International Medical Case Reports Journal

Dovepress
Taylor & Francis Group

Open Access Full Text Article

CASE REPORT

Clinical Perspective on Midgut Nonrotation in Adults: A Clinical Case Report and Review of the Literature

Sameer Kumar Majety[1], Nafisa Alam[1], Nayeem Omar[1], Ayushi Rusia[1], Prabath Vihari Teegala[1], Gopichand Muppana[2]

[1]Department of Clinical Medicine, School of Medicine, Xiamen University, Xiamen, People's Republic of China; [2]Department of Internal Medicine, National Pirigov Memorial Medical University, Vinnytsia, Ukraine

Correspondence: Gopichand Muppana, Department of Internal Medicine, National Pirigov Memorial Medical University, Vinnytsia, Ukraine, Email muppanagopichand82@gmail.com

Objective: To present a case of intestinal nonrotation in a 26-year-old Indian male and conduct a detailed review of 16 additional cases from the PubMed database.

Case Presentation: A 26-year-old male presented with acute right lower quadrant abdominal pain and vomiting. He had a similar episode seven years prior that self-resolved. Physical examination revealed generalized abdominal tenderness, guarding, and mild distention. Imaging studies, including abdominal ultrasound and CECT, confirmed midgut volvulus due to nonrotation. The patient underwent exploratory laparotomy and Ladd's procedure, leading to an uneventful recovery and discharge on postoperative day seven.

Material and Methods: A comprehensive PubMed search was conducted for case reports on midgut nonrotation in adults. 15 relevant cases were selected, and including the present case, 16 cases were reviewed.

Results: The mean age at presentation was 55.19 years (range: 26–86), with a slight male predominance (56.2%). The most common symptoms were acute abdominal pain (50%) and vomiting (31.25%). Notably, 50% of cases were identified incidentally during evaluations for unrelated conditions or procedures. CT scans confirmed diagnoses in 87.5% of cases. Positional anomalies included right-sided small bowel and left-sided colon in 37.5% and reversed SMA/SMV relationships in 33%. Ladd's procedure was performed in 25% of cases.

Conclusion: Midgut nonrotation, resulting from abnormal embryonic bowel rotation, can occur at any age, more commonly in males. It may present as a surgical emergency due to bowel obstruction and volvulus or remain asymptomatic throughout life. CT imaging and surgical intervention, particularly Ladd's procedure, are effective management strategies. The frequent incidental discovery of cases suggests that asymptomatic nonrotation may be more prevalent than clinically recognized.

Keywords: case report, nonrotation and midgut, malrotation and midgut, Ladd's procedure, gastroenterology, congenital disorders

Background

A congenital abnormality of the midgut, nonrotation of the intestine represents a subtype of intestinal malrotation. This condition arises from a disruption in the normal rotation of the fetal midgut during the tenth week of development. A potential contributing factor is laxity of the umbilical ring, the embryonic opening connecting the fetus to the mother.[1] Intestinal nonrotation is a recognized cause of bowel obstruction in neonates and children due to the fibrous Ladd's bands. Patients with Non rotation often experience chronic or recurrent abdominal pain, which can be nonspecific and maybe postprandial in nature. The location of the pain is variable, ranging from the epigastric region to other abdominal quadrants. In severe cases, complications like volvulus and intestinal necrosis can arise.[2,3]

Intestinal malrotation affects roughly 0.2% of newborns. Symptoms typically emerge within the first few weeks, leading to diagnosis during this period. Over 40% of cases are diagnosed within a week of birth, and 75–85% within the first year. While the exact adult prevalence remains unknown, estimates suggest a range of 0.0001% to 0.19%.[4,5] An erect

Received: 15 March 2025
Accepted: 7 September 2025
Published: 11 September 2025

abdominal X-ray is commonly employed to assess patients with intestinal nonrotation, a condition where the normal anatomical arrangement is disrupted. In such cases, the small intestine is predominantly located on the right side of the abdominal cavity, and the colon is situated on the left side. Other imaging techniques like ultrasound, CT scans, and MRI help confirm the diagnosis. These methods focus on identifying abnormal positions of the superior mesenteric artery and superior mesenteric vein relative to each other.[1,6]

