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Case Report

Perforated mucinous diverticulitis of the appendix: a case report

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ABSTRACT

Acute right lower quadrant (RLQ) abdominal pain typically raises the suspicion of appendicitis and must be ruled out, as the treatment is primarily surgical. Other differentials, many of which are medically treated, ought to also be considered. Right sided diverticulitis, although uncommon, often mimics appendicitis due to its inflammatory nature and its location of pain. A 37-year-old woman with a history of recurrent right-sided diverticulitis presented with rapidly escalating RLQ pain. While appendicitis was a prime suspect, additional imaging was refused due to radiation concerns, hence clinical judgement had to be aptly applied. Facing diagnostic ambiguity, Hickam's dictum (seeking the most probable cause) pointed towards appendicitis, while Ockham's razor (favouring the simplest explanation) supported recurrent right sided diverticulitis. This uncertainty necessitated a definitive approach, weighing up the risks and benefits of medical vs surgical treatment for an unconfirmed pathology. To resolve the uncertainty, a diagnostic laparoscopy was performed. Contrary to expectations, it revealed a perforated diverticulum of the appendix with a mucinous tip and free-floating mucin, making both leading differentials, that is, right sided diverticulitis and appendicitis, correct. We explore the diagnostic reasoning used in the case, including the anticipated management strategies and outcomes, if other differentials were encountered. This case aims to support clinicians in pursuing further investigations, or need be, a diagnostic laparoscopy, in order to prioritise patient safety, if clinical concern is present.

Keywords: Right-sided diverticulitis, Appendiceal diverticulitis, Diagnostic laparoscopy

INTRODUCTION

Abdominal pain remains a frequent cause of emergency department visits globally, with diverticulitis and appendicitis being significant contributors.[1] Although both share inflammatory origins, their clinical presentations differ markedly. While left-sided diverticulitis typically presents with left lower quadrant (LLQ) tenderness, appendicitis classically displays pain migrating from the periumbilical region to the RLQ. Right-sided diverticulitis, although relatively uncommon but prominent in certain populations, presents an additional diagnostic challenge due to its pain and location similarities to appendicitis.[2] Uncomplicated diverticulitis often relies on antibiotics for management, while uncomplicated appendicitis traditionally demands surgical intervention, despite contemporary studies exploring antibiotic-only approaches.[3,4]

We present a case of a 37-year-old woman with perforated mucinous diverticulitis of the appendix, to highlight the importance of further imaging or diagnostic laparoscopy in cases of clinical ambiguity.

CASE REPORT

A 37-year-old female of Asian ethnicity presented to the emergency department with a rapidly escalating, 1-day history of RLQ pain. The pain, insidious in onset, had intensified significantly within a 24-hour period. Notably, it differed from her prior experiences of right sided diverticulitis, with this being more severe and the tenderness being more focal.

She reported intermittent subjective fevers but denied nausea, vomiting, diarrhoea, constipation, or dysuria. There was no history of melaena or hematochezia. Notably, she was mid-menstrual cycle and hence suspected to be peri ovulatory.

Past medical history was limited to two prior episodes of right sided uncomplicated diverticulitis, confirmed on both CT and colonoscopy six years prior, treated with antibiotics. She had no prior surgeries or regular medications.

Examination

General examination revealed stable vital signs: heart rate 70 bpm, blood pressure 135/80 mmHg, respiratory rate 12 breaths per minute, temperature 37.2°C, and SpO2 98% on room air.

Abdominal examination demonstrated focal tenderness at McBurney's point, radiating mildly up the right anterior abdomen to the costal margin. No palpable masses were appreciated. There were no stigmata of other potential aetiologies, such as hernias or skin infections.

Investigations

Laboratory investigations revealed an elevated white cell count (14.4×10^9 cells/L) with an associated neutrophilia (10.3×10^9 cells/L), suggesting an acute inflammatory/infectious process. Given the uncertainty surrounding the origin of the pain, a pelvic and abdominal ultrasound was performed to rule out gynaecological causes and support/refute the suspicion of appendicitis. We advised for a computed tomography (CT) scan given its increased sensitivity and specificity, however the patient declined due to radiation concerns, having had multiple previous CT scans for her right sided diverticulitis episodes (Figure 1).

The ultrasound revealed free fluid, exceeding physiological expectations, raising concerns for either a cyst rupture or appendicitis. Additionally, echogenicity of fat was noted, further suggesting an inflammatory process.

Urine microscopy, albeit contaminated, demonstrated normal white cell count, effectively dismissing a urinary tract infection when paired with her clinical history.

