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A Case Report of Left-Sided Appendicitis due to Midgut Malrotation

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Authors' contributions

This work was carried out in collaboration among all authors. Authors RSA and DB proposed the concept of the study. Authors SD and MAS maneged the data curation. Authors HY and RSA performed formal analysis and visualization the study. Authors RSA and SD wrote the original draft. All authors wrote and edited the final manuscript. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Acute appendicitis is the most common cause of abdominal pain that still requires emergency surgery. As a result of delayed diagnosis or misdiagnosis, appendicitis perforation, abscess, generalized peritonitis and sepsis develop, and morbidity and mortality increase. Variations in the location of the appendix in the abdomen are one of the most important causes of false or delayed diagnosis. Left-sided appendicitis due to midgut malrotation is extremely rare in clinical practice and can cause laboratory and radiological findings similar to colonic diverticulitis. Its rarity may lead to a wrong diagnosis. We present a case where intravenous contrast computed tomography was crucial diagnostically and helpful for pre-surgical planning in a patient presenting with an acute abdomen on left-sited perforated appendicitis with midgut malrotation.

Keywords: Midgut Malrotation; lef-sided apendicitis; computed tomography; acute appendicitis.

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1. INTRODUCTION

The incidence of acute appendicitis varies between 8.6 and 11.7 per 10,000 and is an important part of the emergency surgery [1]. Appendicitis causing pain in the left upper quadrant is extremely rare and is seen in congenital anomalies such as situs inversus totalis (SIT) and midgut malrotation (MM) [2,3]. Left-sided appendicitis usually mani fests with left lower, middle or upper abdominal pain and is confused with diverticulitis, gynecological pathologies, malignancies, pyelonephritis, inflammatory bowel diseases [4,5]. Anamnesis, physical examination, laboratory parameters and ultrasonography (US) may be insufficient in atypical localized appendicitis. Therefore, computed tomography (CT) is required for differential diagnosis and further examination. Intravenous (IV) and water-soluble contrast-enhanced CT imaging, in particular, plays a crucial role in the rapid and valid diagnosis of such confusing, complex cases [6-8]. In this article, we aimed to present a case with asymptomatic MM and perforated appendicitis in the left middle quadrant on CT imaging.

2. CASE REPORT

A 58-year-old previously healthy female presented to emergency services with left upper quadrant abdominal pain for five days. Nausea, anorexia and progressive obstipation accompanied the pain. She had hypertension in her history and had no previous abdominal surgery. During physical examination, it was found that she had tenderness, defense and rebound symptoms, more prominent in the left quadrants, and extreme sensitivity in all quadrants. The laboratory findings were: white blood cell count 18.7 x 10^3/uL (Normal, 4.5 to 10.5), neutrophil count 16.2 x 10^3/uL, C-reactive protein level (CRP) 275.2 mg/L (Normal, 0 to 5 mg/L), aspartate transaminase (AST), 65 U/L (Normal, 10 to 37 U/L), Procalcitonin 1,10 ng/mL (Normal - < 0,5 ng/mL). Chest X-ray and antero-posterior abdominal X-rays revealed no abnormalities. Sigmoid diverticulitis and diverticular abscess were considered as a possible preliminary diagnosis, and IV contrast CT was preferred instead of US to determine the etiology and differential diagnosis. Due to MM, the cecum and right colon were in the left quadrant, and the small intestine segments were located on the right. The diameter of the left appendix increased and wall enhancement was detected. Periappendiceal and pericecal infmammatory fat stranding were also found. CT findings were compatible with appendicitis (Fig. 1). The patient was taken to an emergency operation with the diagnosis of acute appendicitis. Laparotomy was performed, preferring a median incision. It was found that the peroperative cecum was located in the left upper quadrant and the appendix was perforated and a pericecal abscess was detected (Fig. 2). Appen dectomy was performed, silicone drain was placed in douglas. Postoperative imipenem IV was given to the patient for seven days. Oral intake of the patient was allowed on the third day and the drain was withdrawn on the fifth day. The patient was discharged uneventfully ten days later. The specimen histopathology reported acute gangrenous appendicitis and local peritonitis.

