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Case Report

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A rare case of acute abdomen: acute appendicitis in a patient with midgut malrotation

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ABSTRACT

Acute appendicitis (AA) is the most common pathology requiring surgery in patients presenting to the emergency department with abdominal pain. AA is usually suspected and diagnosed with abdominal pain localized to the right lower quadrant based on anamnesis and physical examination findings. Atypical anatomical localizations of the appendix vermiformis often do not give typical anamnesis and examination findings and cause delays in diagnosis and treatment. In the presence of Midgut Malrotation (MM) and Situs Inversus Totalis (SIT), the appendix is localized in the left lower quadrant due to malrotation. In this article, we report a case of non-rotation type Midgut Malrotation that presented with left lower quadrant pain and was diagnosed with acute appendicitis.

Keywords: Appendicitis, malrotation, abdominal pain

INTRODUCTION

Abdominal pain is one of the most common complaints in emergency room visits. The most common pathology requiring surgery in these patients is acute appendicitis (AA).[1] It is seen in the general population at a rate of 0.1% per year.[2] Patients usually have typical anamnesis and physical examination findings localized to the right lower quadrant. This is due to the normal anatomical position of the appendix vermiformis in the right lower quadrant, and these findings vary according to the localization.[3] Midgut malrotation (MM) is a rare fetal anomaly caused by incomplete or failed midgut rotation and fixation.[4] The diagnosis of AA is difficult and delayed in patients with MM because of the left lower quadrant location of the appendix.[5] In this article, we report a patient who presented with left lower quadrant pain, was found to have non-rotation type Midgut Malrotation , and was diagnosed with acute appendicitis.

CASE

A 32-year-old woman with no comorbidities other than hypothyroidism and a history of previous cesarean delivery was admitted to the emergency department of an external center with the complaint of abdominal pain that started 2 days ago, accompanied by anorexia, nausea, and vomiting, localized in the left lower quadrant of the epigastrium. He was referred to our hospital after blood tests and abdominal computed tomography (CT) performed at an external center revealed an appearance compatible with MM and AA. A physical examination at the time of admission to the emergency department revealed marked tenderness, defense, and rebound in the left lower quadrant. Blood tests revealed leukocytosis (19.00x10^9/L), no abnormality in biochemical parameters, and a C-reactive protein value of 12.1 mg/L.

A chest radiograph taken in the emergency department showed that the heart was located on the left and the gastric fundus gas was on the left (**Figure 1**). External center tomography interpretation was obtained by the radiology team of the emergency department of our hospital, and it was reported as liver, stomach, spleen in normal position and size, cecum in the midline (malrotation?) and compatible with AA (diameter 17.1 mm, periapendicular fatty tissue dirty, and wall edematous) (**Figure 2-3**).

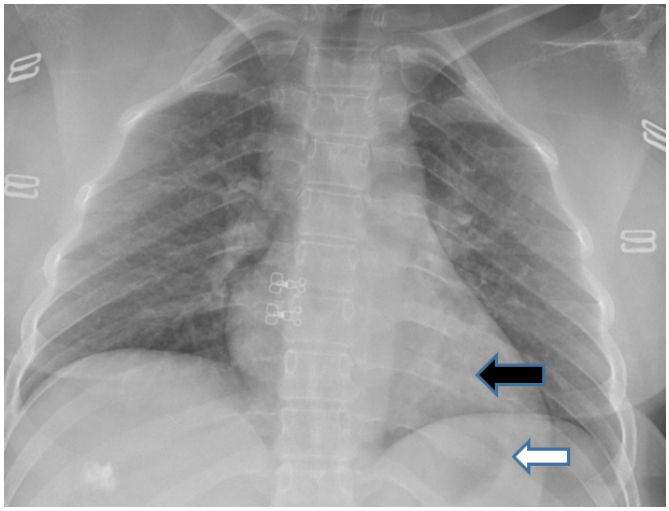

Figure 1. The chest X-ray shows a left-sided heart (black arrow) and gastric fundus gas (white arrow)

Figure 2. Computed tomography shows a left-sided appendix with periapendicular contamination and a wall thickness of 17.1 mm

Figure 3. Computed tomography shows the cecum and ascending colon located in the left quadrant of the abdomen

As a result of the investigations and physical examination, the patient was diagnosed with AA and hospitalized for surgery. Considering the possibility of anatomical variation, a laparoscopic appendectomy was decided. On laparoscopic exploration, contrary to normal anatomy, jejunum and ileum was located in the right lower quadrant, the terminal ileum entered the cecum from the right, the cecum and total colon were located in the left quadrant, and the appendix was inflamed-erectile and edematous in the left lower quadrant (**Figure 4-5**). The appendectomy was successfully completed laparoscopically (**Figure 4**). No complications were observed in the postoperative period, and the patient was discharged on the 1st postoperative day with healing.

