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Acute Appendiceal Diverticulitis Interpreted as Perforation: A Case Report

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Abstract

Appendiceal diverticula are rare anomalies that present diagnostic challenges due to their similarity to acute appendicitis. Treatment can be either with antibiotics and interval appendectomy or with an urgent appendectomy, depending on the patient's clinical picture and laboratory findings. This case report and literature review details a 43-year-old female presenting with upper abdominal pain, nausea, vomiting, leukocytosis, and probable perforated appendicitis based on computed tomography (CT) findings who opted for an urgent appendectomy. The preoperative diagnosis was a perforated acute appendicitis with localized abscess. Her postoperative diagnosis was an appendiceal mass without evidence of acute appendicitis, perforation, or abscess. However, histopathologic examination showed an appendix with acute appendicitis and diverticulum. The rarity and difficulty in distinguishing acute appendicitis from an appendiceal diverticulum on a CT scan may lead to misdiagnosis. The difference in management of appendiceal mass and appendiceal diverticulitis is significant, mainly due to the higher risk of neoplasms.

Keywords: *Appendiceal diverticulum, Appendiceal perforation, Appendiceal diverticulitis interpretation*.

1. INTRODUCTION

Appendiceal diverticula are rare anomalies observed in approximately 1% of appendectomy cases.[1] It is possible for the diverticulum to occur as a congenital aberration, or more commonly as a false diverticulum, which is acquired later in life, rather than a true diverticulum. False diverticula form when the inner layers of the intestinal wall - specifically the mucosa and submucosa - bulge outward through the muscular layer. In contrast, true diverticula involve all three layers protruding through a weakened area in the bowel wall. These two types of diverticula are categorized according to their histological findings.[2]

As with other diverticula within the bowel, an appendiceal diverticulum can become inflamed secondary to obstruction of the lumen. Although appendiceal diverticulitis clinically presents similarly to acute appendicitis (commonly a presumptuous diagnosis preceding appendectomy),[2,3] the inflamed diverticulum has an increased risk of perforation when comparing the two conditions.[4] The increased risk of perforation of appendiceal diverticula can be attributed to a delayed diagnosis of the pathology, which can be due to the difficult radiological identification of the diverticulum.[5] The challenge in diagnosing an appendiceal diverticulum means that most cases are discovered postoperatively through histopathological examination,[6] such as this case. One of the radiologic findings in appendiceal diverticulitis observed in past studies has been a larger appendiceal diameter when compared to non-diverticulitis patients.[7] Despite the size difference and an increase in periappendiceal fluid and fat stranding in diverticulitis cases, it remains a notoriously troublesome anomaly to diagnose radiologically.[7] This case study examines an instance in which preoperative diagnosis based on Computed Tomography (CT) scan findings differ from the postoperative diagnosis, which also differs from the pathology report in the case of an appendiceal diverticulum.

2. Case Presentation

A 43-year-old female presented to the ED for evaluation of upper abdominal pain with nausea and vomiting for 2 days. Her abdominal pain was rated to be 8/10. She reported a decrease in appetite because eating aggravates her pain. Her surgical history includes colon surgery due to an Essure coil migrating from her fallopian tube. She denied other abdominal surgeries. Her past medical history is significant for hypothyroidism, migraines, anxiety, and irritable bowel syndrome. Her physical exam was significant for right upper quadrant, left upper quadrant, and epigastric tenderness. No guarding was noted.

She was hemodynamically stable with a blood pressure of 137/85 mmHg, a pulse of 67 bpm, a temperature of 36.9 C, a respiratory rate of 18 breaths/min, and a SpO2 of 95%. Her laboratory evaluation showed leukocytosis of 15.4 and urinalysis was positive for leukocyte esterase, WBCs, and bacteria. She had a normal right upper quadrant ultrasound. However, her CT abdomen pelvis with contrast (Figure 1) demonstrated "a 10.8 cm long appendix noted extending up to the area of the liver with rim enhancement and fluid throughout with possible small contained small abscess collections adjacent to it consistent with probable perforated appendicitis. No obvious free intraperitoneal air is appreciated, but perforated appendicitis is raised since there are multiple areas noted throughout adjacent to the appendix where the wall appears to be absent".

Therefore, her preoperative diagnosis was a perforated acute appendicitis with a localized abscess. Due to the physical exam conflicting with the radiologic findings, the patient opted for diagnostic laparoscopy with probable appendectomy as opposed to medical management with interval appendectomy.