Surgical correction of intestinal malrotation typically involves Ladd's procedure, a four-step intervention. The initial stage entails detorsion of any volvulus in a counterclockwise direction. Subsequently, Ladd bands, anomalous peritoneal ligaments tethering the bowel, are divided. To enhance stability, the narrow mesentery of the small intestine is then broadened. Finally, adhesions encircling the superior mesenteric artery (SMA) are meticulously dissected. Additionally, surgeons often perform appendectomy and reposition the small intestine along the right lateral gutter and the colon on the left side of the abdomen.[7,8]

Case Presentation

A 26-year-old male presented to the emergency department with complaints of right lower quadrant abdominal pain for the past 8 hours and 2 episodes of vomiting. The pain was cramping in nature and located in the right lower quadrant. The patient had a similar episode of abdominal pain 7 years ago but did not pursue any treatment as the pain self-resolved. He experienced a loss of appetite with constipation, but there was no bleeding per rectum, fever, or dysuria, and the systemic review was unremarkable. He had no previous abdominal operations, no significant past medical history or family history, and took no regular medications.

On physical examination, he was afebrile and hemodynamically stable His vital signs, including blood pressure, SpO2, respiratory rate, and pulse rate, were all normal. However, the patient reported generalized abdominal tenderness associated with guarding and mild distention. Hyperactive bowel sounds were also heard. The patient was admitted with a provisional diagnosis of acute intestinal obstruction. Further investigations, including a complete blood profile, serum creatinine, random blood sugar, viral markers, blood glucose test, and serum electrolytes, were ordered. All results were within normal ranges.

Abdominal ultrasonography revealed signs of inflammatory changes with severe probe tenderness in the right iliac fossa. Subsequently, CECT of the whole abdomen was suggested for a definitive diagnosis. The CECT (Figure 1A and B) revealed a clockwise malrotated bowel with midgut volvulus of two turns involving the distal duodenum, proximal jejunum, and hepatic flexure. Additionally, a transverse colon with altered superior mesenteric vessels was observed. Nevertheless, there was no evidence of bowel wall ischemia, omental thickening, peritonitis, pneumoperitoneum, or ascites, although bowel obstruction was noted.

After the diagnosis of malrotated bowel, an exploratory laparotomy and Ladd's procedure were proposed. Preoperatively, the patient was thoroughly evaluated and monitored. He was put on NPO (nil per oral) and Ryle's tube aspirations were performed every four hours to decompress the gastrointestinal system. Additionally, he was given a prophylactic antibiotic shot of third-generation cephalosporin, symptomatic treatment, and supportive measures such as IV fluids, pantoprazole, and ondansetron.

In the operating room, a median laparotomy was performed under general anesthesia. Typical findings of midgut malrotation were observed intraoperatively, consistent with those identified on CECT. Subsequently, Ladd's procedure was carried out to correct the volvulus. This involved untwisting the midgut, removing abnormal bands, decompressing and mobilizing the duodenum and right colon, and widening the mesenteric base to prevent future twists, thereby relieving the obstruction of the duodenum. Hemostasis was secured, and the pulsations of the superior mesenteric artery were checked. Finally, the bowel was placed in its correct position with the colon on the left side and the small bowel on the right, after which the incision was closed.

Postoperatively, the patient was observed closely for the next 24 hours. He was treated with antibiotics and analgesics, accompanied by supportive care. He did not develop any postoperative complications, and his clinical course was improving. This 26-year-old had an uneventful postoperative recovery and was discharged on the 7th postoperative day. On follow-up, he was well and had no late complications. He had returned to his premorbid level of function and did not report any recurrence of symptoms.

