. Cesarean section, one of the most commonly performed surgical procedures globally, is increasingly recognized as a contributor to adhesion formation. Although many adhesions remain asymptomatic, they may later present with obstruction, infertility, chronic pelvic pain, or rarely, internal hernias with bowel strangulation. Strangulated obstruction represents a surgical emergency due to the risk of bowel ischemia, necrosis, perforation, and sepsis. Early diagnosis remains challenging. Computed tomography (CT) is considered the gold standard for evaluation; however, its sensitivity decreases in early or closed-loop obstruction and in cases without classical radiologic signs. Furthermore, inflammatory markers may remain normal in early ischemia.

We present a rare and diagnostically challenging case of strangulated internal hernia resulting in ischemic enteropathy of the terminal ileum occurring 12 years after cesarean section.

3. Case Presentation

A 46-year-old female presented to the Emergency Department with sudden onset of severe lower abdominal pain that awakened her from sleep. The pain was constant, progressive, and associated with nausea and repeated vomiting. She denied fever, diarrhea, or prior similar episodes.

Her medical history was unremarkable. Surgical history included two cesarean sections, the most recent performed 12 years earlier. No other abdominal operations were reported. On admission, the patient appeared distressed due to severe pain. Vital parameters were stable.

Abdominal examination revealed diffuse tenderness, more pronounced in the lower abdomen, without frank peritoneal signs. Bowel sounds were present. Initial analgesic therapy failed to relieve symptoms.

3.1. Laboratory Findings

Laboratory evaluation demonstrated leukocytosis ranging between 16–18 $\times 10^9$/L. Notably, C-reactive protein remained within reference values throughout assessment. Electrolytes and metabolic parameters were within normal limits.

The discordance between intense pain and modest laboratory abnormalities raised clinical concern.

3.2. Radiologic Findings (Abdominal CT)

A contrast-enhanced computed tomography (CT) scan of the abdomen and pelvis was performed as part of the initial diagnostic work-up.

CT imaging demonstrated multiple dilated small bowel loops, predominantly localized in the lower abdomen and pelvis. The bowel lumen appeared fluid-filled with moderate distension. However, no clear mechanical transition point between dilated and collapsed segments was identified. Importantly, classical radiologic signs of high-grade obstruction were absent.

There were no significant air–fluid levels, no pneumoperitoneum, and no evidence of portal venous gas. Bowel wall enhancement appeared relatively preserved, without obvious hypoenhancement suggestive of transmural ischemia. A small amount of free intraperitoneal fluid was noted in the pelvic cavity. Mesenteric vessels were patent, and no mesenteric thrombosis was visualized. Subtle mesenteric crowding was present but was not initially considered diagnostic.

Overall, CT findings were interpreted as non-specific and not strongly suggestive of strangulated obstruction or bowel ischemia, contributing to the diagnostic uncertainty. CT findings are presented on Figure 1 and Figure 2.

