

Case Report

## Congenital Intestinal Malrotation in an Adult: A Case Report

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### Key Words

Midgut malrotation;  
Volvulus;  
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Computed tomography;  
Barium enema

**Purpose:** To describe our experience using barium studies and computed tomography (CT) to diagnose midgut malrotation in an adult.

**Methods:** Barium studies and CT were used to diagnose midgut malrotation in a 60-year-old man who had intermittent chronic abdominal pain for several months.

**Results:** Abdominal CT without contrast indicated complete malrotation of the bowel. Results of the barium enema showed that the ascending colon and transverse colon had left-sided deviation. The patient was radiologically diagnosed as having malrotation, but he had not yet undergone an operation. He reported only experiencing mild symptoms and wished to receive conservative treatment.

**Conclusions:** Midgut malrotation should be considered in the differential diagnosis in patients presenting with chronic abdominal pain. A physical examination and imaging studies may help the surgeon make an accurate diagnosis.

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Midgut malrotation is defined as the partial or complete failure of 270° counterclockwise rotation of the midgut around the superior mesenteric vessels in the embryonic stage.<sup>1</sup> The ligament of Treitz is not formed, and the distal duodenum and jejunum are aligned on the right side of the columna ver-

tebralis.<sup>2</sup> Patients often present with malrotation in the first month of life, and the incidence of intestinal malrotation in adults is 0.2-0.5%.<sup>3</sup>

Herein, we describe a rare case involving a 60-year-old man presenting with chronic abdominal pain, who was radiologically diagnosed as having midgut malrotation.

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## Case Report

A 60-year-old, non-smoker man had frequently intermittent left side lower abdominal pain for several months. He visited our outpatient department and underwent a fecal occult blood test that showed positive results in August 2015. The physical examination showed that his body temperature was within the normal range, his blood pressure was 120/80 mmHg, and his pulse rate was 80 beats/min. The abdominal examination showed a soft, flat abdomen without muscle guarding. The laboratory analysis indicated that his white blood cell count was  $7.0 \times 10^3/\mu\text{L}$ , hemoglobin level was 13 g/dL, and C-reactive protein level was  $< 0.03$  mg/dL. The colonoscopy examination was incomplete because the patient experienced intolerable pain; we were only able to advance the colonoscope 40 cm away from the anal verge. The non-contrast abdominal computed tomography (CT) scan demonstrated complete malrotation of the bowel (Figs. 1, 2). Results of the barium enema showed the following (Fig. 3A-C). 1) The ascending colon and transverse colon had left-sided deviation. 2) Several small diverticula measuring  $< 1$  cm were identified in the ascending colon, transverse colon, and sigmoid colon. 3) Superimposition of the sigmoid colon with the adjacent ascending colon and descending colon was noted. 4) The appendix had a normal appearance.

The patient was diagnosed as having midgut malrotation. He had not yet undergone an operation, and he was only experiencing mild symptoms. Therefore,



**Fig. 1.** Axial abdominal computed tomography scan. The arrow indicates the cecum, and the arrowhead indicates the sigmoid colon.

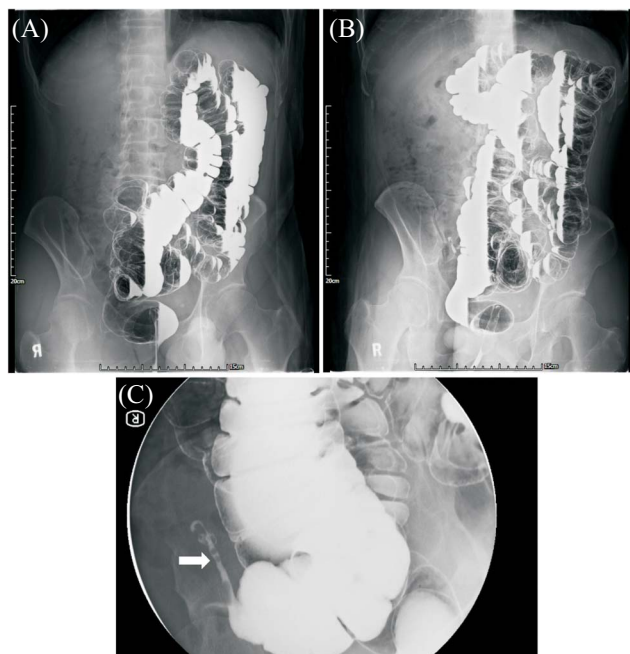
he preferred a conservative treatment approach instead of an operation. He was regularly followed up at our outpatient department.