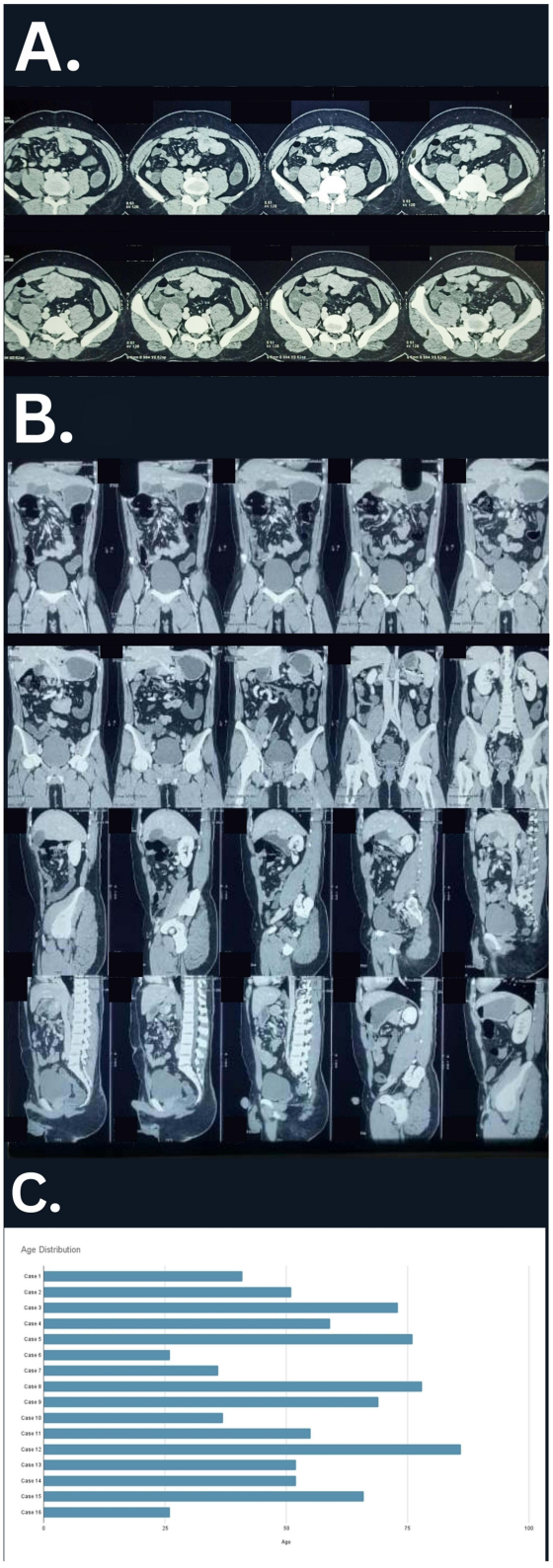

Figure 1 Imaging and demographic features of patients with non-rotation of the midgut. (**A**) Axial contrast-enhanced computed tomography (CECT) of the abdomen showing abnormal positioning of the bowel loops with reversal of the expected small bowel and colonic distribution. (**B**) Coronal reformatted CECT images from the same patient further demonstrating aberrant arrangement of the duodenojejunal flexure and clustering of small bowel and colonic segments in atypical quadrants. (**C**) Bar chart depicting the age distribution of patients with non-rotation of the midgut included in the review.

https://doi.org/10.2147/IMCRJ.S528520

Review

Materials and Methods

We conducted an extensive search on the PubMed database using the keywords "nonrotation" AND "midgut" to find relevant literature published between 1984 and 2024. This search strategy, with the filter applied for article type as "case report", yielded 32 results.

Among the results, we selected the cases based on the following criteria: First, we considered only those articles that were freely accessible or could be accessed through our institutional login. We also excluded articles published in languages for which accurate translation was not feasible. Importantly, we included only cases involving patients aged 18 years and older, to specifically examine the adult presentation of this condition. After screening for relevance and accessibility, we included 15 adult cases of midgut nonrotation, in addition to our primary case (Table 1), for detailed analysis.

From each selected case report, we extracted data on patient demographics (age and gender), presenting symptoms, incidental findings, diagnostic modalities, positional findings of the midgut, treatment procedures, and postoperative outcomes.

While our search was intentionally limited to adult cases of midgut nonrotation, we acknowledge that broader search terms such as "malrotation" or "intestinal volvulus" might identify additional cases. However, our aim was to focus on clearly defined adult presentations of nonrotation to allow for a more focused and clinically relevant synthesis.

