Acute Appendicitis with Intestinal Malrotation: The Usefulness of Coronal Computed Tomography

Tetsuo Sonomura¹, Takao Koyama¹, Seigo Ishii², Taizo Takeuchi¹, Hiroki Sanda¹, Kouhei Nakata¹, Motoki Nakai¹, Hiroki Minamiguchi¹, Kazushi Kishi¹ and Morio Sato¹

Abstract
We herein present a rare case of acute appendicitis with intestinal malrotation. Coronal images of contrast-enhanced computed tomography (CT) revealed the small intestine on the right side and the large intestine on the left side, thus indicating intestinal malrotation (non-rotation type). In addition, an enhanced, tubular, fluid-filled structure was detected attached to the cecum, which was located superior to the urinary bladder, suggesting acute appendicitis. The present study shows that coronal CT images provide important information for the diagnosis and treatment of acute appendicitis in patients with intestinal malrotation.

Key words: appendicitis, intestinal malrotation, coronal CT images


Introduction
Because the appendix is located in an abnormal position in patients with intestinal malrotation (1-5), the diagnosis and treatment of acute appendicitis in such patients requires knowledge of the precise location of the appendix and the anatomy of the small and large intestines. Coronal CT images can provide this information and are helpful for use in preoperative simulation as well as navigation during surgery. There have been several reports in English and Japanese of the application of CT images for the diagnosis of acute appendicitis in patients with intestinal malrotation (1-5); however, none of these studies focused on the usefulness of coronal CT for this purpose.

Case Report
A 44-year-old woman was admitted to our hospital with right lower abdominal pain and a high fever. A physical examination revealed tenderness in the right lower quadrant with abdominal guarding. Blood tests showed a white blood cell count of 13,600/μL (neutrophils: 92.1%) and a C-reactive protein level of 31.3 mg/dL. A coronal image (Fig. 1A, Fig. 2) of contrast-enhanced CT demonstrated the small intestine to be on the right side with the large intestine on the left side. In addition, a dilated appendix measuring 12 mm in maximum diameter was detected attached to the cecum, which was located superior to the urinary bladder. Axial images (Fig. 1B, C) of CT showed a dilated appendix attached to the cecum located anterior and to the right of the uterus, with the superior mesenteric vein (SMV) lying on the left, instead of the right, ventral aspect of the superior mesenteric artery (SMA), a sign of SMV rotation (6). These CT findings indicated a diagnosis of acute appendicitis with intestinal malrotation. Emergency surgery was performed, during which the cecum and ascending colon were not found to be fixed to the retroperitoneum, while the cecum lay in the median lower portion of the abdomen, superior to the urinary bladder. The appendix attached to the cecum was markedly dilated, with inflammatory changes around the appendix, although it was not perforated. The pathological diagnosis was acute phlegmonous appendicitis. The patient was discharged from the hospital 11 days after the operation.

Discussion
Intestinal malrotation is defined as an anomaly of rotation and fixation of the midgut (7). It is a rare disorder, found in

¹Department of Radiology, Wakayama Medical University, Japan and ²Department of Radiology, Kishiwada Tokushukai Hospital, Japan
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Correspondence to Dr. Tetsuo Sonomura, sonomura@wakayama-med.ac.jp
the intestinal anatomy. In the present case, coronal images revealed the position of the small intestine on the right side and the large intestine on the left side in addition to a dilated appendix attached to the cecum, which was located superior to the urinary bladder. These findings enabled the diagnosis of acute appendicitis with intestinal malrotation (non-rotation type). In addition, coronal images offer the same viewpoint as that of the surgeon and provide important information for use in preoperative simulation as well as navigation during surgery. Axial images are useful for identifying the location of the SMV in relation to the SMA. A position of the SMV on the left, instead of the right, ventral aspect of the SMA (SMV rotation sign) (6) indicates a diagnosis of intestinal malrotation.

There have been several reports in English and Japanese of the application of CT images for the diagnosis of acute appendicitis in patients with intestinal malrotation (1-5); however, none of these studies focused on the usefulness of coronal CT for this purpose.

In conclusion, coronal CT images are useful in the diagnosis and treatment of acute appendicitis in patients with intestinal malrotation.

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References