3. DISCUSSION

Intestinal malrotation is an intra-uterine developmental anomaly characterized by the inability of the midgut rotation around the superior mesenteric artery in the peritoneal cavity and fixation disorder [2]. In the literature, the incidence of MM varies between 0.03% and 0.5% in live births, and most are diagnosed early in life. Less than 0.5% of cases are diagnosed in adulthood [2,5,9]. Akbulut et al. [2] found the incidence of appendicitis with left quadrant locali zation as MM secondary in their literature review was 24%. Previously, in adult patients with asymptomatic MM, primarily in left-sided pain; diverticulitis, pyelonephritis, renal-ureter stone, pelvic inflammatory disease, inflammatory bowel diseases, enteritis, ileus and malignancies are considered in differential diagnosis. Collins [10] reported a left-sided appendix prevalence of 0.04% in a series of appen

dix specimens of 70,000 cases. In patients with unknown MM history, physical exa mination, laboratory examina tions and US are similar to sigmoid diveriticulitis and may cause delays in diagnosis. US may be insufficient in left-sided appendicitis due to reasons such as obesity of the patient, presence of intense gas in the bowel and the experience of the radiologist. In particular, imaging with contrast-enhanced CT, detection of atypical appendicitis, revealing MM, it can assist in preoperative planning of cases, and minimizes the delay in diagnosis [6,11,12]. Jones et al. [13] reported that the sensitivity and specificity of CT in acute appendicitis ranged from 90% to 97% and 94 to 100%, respectively, in patients with MM. Kong et al. [12] determined that left quadrant appendicitis cases were seen 2.4 times more in men than women and the average age was 33.2. They reported that according to the localization of the symptoms, it is mostly in the left lower quadrant. They have noted that CT scan has a critical role in the diagnosis of such a typical presentation of a common clinical entity and in guiding intervention.