Results

Demographic Profile

Our comprehensive analysis includes 16 documented cases of intestinal malrotation, revealing a mean age at presentation of 55.19 years with a standard deviation of 18 years, with patients spanning an age range from 26 to 86 years. (Figure 1C) This wide age distribution, ranging from 26 to 86 years, highlights that intestinal malrotation can present

Table 1 Summary of Authors and Publication years for All the reviewed Cases

Case Number	Author Details
1	Fernandez Trokhimtchouk T et al (2023)[9]
2	Kawashima K et al (2001)[10]
3	Kawai K et al (2006)[11]
4	Prathanvanich P et al (2014)[12]
5	Genualdi J et al (2022)[13]
6	Plackett TP et al (2010)[14]
7	Kolcún Š et al (2021)[15]
8	Hyashi H et al (2021)[16]
9	Plackett TP et al (2011)[17]
10	Birnbaum DJ et al (2013)[18]
11	Bohlmann I et al (2023)[19]
12	Chandraraj S et al (1991)[20]
13	Ozkan F et al (2012)[21]
14	Shintaro Kawasaki et al (2016)[22]
15	Motomura Takashi et al (2013)[23]
16	The case presented above

across both younger and older populations, underscoring its potential to manifest at various stages of life. A notable gender predisposition is also observed, with a higher incidence in males. Out of the 16 cases, 9 were male (56.2%) and 7 were female (43.8%), suggesting a slight male predominance in the occurrence of intestinal malrotation.

Mode of Discovery

Incidental findings during unrelated medical evaluations accounted for the highest proportion of cases. Out of the 16 cases reviewed, 8 (50%) were diagnosed incidentally during evaluations for other medical conditions or procedures, highlighting the often asymptomatic or atypical presentation of malrotation. Notably, some cases were also identified postmortem (Case 3,[11] Case 12)[20] The PM findings in these cases suggest the presence of underlying issues that may have shown no symptoms during the patients' lives. Another interesting observation was the incidental diagnosis of malrotation in two of the patients undergoing bariatric surgery. Case 4[12] involves a 59-year-old male, a candidate for bariatric surgery, who was already diagnosed with malrotation and aware of his condition. Case 11,[19] a 55-year-old male, was also incidentally diagnosed with intestinal malrotation intra-operatively during his laparoscopic Roux-en-Y gastric bypass procedure. Furthermore, Case 8[16] featured incidental findings related to appendiceal conditions during the evaluation of appendiceal cancer. Gastrointestinal disorders were another common context, with cases 5[13] and 6[14] revealing incidental findings during the diagnosis of viral gastroenteritis and irritable bowel syndrome (IBS). This pattern suggests a high likelihood of discovering this disease as an incidental finding during routine abdominal evaluations. Routine screening procedures also further contributed to incidental findings, as seen in case 9.[17] Similarly, Case 13's malrotation[21] was discovered during treatment for left renal colic, while Case 14[22] involved a patient with polysplenia and agenesis of the dorsal pancreas, further underscoring the incidental nature of these diagnoses. In contrast, non-incidental cases, such as those involving specific clinical symptoms (Cases 1,[9] 2,[10] 7,[15] 15,[23] and 16), clearly demonstrate the characteristic symptoms of malrotation.

Diagnosis of the Disease

Our review of all 16 cases highlights the significance of various diagnostic modalities in identifying positional anomalies and rotational abnormalities of the midgut. We found that among the various methods employed during diagnosis, including abdominal ultrasound (USG), barium enema, colonoscopy, and exploratory celiotomy, it was ultimately the use of CT that confirmed the diagnosis in nearly all cases.

As mentioned above, Computed tomography (CT) was the most frequently utilized diagnostic tool, featured in 14 out of 16 cases (87.5%). Of these, 4 cases specifically mentioned the use of contrast-enhanced CT (CECT), accounting for 25% of the total cases. Abdominal ultrasound (USG) was used in 3 cases (18.75%), often in combination with CT scans to provide better insights. More specialized methods such as 3D-CT angiography and pancreatic endoscopic ultrasound were employed in some cases, particularly in complex scenarios requiring detailed anatomical mapping. Exploratory celiotomy was noted in 1 case (case 9), highlighting the necessity of direct surgical examination in certain situations. Additionally, laboratory examinations were also included in a few cases alongside imaging techniques to support the diagnostic process. Overall, we can conclude that the diagnostic landscape for nonrotation of the midgut shows a variety of approaches, with CT being the definitive tool for confirmation.