Figure 1: CT with portal venous contrast axial image showing caecal diverticulitis (red arrow) from a previous episode.

Treatment

Initial management pertained to analgesia with oral opioids, intravenous fluids, and intravenous antibiotics to treat suspected intra-abdominal sources of infection (IV ceftriaxone and IV metronidazole). A diagnostic laparoscopy ±appendicectomy was performed, due to inability to rule out appendicitis on clinical assessment in conjunction with an elevated WCC of uncertain origin. The patient chose this option to negate the need for further imaging in the future if a similar episode were to occur again. Laparoscopy revealed an inflamed appendix with a mucinous tip, and a 5 mm free floating mucin deposit in the right iliac fossa (Figure 1 and 2). A standard appendicectomy was performed with hook monopolar diathermy being used to divide the mesentery to the appendiceal base, with 3-0 PDS loops to secure the appendiceal-caecal junction, before transection and removal. The patient was discharged 24 hours later with no complications. There was no evidence of diffuse mucinous peritoneal involvement.

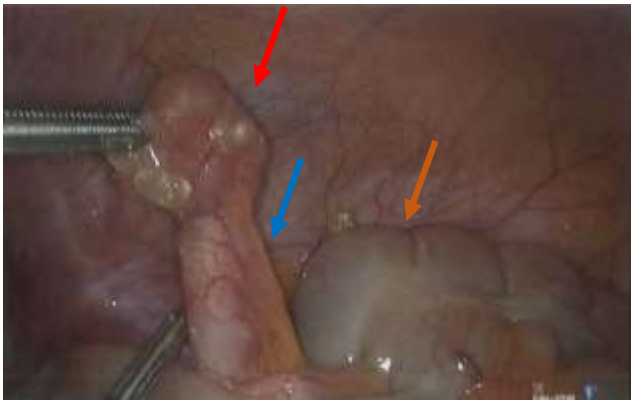

Figure 2: Intraoperative laparoscopic view of appendix with mucinous tip (red arrow), mesoappendix (blue arrow) and caecum (orange arrow).

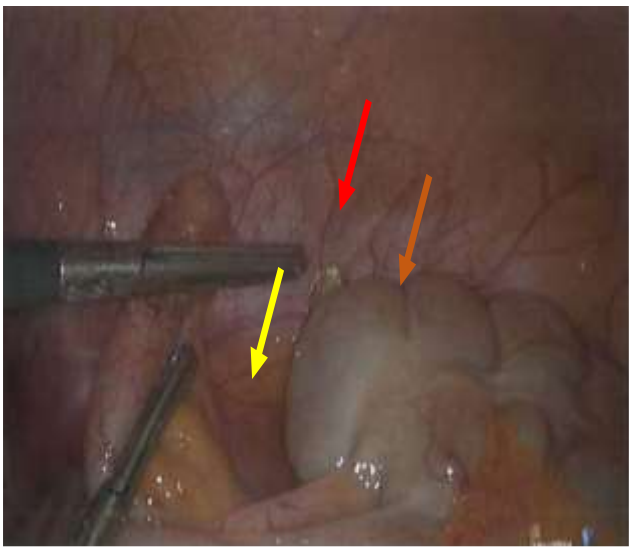

Figure 3: Intraoperative laparoscopic view of free-floating mucinous deposit (red arrow) adjacent to caecum (orange arrow) with serous free fluid in the RIF (yellow arrow).

Histopathology

The section showed a perforated diverticulum with extravasation of acellular mucin at the distal tip of the appendix, displayed in Figure 4. The extravasated mucin was admixed with haemorrhage and neutrophils and associated with neovascularisation and serosal reactive mesothelial changes. There was focal dystrophic calcification within the extravasated mucin. The entire appendix and associated nodal tissue were examined, and there was no underlying neoplasm or evidence of malignancy.

Figure 4: Histological section of appendix showing mucinous perforation (blue arrow), the appendiceal lumen (orange arrow) and dystrophic calcification (green arrow).

DISCUSSION

This presentation highlights the complexities in diagnosing acute lower abdominal pain, specifically focusing on the critical differentiation between surgical and non-surgical pathologies. We report a rare case of perforated appendicitis secondary to diverticulitis of the appendix, a presentation infrequently documented in the literature, with an estimated incidence of 0.014%.[5-7]

In this case, we challenged the common assumptions for lower abdominal pain and aim to emphasise the importance of considering alternative diagnoses. While Hickam's dictum (the notion that a patient can have multiple pathologies at once) suggests appendicitis as the most likely culprit, Ockham's razor (the notion that the simplest explanation is the most likely) favoured recurrent diverticulitis due to the pre-existing right-sided colonic diverticulosis.