2.1. Preoperative Imaging

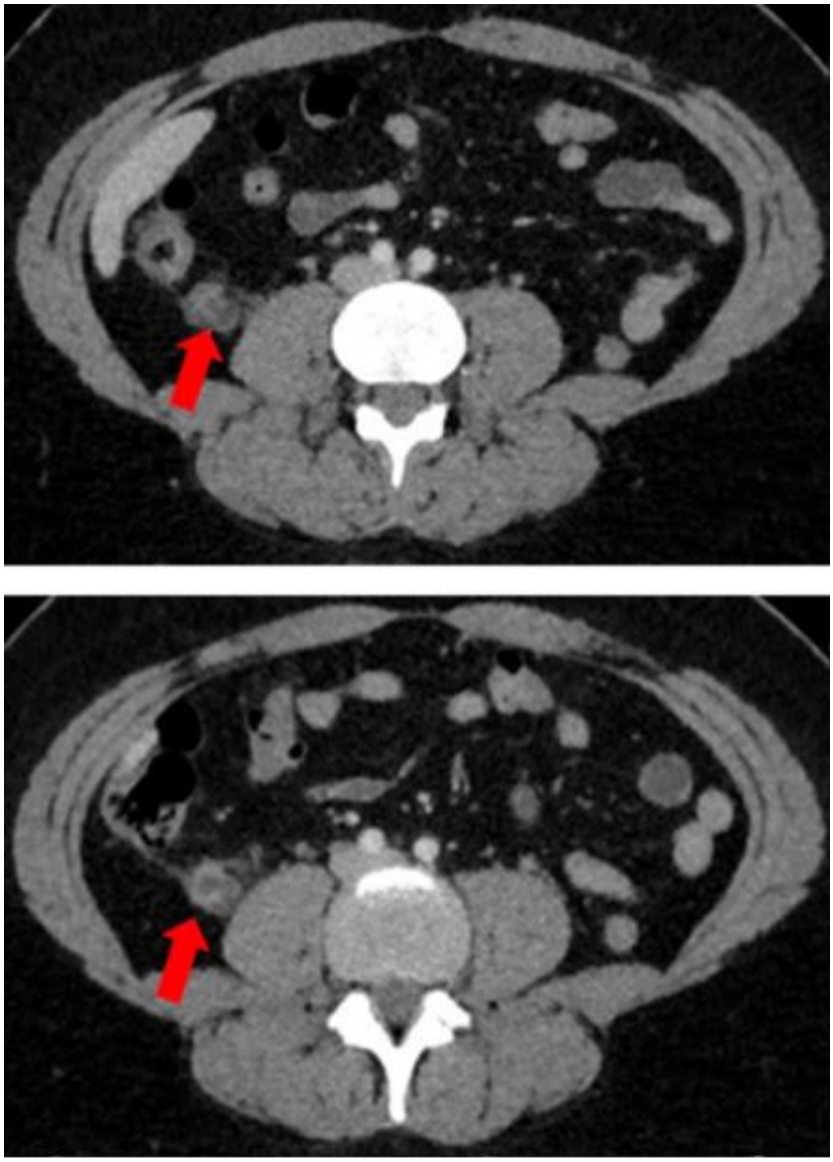

Figure 1. *Axial CT scan images showing possible perforated appendix with the more caudal image below*

2.2. Intraoperative and Postoperative Findings

An inspection of the peritoneal cavity during the operation revealed no gross abnormalities. The base of the appendix appeared healthy. Intraoperative findings were more consistent with an appendiceal mass than appendicitis. No perforation or abscesses were found. Her postoperative diagnosis was an appendiceal mass without evidence of acute appendicitis, perforation, or abscess. Upon histopathologic examination, the specimen was found to be an appendix with acute appendicitis and diverticulum (Figures 2 and 3).

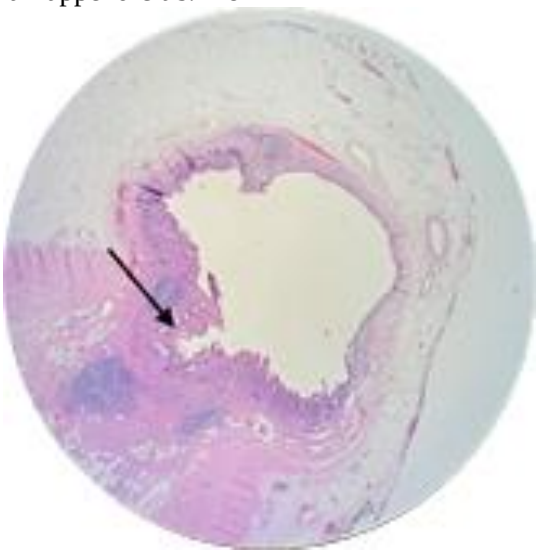

Figure 2. *H&E stained light micrograph showing appendiceal lumen (arrow) and prominent diverticulum*

