CASE REPORT

CT Classification Improved Precision of Left Appendicitis Diagnosis with Intestine Malrotation

Sri Inggriani[1,2], Mira Yuniarti[1,3], Jessica Christanti[1,4]

[1] Department Radiology, Medical Faculty of Pelita Harapan University, 15811 Banten , Indonesia
[2] Department Radiology, Medistra Hospital, Jakarta 12950, Indonesia
[3] Department Radiology, Siloam Hospitals Denpasar 80361, Indonesia
[4] Medical Faculty of Soegijapranata Catholic University, Semarang 50234, Indonesia

ABSTRACT

Complicated left appendicitis is a rare condition in the left lower abdomen that can lead to serious complications like peritonitis and abscesses. Computed Tomography classification can improve anatomical detail and assist in surgical planning. This presentation reviews two cases of delayed diagnosis in patients with intestinal malrotation. Both patients had recurring lower left abdominal pain. The first exhibited localized tenderness, while the second had diffuse tenderness. Both showed leukocytosis and elevated neutrophil levels. A non-contrast CT for the first confirmed suppurative-phlegmonous acute appendicitis with a periappendiceal abscess, while the second CT revealed perforating acute appendicitis with ulcerative mucosa. The CT classification shows that both patients had intestine malrotation with DNJRCL and DYJRCL subtypes according to CT classification. Fortunately, both patients recovered after undergoing appendectomies. CT classification can improve awareness of anatomical variants, which is vital for accurately diagnosing left-sided appendicitis.
Malaysian Journal of Medicine and Health Sciences (2025) 21(4): 378-380. doi:10.47836/mjmhs.21.4.43

Keywords: Left appendicitis, Intestine malrotation, CT classification, Appendectomy, Acute abdomen

Corresponding Author:
Sri Inggriani, PhD
Email: giokingkwee@gmail.com
Tel: +62 811-946-059

INTRODUCTION

Complicated appendicitis is an acute condition of the right lower abdomen that can lead to severe complications such as peritonitis, abscess, and even death. Bowel malrotation is a rare congenital disorder estimated to occur in 1 in 6000 live births.1 Computed Tomography (CT) can diagnose left-sided appendicitis but is often overlooked by pre-imaging differential diagnosis by clinicians. Therefore, CT classification of intestinal malrotation is divided into ten subtypes and could be used for more precise surgical planning to help the surgeon, especially in bowel malformation cases2. We will present two cases of delayed diagnosis of left-sided appendicitis with intestinal malrotation.

CASE REPORT

First Case

A 21-year-old male patient experienced recurrent lower left abdominal pain, vomiting, and constipation for a month despite receiving painkillers and laxatives from previous primary health care. Upon physical examination in the emergency department, the patient's left lower abdomen was tender on palpation. Laboratory examination revealed leukocytosis of 10.470/ul (reference range: 4,000-10,000/ul), neutrophilic count of 77.9% (reference range: 50-70%), lymphocytic count of 13.8% (reference range: 20-40%), and neutrophil to lymphocyte ratio was 5.7 (reference range: <3.13). The emergency physician diagnosed constipation with a differential diagnosis of ileus before a non-contrast abdominal CT was ordered. Non-contrast abdominal CT found left-sided appendicitis with intestinal malrotation type DNJRCL (Figure 1). The patient underwent an appendectomy, and histopathologic examination

revealed suppurative-phlegmonous acute appendicitis with periappendicular infiltrate. The patient underwent hospitalization for three days and then discharged as an outpatient.

