

Subcutaneous emphysema: an indirect sign of anastomotic leak in cecal volvulus

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ABSTRACT

Cecal volvulus (CV) is a rare cause of intestinal obstruction. A 22-year-old man with cerebral palsy presented with intestinal obstruction symptoms for 2 days. Abdominal computed tomography (CT) revealed a severely dilated cecum, confirmed as CV, during exploratory laparotomy. A right hemicolectomy with primary anastomosis was performed due to an unhealthy cecum. However, his postoperative recovery was stormy as he developed right flank subcutaneous emphysema, but the surgical drain was empty. Follow-up CT showed no extravasation of oral contrast from the lumen, but a relaparotomy noticed a small leak at the posterolateral aspect of the anastomosis, which was reinforced. He recovered well and was discharged 5 days after the relaparotomy. In conclusion, despite being uncommon, subcutaneous emphysema can become an indirect sign of an anastomotic leak even in a negative CT scan.

KEYWORDS anastomotic leak, cerebral palsy, subcutaneous emphysema, volvulus

Cecal volvulus (CV), a rare cause of small bowel obstruction, is challenging to diagnose due to its vague symptoms and low incidence rate of 1% of all large bowel obstructions.¹ It happens when the cecum is abnormally fixated to the posterior parietal peritoneum, twisting around the axis of its mesentery and causing vascular compromise, bowel ischemia, and necrosis. Surgical intervention is preferred, as endoscopic decompression often fails to handle CV.² We presented a case of a 22-year-old male with CV who

developed an anastomotic leak (AL), which manifested as subcutaneous emphysema in a negative computed tomography (CT) scan.

CASE

A 22-year-old male with global developmental delay and cerebral palsy presented with postprandial vomiting, no bowel output, and abdominal distension for 2 days. He was lethargic and mildly dehydrated, with



Figure 1. Abdominal radiography showed dilated bowels but was not diagnostic for a cecal volvulus (CV). In certain cases, the presence of a ‘cecal embryo sign’ or dilated cecum with proximal small bowel dilatation and distal colon collapse in abdominal radiography can aid in the diagnosis of CV

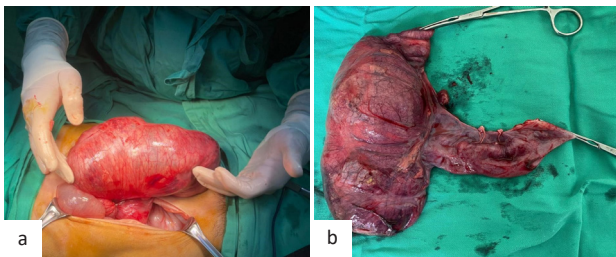


Figure 2. Intraoperative findings and postoperative specimen. (a) The cecal volvulus (CV) that was twisted 540 degrees; (b) postoperative image of a right hemicolectomy specimen

tachycardia as his only notable vital sign. Abdominal radiography revealed dilated small bowel loops without a clear classical cecal embryo sign (Figure 1).

His abdomen CT scan revealed a significantly distended right-sided colon (measuring 10.7 cm) with a thin wall, swirling of mesentery, a markedly distended cecum in axial view, and an upside-down, backward cecum with a laterally pointed ileocecal valve in coronal view. Exploratory laparotomy confirmed the diagnosis of twisted CV for 540 degrees (Figure 2). The cecum appeared unhealthy with microperforations, prompting a right hemicolectomy (Figure 3) with primary hand-sewn end-to-end anastomosis to place an abdominal drain. After surgery, his abdomen remained distended with no bowel output. Abdominal examination revealed extensive right lumbar region subcutaneous emphysema without drain output.

On Day 5 postoperative, a follow-up CT scan showed no overt features of an AL. Due to his lack

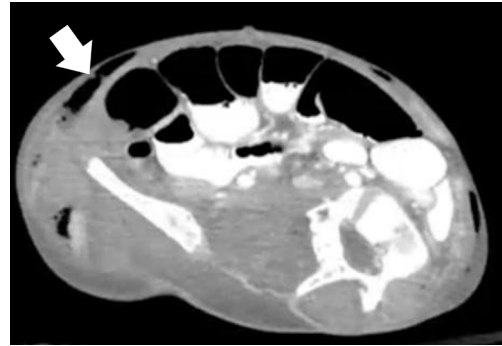


Figure 3. Subcutaneous emphysema (arrow) over the abdominal wall post-right hemicolectomy. There was evidence of anastomotic leak (AL) intraoperatively

of improvement, an emergency relaparotomy was performed to assess the intra-abdominal condition. During this surgery, a slough was found within the peritoneal cavity, especially at the perianastomotic area, and upon close inspection, a small defect at the posterolateral aspect of the anastomosis was revealed. The site was reinforced using a 3-0 polydioxanone suture. He recovered well and was discharged 5 days post-relaparotomy. A month later, his follow-up showed no complications. The histological report showed ischemic changes with colonic mucosal hemorrhages, sloughing, and fibrin deposition. A written informed consent for publication was obtained from him.

DISCUSSION

The clinical symptoms of CV are varied and non-specific, depending on how much the bowel is involved, the degree of volvulus, and the duration of strangulation. Bowel volvulus diagnosis requires imaging such as abdominal radiographs, barium enema, and CT scans.³ Barium enema, more accurate than radiography, is only offered to stable patients due to the high risk of bowel perforation. CT scan offers greater specificity and sensitivity, with hallmark signs like the “bird beak” and “whirl” sign to help identify the site of obstruction caused by bowel volvulus.³

Immediate surgical intervention is generally required to prevent necrosis and perforation. Colonoscopy is not recommended as first-line treatment due to the risk of colonic perforation and delays in surgical intervention.³ Surgical treatment is preferred once CV is diagnosed. Bowel resection is mandatory for bowel gangrene or perforation, while

detorsion followed by cecopyexy is for a viable, twisted bowel.^{3,4}

As for this patient, right hemicolectomy and primary anastomosis were performed. Despite no evidence of an AL on the pelvic drain and CT abdomen scan, subcutaneous emphysema in the abdominal region raised concerns about certain unwanted sequelae. While such concerns arise from procedural complications, this circumstance has a higher probability of AL.⁵ Although most of the leaks occur intraperitoneally, the AL presented as extraperitoneal subcutaneous emphysema in this case. Without pneumothorax, subcutaneous emphysema should raise our suspicion towards AL or viscus perforation.⁶ Possible causes include gas leakage from the AL, air tracking through the opening parts of the surgical drain, or gas following the fascial plain from the drain insertion.⁷ Given the major complications of an AL, including prolonged hospital stays, increased morbidity, and mortality, a quick decision was made.⁸ From our assessment, the deep positioning of the opening parts of the drain in the pelvic cavity makes air tracking less likely. In conclusion, in any case involving primary bowel anastomosis, including CV, an unwell patient must be suspected of AL. Even in a negative CT scan, subcutaneous emphysema can become an indirect sign of AL.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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