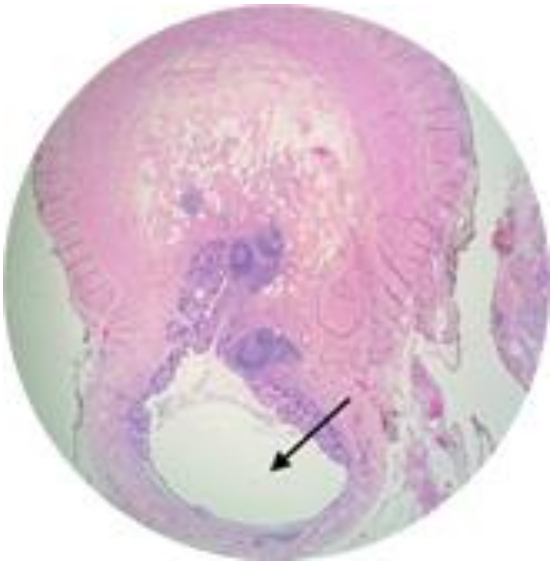

Figure 3. *Nearly obliterated true lumen with large false lumen of the diverticulum (arrow)*

3. DISCUSSION

If an appendiceal diverticulum is discovered in a patient, a prophylactic appendectomy is typically performed due to the high likelihood that the anatomical anomaly will perforate or contain a neoplasm.[2] The precautious removal of the appendix in the case of an appendiceal diverticulum can differ from the typical treatment in a stable patient with perforated appendicitis.

The surgeon can use their judgment to decide if the initial treatment would be to either treat the patients with antibiotics,[8] or perform an appendectomy. Despite the option, the majority of medical centers opt for appendectomy in the majority of their cases.[9] Previous randomized trials examining the difference in safety and efficacy between antibiotic treatment and an appendectomy have not been able to recommend one option over the other due to a lack of quality in the evidence.[10] Given that this patient's radiologic findings were questionable for perforated appendicitis, the tenderness to her right upper quadrant, left upper quadrant, and

epigastric region, and the patient's preference for surgical management, the surgeon performed an appendectomy instead of medical management with antibiotics. For this patient, the appendectomy proved to be advantageous nonetheless due to the associated risks of an appendiceal diverticulum. Regardless, it is notable that the preoperative diagnosis, the postoperative diagnosis, and the pathology report all differed in their diagnosis.

A postoperative diagnosis of an appendiceal mass without evidence of acute appendicitis, perforation, or abscess was made based on intraoperative findings.

Upon additional examination, the pathology report revealed another distinct diagnosis, identifying the condition as acute appendicitis with the presence of an appendiceal diverticulum.

The rarity of an appendiceal diverticulum likely adds to the difficulty in making an accurate preoperative diagnosis, as some sources report an incidence of about 0.014%-1.9% of the population.[11] Due to the great difficulty in distinguishing acute appendicitis and an appendiceal diverticulum on a CT scan combined with the rarity of the latter, it is reasonable to assume a different preoperative diagnosis. Previous research has examined how CT scans have preoperatively over-diagnosed cases of appendiceal diverticulitis as appendiceal perforation, likely due to the difficulty distinguishing the inflamed diverticulum from a rupture in the wall.[5]

Appendiceal perforation versus diverticulum have differing management options. Perforation can be treated with non-operative management with antibiotics followed by interval appendectomy or appendectomy with drainage.[8, 12] Diverticulum is managed with appendectomy due to the high-risk perforation or of being neoplasms (carcinoid tumors and mucinous adenomas), which have incidences ranging from 7.1% to 47.8%.[13-15] Additionally, because of the high risk of rupture associated with appendiceal diverticula, surgical intervention is warranted once the diagnosis is made. In conclusion, appendiceal pathology can be more complex than simple acute inflammation. Diagnostic scrutiny is warranted but may not be definitive until pathologic evaluation. Certainly, there is a necessity for individualized treatment approaches and further research may enhance diagnostic accuracy and optimize management strategies for appendiceal diverticula.

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AUTHOR CONTRIBUTION/CONTRIBUTION STATEMENT

Author 1: Writing – original draft (equal).

Author 2: Writing – original draft (equal).

Author 3: Pathology.

Author 4: Conceptualization (lead)

AUTHOR DISCLOSURE

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