## Discussion

Most cases of malrotation are observed in the first month of life, but this condition can be seen in adulthood.<sup>2</sup> Although its clinical symptoms are obscure, most adult patients visit a hospital with complaints such as vomiting and intermittent abdominal pain, which are probably due to chronic partial obstruction.<sup>4,5</sup> Midgut volvulus is a rare, critical cause of intestinal obstruction, and cases of midgut volvulus secondary to congenital malrotation have been previously described.<sup>6</sup> Small bowel volvulus is mostly found with acute abdominal pain around the periumbilical or epigastric regions.<sup>7</sup> At the time of diagnosis, 30% of the patients were less than 1 year old, and 48% were more than 18 years old. Nehra and Goldstein reported a decreased risk for volvulus with age. A conservative treatment instead of an operative approach is more



**Fig. 2.** Coronal abdominal computed tomography scan. Complete malrotation of the bowel is noted. The small intestine (arrow) is located in the right abdomen, whereas the colon (arrowhead) is located in the left abdomen.



**Fig. 3.** Barium enema. The barium enema is shown (A, B). The ascending colon and transverse colon have left-sided deviation. Several small diverticula measuring < 1 cm are identified in the ascending colon, transverse colon, and sigmoid colon. Superimposition of the sigmoid colon with the adjacent ascending colon and descending colon is noted (C). The appendix (arrow) also has abnormal appearance.

reasonable in older patients with malrotation.<sup>8</sup> Since 1936, the Ladd procedure has been the golden standard procedure of elective treatment for intestinal malrotation. This procedure consists of following steps: midgut volvulus is untwisted; bands causing obstruction are divided; segments of colon and small bowel are set to neutral position and appendectomy is added to prevent future difficulty of diagnosis of appendicitis.<sup>9</sup> The recurrence rate after the Ladd procedure is low, with an incidence rate ranging between 2% and 7% in pediatric reports.<sup>10,11</sup> A chronic inflammatory lesion in the bowel wall can affect the outcome of the Ladd procedure.<sup>8</sup> Many other authors have advocated surgical correction of midgut malrotation because of the difficulty in predicting which patients will develop torsion of the midgut, which is life-threatening, in the future.<sup>12,13</sup> In our case, the patient had a radiological diagnosis of malrotation, and he had not yet undergone an operation; additionally, he claimed

that he only experienced mild symptoms and wished to be treated with a conservative approach.

The increased recognition of intestinal malrotation may be explained by the more frequent use of abdominal CT in adults.<sup>14</sup> CT provides the possibility of following the exact position of the small bowel and cecum. The orientation of the superior mesenteric vessels also becomes assessable with an additional rotation of the mesentery of the bowel, which forms a whirlpool sign. This may result in precarious circulation of the bowel, possibly requiring rapid surgical intervention.<sup>10</sup>

Contrast-enhanced radiography has been shown to be the most accurate method for diagnosing malrotation.<sup>15</sup> On a sonogram, the superior mesenteric vein (SMV) is located to the left or anterior to the superior mesenteric artery (SMA). A Doppler ultrasonogram may show the whirlpool sign with rotation of the SMV around the SMA, which is a typical feature of malrotation. Ultrasonography is a good tool for ruling out patients with malrotation at risk for volvulus.<sup>16</sup>

## Conclusions

Midgut malrotation should be considered in the differential diagnosis of patients presenting with chronic abdominal pain. Patients may also be asymptomatic or have acute abdomen symptoms. A physical examination and imaging studies may help the surgeon make an accurate diagnosis.

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病例報告

## 成人先天性腸道旋轉不良：病例報告

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**目的** 本病例我們使用鋇劑攝影和電腦斷層掃描來診斷成年人中腸旋轉不良。

**方法** 將鋇劑攝影和電腦斷層掃描用於診斷慢性腹痛多月的 60 歲男性的中腸旋轉不良。

**結果** 無顯影劑腹部電腦斷層掃描診斷腸道旋轉不良。鋇劑攝影顯示升結腸和橫結腸左側偏差。這名患者雖然診斷出腸道旋轉不良，但他認為目前只經歷輕微的症狀，並希望採取保守治療。

**結論** 鑑別診斷慢性腹痛患者時應考慮中腸旋轉不良這個診斷。理學檢查和影像輔助可使外科醫生準確診斷中腸旋轉不良。

**關鍵詞** 中腸旋轉不良、扭轉、成人、電腦斷層掃描、鋇劑攝影。