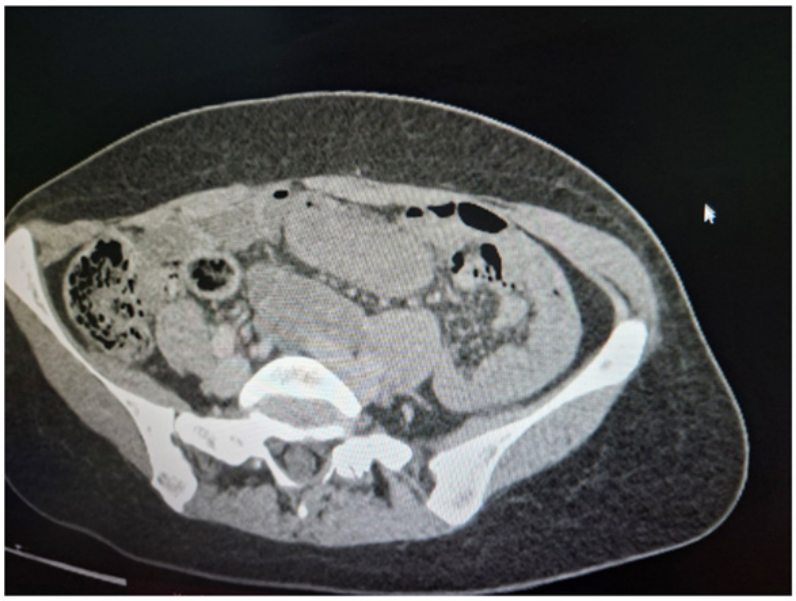

Figure 1: Contrast-enhanced CT image demonstrating dilated small bowel loops without definitive transition point or overt signs of ischemia.

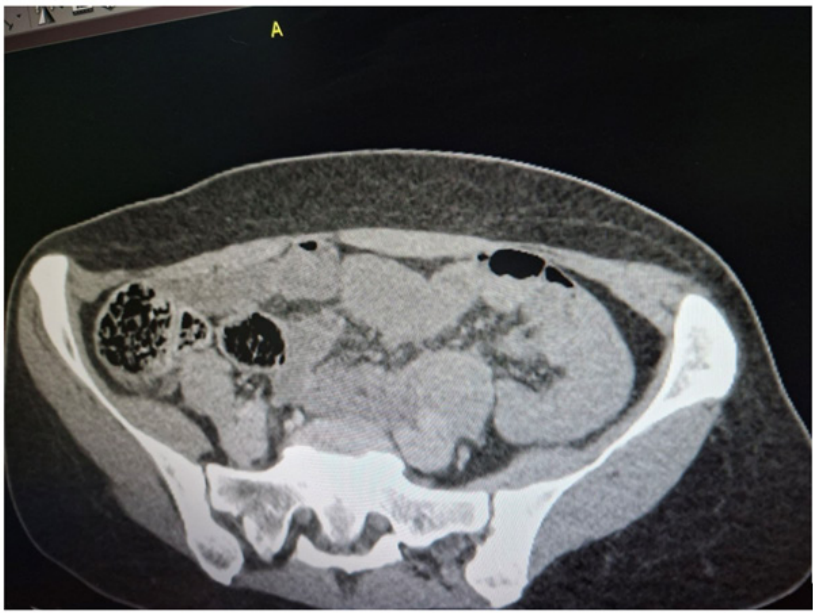

Figure 2: Clustered and moderately distended small bowel loops with subtle mesenteric crowding. No definitive radiologic signs of closed-loop obstruction are seen.
Pelvic CT section showing dilated bowel segments and minimal free intraperitoneal fluid. Bowel wall enhancement appears relatively preserved, without overt signs of ischemia.

3.3. Gynecological Assessment

Given the patient's history and lower abdominal pain localization, gynecological consultation was obtained. Ultrasound revealed normal uterine and adnexal morphology with minimal free fluid in the Douglas pouch. No gynecological pathology was identified.

3.4. Surgical Decision-Making

Despite inconclusive imaging and normal CRP, the patient continued to experience severe, persistent pain disproportionate to objective findings. Based on clinical suspicion of evolving intra-abdominal pathology, a decision was made to proceed with diagnostic laparoscopy.

3.5. Intraoperative Findings

Laparoscopy revealed normal gynecologic organs but demonstrated livid, congested small bowel loops suspicious for compromised perfusion. Due to concern for ischemia, conversion to exploratory midline laparotomy was performed with involvement of a digestive surgeon.

Interintestinal adhesions forming an internal hernia were identified. A segment of terminal ileum was incarcerated and strangulated. The involved bowel showed gangrenous discoloration and loss of viability. The compromised segment measured approximately 40 cm in length.

Adhesiolysis was performed followed by segmental resection of the nonviable bowel. A termino-terminal enteroenteric anastomosis was constructed. Peritoneal lavage and pelvic drainage were performed. Intraoperative finding are presented on Figure 3, Figure 4 and Figure 5.

