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Advanced case report: Right hemicolectomy and primary ileocolic anastomosis for complicated appendicitis in a pediatric patient with mesenteric ischemia

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Abstract

We report a rare and complex case of a 14-year-old male presenting with delayed, complicated appendicitis and secondary mesenteric ischemia involving the terminal ileum and cecum. An emergency right hemicolectomy with resection of 7 cm of terminal ileum, cecum, and 5 cm of ascending colon was performed, followed by primary end-to-end ileocolic anastomosis. Despite the compromised mesenteric blood supply, the postoperative course was uneventful. This case underscores the importance of timely surgical decision-making and supports primary anastomosis in pediatric patients when favorable conditions are present. A review of recent literature is included to contextualize management strategies.

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Introduction

Complicated appendicitis in children, particularly when associated with delayed presentation, can progress to perforation, peritonitis, and bowel necrosis. Rarely, ischemia of the terminal ileum and cecum due to mesenteric inflammation or thrombosis may occur, necessitating resection.

Historically, in scenarios involving gross intra-abdominal contamination or hemodynamic instability, surgical management has favored a staged approach—commonly involving proximal diversion via temporary ostomies to mitigate anastomotic risk. However, emerging evidence increasingly supports the feasibility and safety of primary anastomosis in well-selected pediatric patients, particularly when intraoperative conditions permit adequate source control, tissue perfusion is satisfactory, and contamination is localized and manageable.

Case presentation

Patient demographics and history:

- Age/Sex: 14-year-old male
- Presentation: 10-day history of right lower quadrant (RLQ) abdominal pain, fever, vomiting, and diarrhea
- Past medical history: Unremarkable

Clinical examination and investigations:

- Vitals: Temp 38.5°C, HR 110 bpm, normotensive
- Abdominal exam: RLQ guarding and rebound tenderness
- Labs: WBC 17,000/µL, CRP elevated
- Imaging (US and CT if available): Appendiceal inflammation with suspicion of perforation and fluid collection

Intraoperative findings

- Initial Lanz incision was made and subsequently widened after encountering complications
- Purulent peritoneal fluid
- Gangrenous appendix with rupture
- Perforation of the ileum near the ileocecal valve junction
- Necrosis of the terminal ileum, cecum, and 5 cm of the ascending colon
- Approximately 7 cm of terminal ileum resected
- Mesentery of the terminal ileum was severely ischemic and gangrenous, with skeletonized and friable vessels
- Terminal ileum appeared skeletonized, DE vascularized, and nonviable

Operative procedure

- Right hemicolectomy with resection of ~7 cm of terminal ileum, entire cecum, and 5 cm of ascending colon
- Primary hand-sewn end-to-end ileocolic anastomosis
- Peritoneal lavage
- Removal of fecal contamination
- Placement of abdominal drain and nasogastric tube

Postoperative course

- POD 1-2: Stable vitals, serous drain output, NGT maintained
- POD 3: Passed flatus, NGT removed, clear oral fluids started
- POD 4: Passed stool, tolerating soft diet, drain removed
- POD 5-7: Continued improvement, mobilizing, wound clean
- POD 8: Discharged in stable condition with oral antibiotics and follow-up plan

Discussion

This case is notable for the extent of intra-abdominal inflammation, mesenteric ischemia, and gangrene. Early surgical intervention was crucial in preventing systemic sepsis and further bowel necrosis.

Several contemporary studies support the use of primary anastomosis even in the setting of complicated appendicitis when the patient is hemodynamically stable and the bowel ends are viable. Important considerations include:

- Absence of gross fecal contamination
- Adequate vascular perfusion
- Low anastomotic tension

Literature review

- Allievi et al. found primary anastomosis safe in perforated appendicitis if the patient is optimized preoperatively [3].
- Lejus et al. showed reduced complications and improved quality of life in children undergoing primary anastomosis vs stoma formation [4].
- A 10-year retrospective study by Stringel et al. emphasized that primary anastomosis does not increase morbidity when principles of surgical technique are adhered to [5].

Differential diagnoses considered

- Crohn's disease (ruled out intraoperatively)
- Infectious enteritis
- Mesenteric vasculitis

Histopathology confirmed acute appendicitis with transmural inflammation, ruptured appendix, ileal perforation, ischemic necrosis of the cecum and terminal ileum, and gangrenous mesentery.

Conclusion

This case illustrates that in pediatric patients with complicated appendicitis, appendiceal rupture, ileal perforation at the ileocecal junction, mesenteric ischemia, and gangrene, right hemicolectomy with primary ileocolic anastomosis is a viable and effective treatment strategy. The skeletonization and nonviability of the terminal ileum further justified the extent of resection. Careful intraoperative assessment of perfusion and postoperative monitoring are critical to success. This supports a shift toward more definitive management in selected cases.

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