Clinical Presentation

Presenting Symptoms

Intestinal malrotation presents with a spectrum of clinical manifestations, as observed in our detailed analysis of 16 documented cases. While intestinal malrotation is most commonly diagnosed in infancy, often within the first year of life, its presentation in adulthood is exceptionally rare. Most symptomatic cases are detected early because of acute volvulus or bowel obstruction in neonates.[24] In contrast, adult cases typically present with nonspecific or chronic gastrointestinal symptoms, which often leads to delayed diagnosis. This case highlights the atypical nature of adult presentations and reinforces the importance of maintaining clinical suspicion in adults with recurrent, unexplained abdominal complaints.[24] Among the cases reviewed, the presenting symptoms ranged from acute abdominal pain and vomiting to incidental findings during unrelated medical evaluations. Some patients also presented with a history of recurrent abdominal pain episodes, while

others had symptoms suggestive of bowel obstruction such as distention, constipation, or absence of flatus and bowel movements. Several patients were also found to have a history of previous episodes or chronic symptoms related to other diseases. Acute abdominal pain was the most predominant symptom, observed in 50% (8 out of 16) of patients. This pain was often described as colicky and could be either localized or diffuse. Nausea and vomiting were also common, affecting 31.25% (5 out of 16) of patients. These symptoms frequently accompanied the abdominal pain and were significant enough to prompt medical evaluation. The symptoms typically began acutely or subacutely, lasting from a few days to one or two weeks. An acute onset, occurring in less than 24 hours, was observed in 12.5% of cases. Diarrhea was a less frequent symptom; seen only in case 5 where it was described as non-bloody and non-mucoid. Additionally, some patients also experienced postprandial vomiting and severe cramping pain, along with other symptoms.

Positional Findings

The analysis of all 16 cases reveals notable recurring patterns and significant variations in intestinal malrotation. These primarily involve the unusual positioning of the small and large intestines and irregularities in vascular structures. A significant number of cases (about 37.5%) document the small bowel localized to the right side and the large bowel to the left (cases 2, 3, 4, 5, 6, and 9). Case 10,[18] in contrast, presents a rare reversal where the entire small bowel was found in the left half of the abdomen and the entire colon in the right half, which diverges from typical malrotation presentations. Approximately 33% of cases (cases 1, 4, 5, 6, 10, 13) highlight a reversed relationship between the superior mesenteric artery (SMA) and superior mesenteric vein (SMV), and in one case, the SMV is found rotated 270 degrees clockwise (case 8). Additionally, several instances report abnormal positioning and fusion of the duodenum (cases 3, 4, 12). Other noteworthy findings include case 3, which uniquely mentions an anomalous branch that arose from the abdominal aorta between the superior and inferior mesenteric arteries (SMA and IMA).Case 1 presents with a surprising finding of a dilated cecum folded into the left hypochondrium with a 360° clockwise twist upon its mesentery. In addition, the absence of the ligament of Treitz is noted in cases 9 and 15, resulting in the failure to secure the small intestine in its usual position. The positions of the cecum and appendix also varied significantly, with some cases showing the cecum and appendix located in the lower midpelvis (case 4) or an ascending colon with an unfixed cecum (case 15).

To sum everything up, the review of these 16 cases reveals a broad range of presentations and anomalies. However, the consistent localization of the small bowel to one side and the large bowel to the other, along with the recurrent reversed relationship between the SMA and SMV, suggests a common pattern that could be crucial for diagnosis and treatment.

Similar Findings

This review of 16 midgut malrotation cases reveals several consistent findings.

Volvulus, a potentially life-threatening intestinal obstruction due to twisting, was identified in Cases 1 and 7. Additionally, Cases 10 and 13 presented with appendicitis, inflammation of the appendix.

Intriguingly, two patients (Cases 8 and 9) harbored adenocarcinomas, a malignant epithelial tumor. In Case 8, the tumor was located within the appendix, while Case 9 presented with a pancreatic head adenocarcinoma. This highlights the potential for co-existing pathologies in patients with midgut malrotation.

A significant proportion of the patients (Cases 1, 4, 5, 8, 10, 11, and 13) reported no significant past medical history, suggesting that midgut malrotation can present in individuals with no prior health concerns.

The mode of the discovery, clinical presentation, and associated findings are detailed in Table 2.