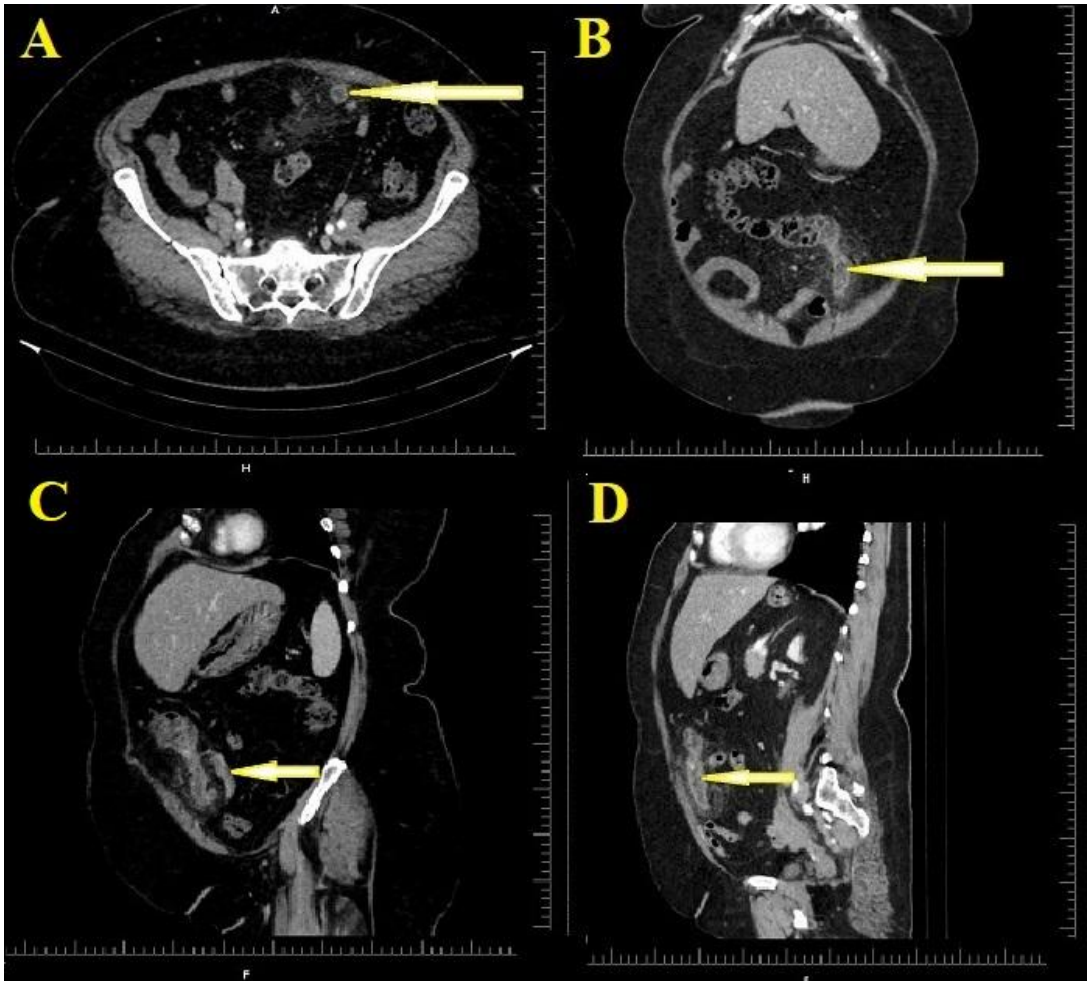

Fig. 1. Inflamed appendix in CT images
A- Inflamed appendix in axial images (Arrow); B- Inflamed appendix in coronal images (Arrow); C- Inflamed appendix in sagittal-oblique images (Arrow); D- Inflamed appendix in sagittal images (Arrow)

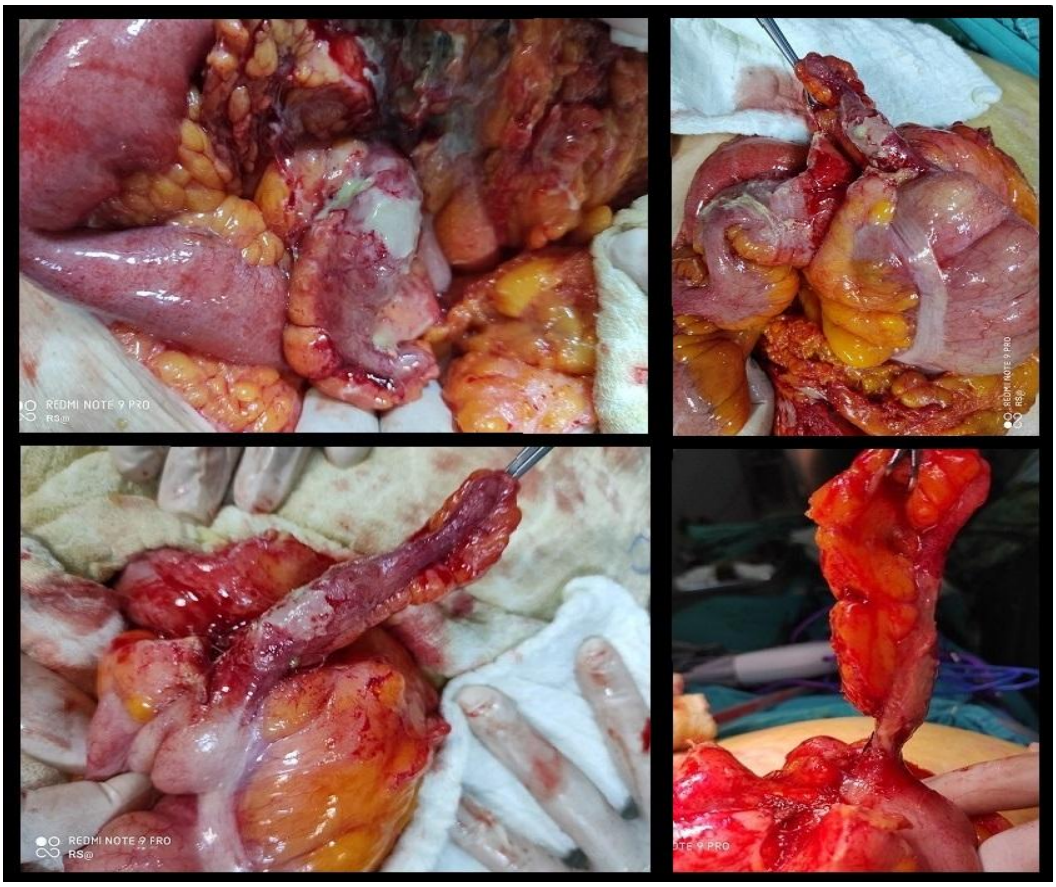

Fig. 2. Perioperative specimen pictures

4. CONCLUSIONS

Left-sided appendicitis is one of the pitfalls in the emergency department during exploration of an abdominal pain located in left abdominal quadrants. Appendicitis should always be considered in the differe ntial diagnosis in patients with acute abdomen due to the variation in anatomical location and different length. As a result of intestinal malrotation, the appendix can be seen in all quadrants of the abdomen. In particular, contrast-enhanced CT images will reveal the rare anatomical variation and help in differential diagnosis to prevent morbidity and mortality.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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