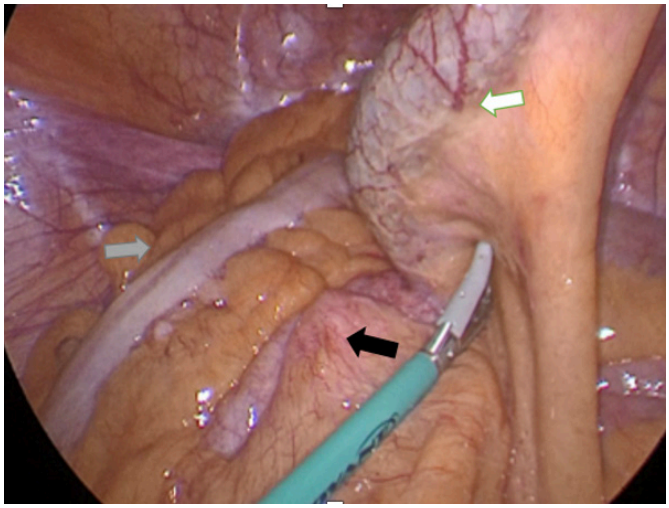

Figure 4. Inflamed-erectile appendicitis with increased vascularity (white arrow) and a left-sided cecum (black arrow) juxtaposed with a sigmoid colon (gray arrow) is shown on laparoscopic exploration

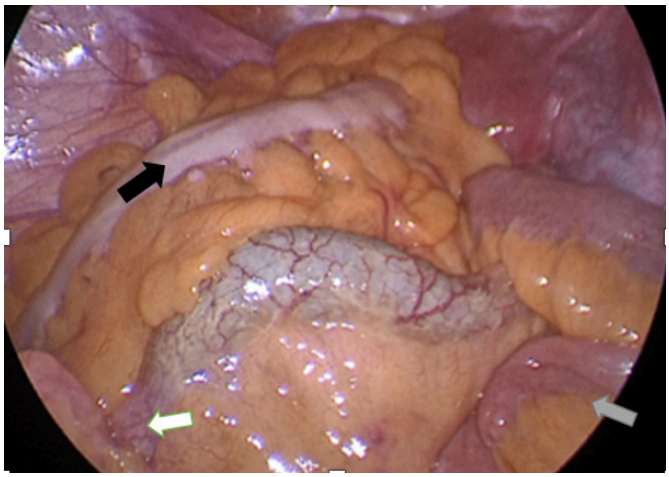

Figure 5. Laparoscopic exploration shows the appendix stump (white arrow) and right ileal anus (gray arrow) adjacent to the sigmoid colon (black arrow)

DISCUSSION

AA is an acute inflammation of the appendix vermiformis, which is the most common abdominal surgical pathology in the world.[6] It is typically recognized with pain that starts as a feeling of discomfort around the umbilicus, accompanied by symptoms such as nausea, fever, and anorexia, and localizes to the right lower quadrant as the inflammation increases. However, findings may vary due to positional variations in the appendix. In retrocaecal, subhepatic, pelvic, subcaecal, preileal, and postileal appendicitis, pain and examination findings may shift to other quadrants.[7] In Situs invertus

totalis (SIT) and MM conditions in which the middle intestine and thus the cecum and appendix vermiformis are atypically localized, pain is felt in the left lower quadrant with clinical differentiation. In our patient, the clinical and physical examination findings were that the typical right-located AA was seen symmetrically on the left side.