Unique Findings

A review of these cases revealed several unique presentations alongside the common characteristics. Case 13 presented with a perforated appendicitis, a more severe form compared to typical appendicitis. Case 2 exhibited a mucocele (mucus-filled cyst) of the appendix containing concerning cells, potentially indicative of a premalignant state. A history of recurrent pancreatitis was noted in Case 14, while Case 7 had a prior diagnosis of a bowel rotation issue, potentially related to malrotation itself. Interestingly, Case 2 also had a medical history of ileus, a small bowel obstruction, at a young age (14 years old). Case 6 presented with a concurrent diagnosis of acute colitis superimposed on chronic constipation. Case 5 had undergone a prior laparoscopic surgery to address an umbilical hernia and associated adhesions. Case 13 discusses a midline-positioned dilated appendix with wall enhancement and abscess formation, representing

Table 2 Discovery Mode, Presenting Symptoms, and Associated Findings Across Examined Cases

Case	Mode of Discovery	Presenting Symptoms	Associated Findings
1	Symptomatic	Colicky abdominal pain, lack of flatus and bowel movements, an episode of vomiting.	Cecal volvulus. Ladd's bands were absent.
2	Symptomatic	Acute abdominal pain, Nausea and vomiting, lack of bowel movements	Appendiceal mucocele.
3	Post-Mortem Finding	Asymptomatic, discovered in an autopsy.	Anomalous branch of the Middle mesenteric artery.
4	Diagnosed earlier incidentally	No symptoms associated with Non- rotation were reported.	Underwent bariatric surgery
5	Incidental	Abdominal pain, nausea, non-bloody non-bilious emesis, and non-bloody non-mucoid diarrhea.	Viral gastroenteritis
6	Incidental	Severe cramping abdominal pain in Periumbilical and suprapubic regions	constipation-predominant irritable bowel syndrome.
7	Symptomatic	Acute abdominal pain which was intermittent in nature.	Volvulus of small bowel
8	Incidental	No symptoms associated with Non- rotation were reported	Stage 3a AdenoCa Appendix
9	Incidental	No symptoms associated with Non- rotation were reported	AdenoCa in the Head of Pancreas. Ligament of Treitz is absent
10	Incidental	Acute abdominal pain suggestive of peritoneal inflammation.	Appendicitis
11	Incidental	No symptoms associated with non-rotation were reported, However, Recurrent nausea and vomiting were present.	Underwent Roux-en-Y gastric bypass surgery.
12	Post-Mortem Finding	Asymptomatic, discovered in an autopsy.	Congenital Esophageal Diaphragmatic hernia
13	Incidental	Fever, vomiting and abdominal pain	Ruptured appendicitis
14	Incidental	No symptoms associated with Non- rotation were reported	Polysplenia with agenesis of dorsal pancreas and PJS
15	Symptomatic	Postprandial vomiting episodes	Ladd's bands were absent.
16	Symptomatic	Acute abdominal pain, abdominal distention.	N/A

Table 3 Anatomical Variations and Abnormalities in Cases Examined

Case Numbers	Positional Findings
Cases 2, 3, 4, 5, 6, 9, and 12	Small bowel is localized to the right side and the large bowel to the left.
Case 10	Small bowel was found in the left half of the abdomen and the colon in the right half.
Cases 3, 4, and 12	Abnormal positioning and fusion of the duodenum
Case 1	Dilated cecum folded into the left hypochondrium with a 360° clockwise twist upon its mesentery.

a rare but critical finding. Another particularly surprising finding is the absence of Ladd bands in two of the cases (cases 1, 15), which are typically expected in malrotation, thereby adding complexity to diagnosis. These findings underscore the variable presentations and potential for co-existing pathologies in patients with midgut malrotation. The unique anatomical variations are compared in Table 3.

https://doi.org/10.2147/IMCRJ.S528520

Two cases involved deceased patients. Autopsy findings in Case 3 revealed an atypical arterial branch supplying the intestine. Most tragically, Case 12 suffered from a congenital esophageal diaphragmatic hernia, a birth defect characterized by the abnormal protrusion of the esophagus and stomach into the chest cavity. This ultimately resulted in cardiorespiratory failure and death.