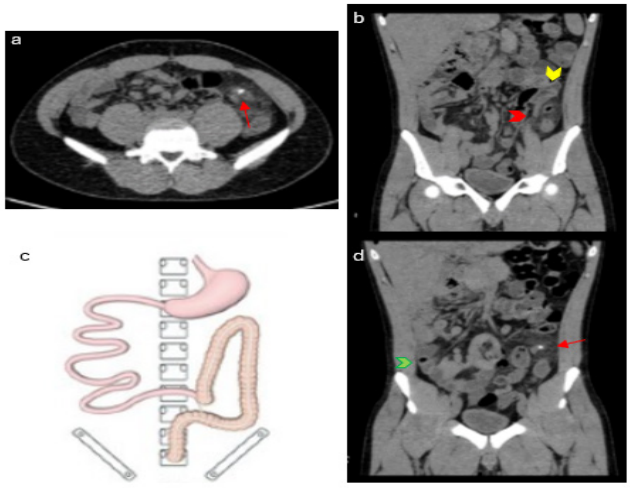

Figure 1: Non-Contrast Abdominal CT; axial (a) and coronal (b,d) views showed the ileum in the right abdomen (green arrowhead) and the caecum in the left mid abdomen. A Tubular, dilated, blind-ended structure (red arrowhead) is connected with the caecum (yellow arrowhead) at the left lower abdomen quadrant with significant fat stranding adjacent to it. A hyperdense lesion (221 Hounsfield Unit), probably appendicolith, is seen inside (arrow)—suggestive findings of intestinal malrotation with left-sided acute appendicitis. (c) Schematic diagram of intestinal malrotation type DNJRCL2.

Second Case

A 40-year-old male patient experienced diffuse acute abdominal pain with fever despite receiving gastric and antipyretic medications. Upon physical examination, his lower abdomen was diffusely tender on palpation. Laboratory examination revealed leukocytosis of 25.700/ul (reference range: 4.000-10.000/ul), neutrophilic count of 80 % (reference range: 50-70%), lymphocytic count of 10.4% (reference range: 20-40%), and neutrophil to lymphocyte ratio 7.7 (reference range: <3.13). The emergency physician diagnosed the case as peritonitis with a suspicion of bowel perforation before a contrast abdominal CT was ordered. Contrast abdominal CT found left-sided appendicitis with intestinal malrotation type DYJRCL (Figure 2). The patient underwent an appendectomy and histopathologic examination which revealed an ulcerated appendix mucosa, concluding perforating acute appendicitis. The patient was hospitalized for three days and then discharged as an outpatient.

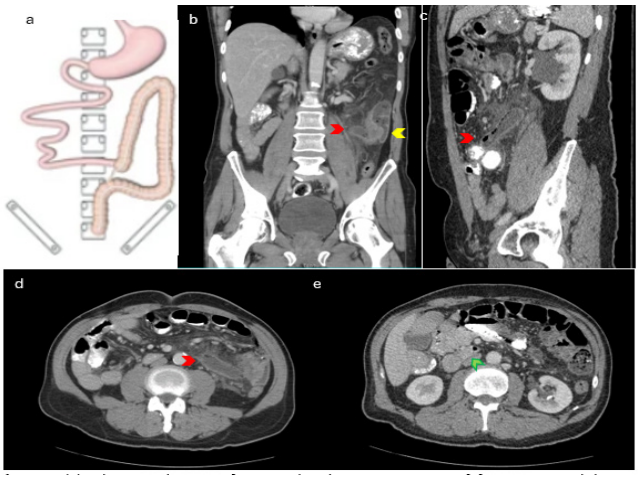

Figure 2: (a) Schematic diagram of intestinal malrotation type DYJRCL2. A Contrast Abdominal CT coronal (b,c) and axial (d,e) views showed all parts of duodeno-jejunal in the right abdomen (green arrowhead) and colonic segment in the left mid abdomen. A Tubular, thickened, dilated, blind-ended structure (red arrowhead) is connected with the thickened caecum (yellow arrowhead) at the left lower abdomen quadrant with significant fat stranding adjacent to it.—suggestive findings of intestinal malrotation with left-sided acute appendicitis.

DISCUSSION

Left-sided appendicitis is a challenge for clinicians when diagnosing emergency patients with acute abdomen due to its abnormal position. In addition to the abnormal position, clinical signs are not typical because the nervous system does not show corresponding transposition based on the affected viscera. Between 18.4 and 31% of patients with left-sided appendicitis may feel pain in the right lower quadrant.3 According to a prior research conducted by Shimamura et al., instances of left-sided appendicitis were linked to congenital irregularities like situs inversus and intestinal malrotation in about 93.6% of cases.4 .Previous studies have found that most clinicians experience diagnostic bias, such as in cases of gastric ulcer, diverticulosis, colitis, and constipation. Furthermore, it is important to highlight that most of these studies overlooked the analysis of subtypes of intestinal malrotation, even though they had readily available CT data. This gap suggests a critical need for more in-depth investigations in this area 5 In our 2 cases of left-sided appendicitis, clinicians experienced diagnostic biases such as gastric ulcer and constipation. Both clinicians had not considered anatomical variants of the bowel, such as malrotation. However, in both cases, the clinicians recommended both contrast and non-contrast