MM is a fetal anomaly caused by incomplete or failed rotation of the middle intestine, which is rare during embryonic development.[8] It is classified into three main types, including non-rotation (type I), duodenal malrotation (type II), and combined duodenal and cecal malrotation (type III), depending on the stage at which the embryologic defect occurs.[9] The patient presented in our study was also of the non-rotation type (type I). When the diagnosis of appendicitis is delayed in these cases, complications such as perforation and subsequent abscess formation may occur, which may worsen the clinical course of the patient and complicate the operation.[10]

In patients presenting to the emergency room with left lower quadrant pain, surgeons primarily focus on diverticular disease, gynecologic, or urologic pathologies.[2] If a previous diagnosis of SIT or MM is not known in patients, AA is usually not considered among the initial diagnoses. Because of the anatomical displacement of the heart, stomach, and liver in patients with SIT, the diagnosis is suspected with a chest radiograph and Ultrasonography (USG), which are the first imaging methods, and the diagnosis of AA may be suspected because the appendix is thought to be located on the left side. However, since intra-abdominal and intra-thoracic organs will also be located normally in patients with MM, as in our case, the diagnosis of AA is very difficult according to the results of direct radiography and USG, which are the first imaging methods. Computed tomography (CT), which has a diagnostic value of 90% in the diagnosis of AA, has diagnostic importance in these patients.[7] Our patient was diagnosed with malrotation and AA in an external center as a result of a good anamnesis, physical examination, leukocytosis, and CT imaging.

After the diagnosis of AA is made in patients with MM, open surgery or laparoscopy can be performed depending on the surgeon's experience and technical possibilities.[11] The laparoscopic treatment option was applied in our case because of the advantage of providing a better exploration during surgical treatment with laparoscopy, excluding other pathologies causing left lower quadrant pain, although AA was diagnosed despite the high sensitivity of the CT scan, and considering the possibility of anatomical variation of the appendix.

CONCLUSION

In patients presenting to the emergency room with left lower quadrant pain, it should be kept in mind that AA may rarely be associated with MM. The diagnosis should be made rapidly by using appropriate imaging methods, and treatment should not be delayed. The patient should be informed about the existing malrotation.

ETHICAL DECLARATIONS

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Hou SK, Chern CH, How CK, et al. Diagnosis of appendicitis with left lower quadrant pain. *J Chinese Med Assoc.* 2005;68(12):599-603.
2. Karagülle E, Türk E, Yıldırım E, Moray G. A rare cause of left lower quadrant abdominal pain: acute appendicitis with situs inversus totalis. *Turkish J Trauma Emerg Surg.* 2010;16(3):268-270.
3. Bazeliuc I, Bour A. Cazuri clinice rare ale apendicitei acute. Revista literaturii. *Arta Medica.* 2022;82(1):28-35.
4. Chuang PW, Huang BM, Liu CH, Chen CC, Tsai MJ. Left-sided appendicitis in an elderly patient with midgut malrotation. *Indian J Surg.* 2015;77(3):1418-1420.
5. Abdullah O, Önder A, Taşkesen F, Mesut G, Arslan M, Kapan M. Acute appendicitis in a patient with situs inversus totalis. *Harran Üni Tip Fak Derg.* 2012;9(3):138-140.
6. Gamez RA, Barrios JG, Perez DM, de Franca MT, Delgado JET, Zapata LV. Acute appendicitis in situs inversus totalis: a case report and literature review. *Health Sci J.* 2022;16:1-4.
7. Akbulut S, Ulku A, Senol A, Tas M, Yagmur Y. Left-sided appendicitis: review of 95 published cases and a case report. *World J Gastroenterol: WJG.* 2010;16(44):5598.
8. Israelit S, Brook OR, Nira BR, Guralnik L, Hershko D. Left-sided perforated acute appendicitis in an adult with midgut malrotation: the role of computed tomography. *Emerg Radiol.* 2009;16(3):217-218.
9. Kanazawa T, Kasugai K, Miyata M, et al. Midgut malrotation in adulthood. *Intern Med.* 2000;39(8):626-631.
10. Yılmaz Ö, Bayrak V, Çallı İ, Demir A. Sol alt kadran ağrısında ayırıcı tanı: situs inversus totalisli hastada akut apandisit. *Sakarya Tip Derg.* 2014;4(2):96-99.
11. Graziano K, Islam S, Dasgupta R, et al. Asymptomatic malrotation: diagnosis and surgical management: an American Pediatric Surgical Association outcomes and evidence based practice committee systematic review. *J Pediatr Surg.* 2015;50(10):1783-1790.