Utilisation of more specific investigations, primarily imaging, is a common way to circumvent many diagnostic challenges. Despite the high sensitivity and specificity of CT scans in resolving such dilemmas, access to this modality can be hindered either via availability, patient preference or contraindications.[8] In our case further imaging was refused, necessitating reliance on the cornerstone of clinical practice-thorough history, physical examination, and meticulous clinical reasoning.

Ultimately, the potential consequences of misdiagnosing the condition as recurrent diverticulitis, potentially missing a malignant or surgical cause, outweighed the risks of a diagnostic laparoscopy. This approach revealed the unexpected culprit, emphasising the importance of the diagnostic laparoscopy, even in the modern medicine era.

It's important to acknowledge the low complication rate of appendicectomies, which mainly pertains to post operative pain and skin infections, at about 6%.[9] For a patient approaching their 5th decade, undertaking a diagnostic laparoscopy carries additional risk, not solely from an anaesthetic point of view, but from variations of appendicitis such as phlegmonous inflammation, mucoceles, or caecal cancers, in which a simple appendicectomy is not appropriate for treatment.[10] Furthermore, the negative appendicectomy rate in Australia pertains to ~22%, and hence alternatives to the diagnosis are highly expected, which the patient should be informed of.[11]

Phlegmon appendicitis consists of an inflammatory mass containing the appendix, adjacent viscera, and the greater omentum, and usually develops over several days, which was not consistent with our patient's history.[12] Phlegmon appendicitis is recommended to be treated with antibiotic therapy, a delayed colonoscopy (to excluded malignancy), and an interval appendicectomy depending on the cause.[13] An ileocolic resection is performed only if

the patient demonstrates instability.[14] In our case, if a phlegmon was encountered, an appendicectomy would have been aborted.

While classic appendicitis was suspected, the patient's age elevated the risk of appendiceal neoplasia, albeit rare with an incidence of 0.97 per million persons.[15] Mucinous neoplasms, comprising over half of appendiceal tumours are often incidentally diagnosed during appendectomy.[16] However, other aggressive malignancies like neuroendocrine tumours, goblet cell adenocarcinomas, and adenocarcinomas exist, demanding specific oncologic resections based on stage.[17] Although a prior colonoscopy six years prior showed no appendiceal concerns, a potential neoplastic process was unable to be excluded on history and exam alone. Therefore, we opted for an en-bloc resection of the appendix and mesentery to facilitate definitive diagnosis and oncologic staging, guiding potential further resections like right hemicolectomy or ileocolic resection if disease in the mesoappendix nodal tissue were to be present. Histologically, the appendix proved benign, yet this case underscores the importance of vigilance for unexpected pathologies, even in seemingly routine procedures.

Right sided diverticulitis is a less common entity, particularly in western world (being over represented in Asian ethnicities), which represents about 5% of diverticulitis presentations.[18] Caecal diverticulitis, given its proximity, is the typical mimic of appendicitis from an enteral origin. In our case, perforation was present, which in right sided diverticulitis is reported to be less common, further demonstrating the rarity of our patient's event.[19] Right sided diverticulitis patients also tend to be younger, which fits with our patient's characteristics.[20] Approximately 10% of patients with recurrent caecal diverticulitis require operative management, further the supporting the need for a diagnostic laparoscopy.[21] The removal of the appendix during a diagnostic laparoscopy for right sided diverticulitis, providing the caecal and appendiceal base are not inflamed (due to the risk of perforation on ligation), is supported practice which we performed.[22,23]

In our institution, an index presentation of diverticulitis demands an interval colonoscopy to rule out malignancy, in alignment with the American gastroenterological association guidelines. A repeat colonoscopy is not performed in our institution when a colonoscopy has been performed in the vicinity of 5 years. An exception to this, is if a suspicion of malignancy due to weight loss, melaena or iron deficiency anaemia is present, or if the patient has a strong family history of bowel cancer/polyp syndromes, however data supporting this practice is limited. Lastly, other mimics of appendicitis and right sided diverticulitis, such as a Meckel's diverticulum, renal calculi, and gynaecological pathologies, must all be ready to be encountered when treating a patient for right lower abdominal pain.

CONCLUSION

This case presented demonstrates a complex diagnostic dilemma with a perforated diverticulum of the appendix, showcasing the crucial role of considering alternative diagnoses beyond the most likely suspects, particularly in atypical presentations or when imaging investigations are limited. By sharing this unique pathology, we aim to contribute to the ongoing advancement of diagnostic acumen and surgical decision-making in managing acute lower abdominal pain, ultimately leading to improved patient outcomes.

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