Adhesiolysis was performed followed by segmental resection of the nonviable bowel. A termino-terminal enteroenteric anastomosis was constructed. Peritoneal lavage and pelvic drainage were performed. Resected ischemic segment of the terminal ileum is presented on Figure 6.

Histopathological examination confirmed the intraoperative diagnosis of ischemic enteropathy presented on Figure 7.

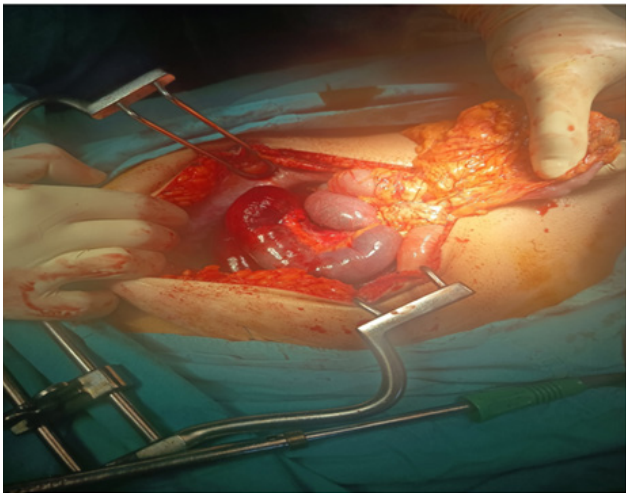

Figure 3: Intraoperative image showing the terminal ileum incarcerated within dense interintestinal adhesions, likely related to prior cesarean section, resulting in bowel strangulation.

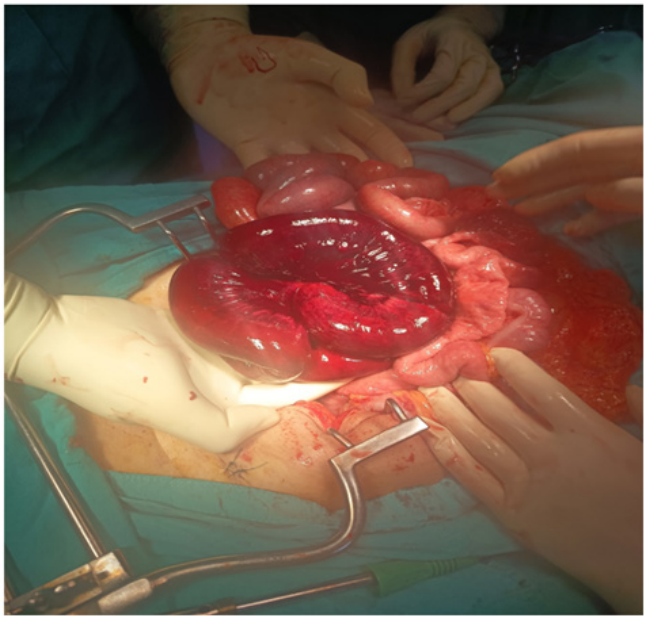

Figure 4: Intraoperative image illustrating ischemic and severely congested small bowel with dusky discoloration suggestive of nonviable intestinal tissue.

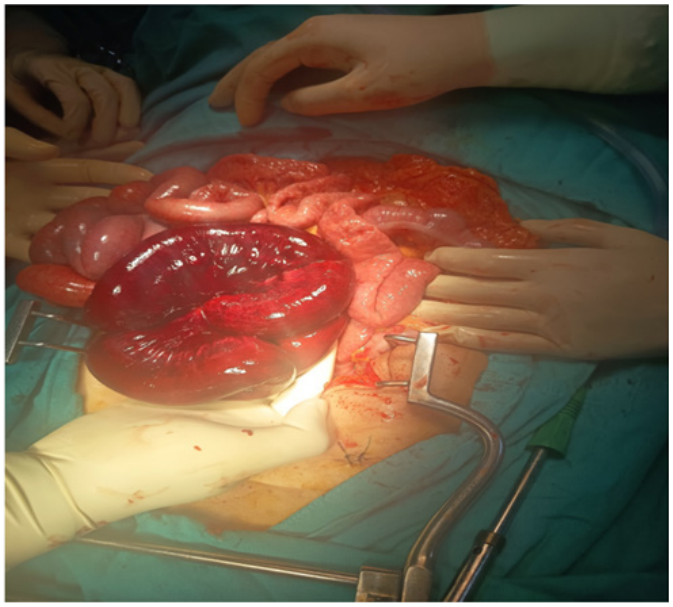

Figure 5: Intraoperative image showing ischemic and markedly congested small bowel loops with livid serosal discoloration, indicating vascular compromise secondary to strangulation.