CT abdomen for a more definitive diagnosis. Accurate diagnosis is essential to avoid unnecessary incisions

In both cases, the diagnosis of left-sided appendicitis with intestinal malrotation was made. Intestinal malrotation occurs due to partial or complete failure of rotation of the midgut around the superior mesenteric vessels during the embryonic period. Xiong Z, et al. categorized malrotation based on the anatomical position of the bowel. First, the location of the duodenum with respect to the midline was divided into nonrotation (coded N), partial rotation (coded Y), and malrotation (coded Y). Second, the location of the jejunum with respect to the abdomen is divided into right (code R), left (code L), and middle (code M). Third, the location of the caecum with respect to the abdomen is divided into right (code R), left (code L), and center (code M). Additionaly, analyzing the position of the superior mesenteric artery (SMA) against the superior mesenteric vein (SMV) is recommended to ensure smooth vascularization. Finally, assessing the presence or absence of whirlpool signs associated with midgut volvulus is important. 2. In the first case, the patient has DNJRCL type intestinal malrotation characterized by a nonrotated duodenum, and jejunal on the right, and caecum and appendix on the left side. In the second case, the patient had DYJRCL type intestinal malrotation characterized by partial rotation of duodenum, and jejunal on the right, and caecum and appendix on the left side. Abdominal CT analysis is the gold standard to diagnose any abdominal malrotation, especially intestinal malrotation. Thus, CT classification can improve incidental findings and make it easier for clinicians to plan therapy, especially for procedures with a limited field of view such as laparoscopic follow-up, and prevent postoperative complications.2 Both cases had appendectomy without the laparoscopic technique because intestinal malrotation, as found based on CT classification, was too complicated to be operated on because of the limited competency of the surgeon in performing laparoscopy for this case.

The main limitation of this case report is that not all examinations, such as histopathology and surgery duration, were documented. So, information was only obtained from the electronic medical record. This case emphasized the importance of considering the differential diagnosis of intestinal malrotation in acute abdominal cases in adults, which clinicians often overlook.

CONCLUSION

CT classification can improve awareness of anatomical variants, which is vital for accurately diagnosing left-sided appendicitis. Prompt recognition is crucial to avoid complications. Additionally, CT classification assists surgeons in planning precise surgeries.

ACKNOWLEDGEMENT

We would like to convey our heartfelt appreciation to the patient for granting us permission to publish this case. I would also like to thank my colleagues for their exceptional support. We would like to express our sincere gratitude to the patient for giving consent for us to publish ini this case. I would like to extend my thanks to my colleagues for their invaluable support

REFERENCES

1. Butterworth WA, Butterworth JW. An adult presentation of midgut volvulus secondary to intestinal malrotation: A case report and literature review. *Int J Surg Case Rep* 2018; 50: 46–49.
2. Xiong Z, Shen Y, Morelli JN, et al. CT facilitates improved diagnosis of adult intestinal malrotation: a 7-year retrospective study based on 332 cases. *Insights Imaging;* 12. Epub ahead of print 1 December 2021. DOI: 10.1186/s13244-021-00999-3.
3. Kunitomo K, Shimizu T, Tsuji T. A Common Diagnosis Delayed by Three "Wrong Footing" Anchoring Errors - it is Difficult to Remember What You Have Forgotten. *Eur J Case Rep Intern Med;* 9. Epub ahead of print 2022. DOI: 10.12890/2022_003615.
4. Hu Q, Shi J, Sun Y. Left-sided appendicitis due to anatomical variation: A case report. *Front Surg;* 9. Epub ahead of print 24 August 2022. DOI: 10.3389/fsurg.2022.896116.
5. Akbulut S, Ulku A, Senol A, et al. Left-sided appendicitis: review of 95 published cases and a case report. *World J Gastroenterol* 2010; 16 44: 5598–602.