Figure 6: Resected ischemic segment of the terminal ileum measuring approximately 40 cm in length.

HISTOPATHOLOGICAL FINDING
ENTEROPATHIA ISCHAEMICA (K55–K55)
Microscopic Finding The submitted surgical specimen is labeled as: **"1. Resected segment of small intestine"** – A resected segment of small intestine measuring **64 cm** in length, with a volume of **2.7 cm**. At **7 cm** from one end and **11 cm** from the other resection margin, the serosal surface of the intestine appears visibly altered, and upon opening the bowel, the mucosa is **hemorrhagically imbibed** (blood-soaked). For histopathological analysis (HPA), samples were taken and placed into **5 tissue cassettes**.
Microscopic Finding Microscopic examination of the samples taken from the small intestine shows findings consistent with **ischemic enteropathy**.The mucosa is partially **eroded**, with focal infiltration by a mixed inflammatory infiltrate, and the submucosal space is **edematously expanded** with an inflammatory reaction and hemorrhage.The blood vessels of the transmural wall are **markedly dilated and congested**.The resection margins pass through **vital (viable) tissue**.The findings in the submitted material are consistent with **ischemic enteropathy**.

Figure 7: Histopathological examination confirmed the intraoperative diagnosis of ischemic enteropathy secondary to bowel strangulation.

3.6. Outcome and Follow-Up

The postoperative course was uneventful. Bowel function gradually returned. The patient remained hemodynamically stable and was discharged in good condition. Follow-up showed no complications.

4. Discussion

This case illustrates several diagnostic pitfalls. Although adhesions are a common cause of small bowel obstruction, internal hernias developing many years after cesarean section are rare. The delayed presentation likely reflects slow remodeling and shifting of adhesions over time.

CT is highly valuable but not infallible. Closed-loop obstruction and early ischemia may lack classical signs. In our case, absence of pneumoperitoneum, transition point, or wall hypoenhancement contributed to diagnostic uncertainty.

Equally important, inflammatory markers may remain normal in localized ischemia before systemic response occurs. A normal CRP should therefore not reassure clinicians in the presence of concerning symptoms.

The decisive factor was clinical judgment. Pain out of proportion to findings remains a key warning sign for ischemia. Diagnostic laparoscopy provided critical information and enabled timely conversion to laparotomy before perforation or sepsis developed.

5. Conclusion

Strangulated internal hernia should be considered in patients with acute abdomen and prior cesarean section, even many years after surgery. Normal CRP and non-diagnostic CT do not exclude bowel ischemia. Early surgical exploration remains essential when clinical suspicion is high.

6. Key Points

• Severe abdominal pain disproportionate to clinical and radiologic findings should raise suspicion for bowel ischemia.

• Normal inflammatory markers, including CRP, do not exclude intestinal strangulation or ischemia.

• CT imaging may be non-diagnostic in early or closed-loop obstruction and should not delay surgical decision-making.

• Previous cesarean section can predispose to late adhesive complications, including internal hernia and strangulated bowel.

• Diagnostic laparoscopy is a valuable tool in unexplained acute abdomen and can be lifesaving when clinical suspicion persists.

• Early surgical intervention significantly reduces morbidity and prevents progression to perforation and sepsis.

7. Consent

Written informed consent was obtained from the patient for publication and use of intraoperative images and radiological images in this case report. All identifiable patient information has been removed.

8. Conflicts of Interest

The authors declare no conflicts of interest.

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