Treatment

Surgical intervention was the primary course of treatment for most patients (15 out of 16) in this case analysis. The most common surgery was Ladd's procedure (Cases 7, 10, 11 and 18), which aims to correct the malrotation and prevent potential complications like volvulus (twisting of the intestine). In Case 10, both Ladd's procedure and ligament of Treitz dissection were performed. Case 15 uniquely benefited from ligament of Treitz dissection alone as there were no Ladd's bands involved. In two of the cases (Cases 13, and 15), an isolated appendectomy was sufficient, likely because the malrotation itself was not causing any immediate problems and the appendix needed removal for prophylactic reasons.

However, the specific surgical approach went beyond addressing malrotation in a few cases. For one patient (Case 8), a cancerous appendix (adenocarcinoma) necessitated an ileocecal resection, which removes the last portion of the small intestine and the beginning of the large intestine, along with lymph node dissection to assess potential spread of the cancer. Another patient (Case 2) with a mucus-filled appendix (appendiceal mucocele) also underwent an ileocecal resection to remove the affected area. Interestingly, two patients (Case 4 and Case 11) received Roux-en-Y gastric bypass surgery, a weight loss procedure.

Finally, it's important to note that surgery was not always necessary to address malrotation itself. In four cases (Cases 5 and 6), the malrotation was identified but not causing any obstructive symptoms, so surgery was not performed specifically to correct the malrotation. Similarly, Cases 13 and 14 did not undergo any specific procedure for malrotation as it was not causing complications.

Post Operative Course

In our analysis of postoperative outcomes in midgut malrotation cases, 8 out of 16 patients (50%) had no complications after surgery, while postoperative complication data were unavailable for the remaining 8 patients (50%). This finding underscores the efficacy of surgical management in addressing midgut malrotation and preventing potential complications associated with the condition. Early diagnosis and prompt surgical intervention are crucial to optimize patient outcomes. However, a nuanced approach is necessary for certain cases that require extended follow-up or management of co-existing conditions.

This case is notable for its rare presentation of symptomatic midgut nonrotation in a previously healthy 26-year-old adult male. While midgut malrotation is predominantly diagnosed in infancy, adult presentations are infrequent and often pose diagnostic challenges due to their nonspecific and intermittent symptoms. What distinguishes this case is not only the patient's age and the absence of prior surgical or medical history but also the presence of a two-turn volvulus without ischemic complications, allowing for timely surgical intervention and a full recovery. Moreover, the successful diagnosis using CECT and the favorable postoperative outcome following a Ladd's procedure reinforce the importance of considering this congenital anomaly in differential diagnoses of acute abdomen in adults. Such cases remain underreported and underrecognized, emphasizing the clinical value of detailed documentation and discussion. Given this underreporting, our focused literature review on adult cases of midgut nonrotation provides a valuable contribution by synthesizing available evidence specific to this subgroup. By narrowing our scope to clearly documented adult cases, we aim to contribute a more targeted understanding of the diagnostic and surgical considerations unique to this population.

Limitations

With only 18 cases reviewed, our study's findings might not fully represent the broader population affected by nonrotation of the midgut. The limited number of cases may not capture the full spectrum of clinical presentations, diagnostic approaches, and management strategies. The cases we analyzed exhibited a wide range of coexisting diseases and past medical histories, which may have influenced the clinical course and impacted our study. This variation may also affect the treatment approaches used, complicating our ability to draw definitive conclusions. Additionally, our

literature search was limited to a single database (PubMed) and used only two keywords, which may have excluded relevant cases indexed under broader or alternative terms such as "malrotation" or "intestinal volvulus." This narrow search strategy further restricts the generalizability of our findings. Consequently, these factors limit the broader relevance of our results and highlight the need for more comprehensive, multi-database studies to gain a deeper understanding of this anomaly.

Conclusion

Midgut nonrotation is a congenital anomaly usually diagnosed in infancy, but it can occasionally present in adults with varied and often nonspecific symptoms. Our case of a 26-year-old male with a two-turn volvulus and no ischemic complications highlights the importance of including this condition in the differential diagnosis of acute abdomen in adults. Timely imaging and surgical intervention led to a full recovery, underscoring the value of early recognition.

Our focused review of adult cases shows a wide spectrum of presentations, from incidental findings to acute surgical emergencies. Unusual anatomical features, reversed vascular relationships, and the absence of typical signs like Ladd's bands were common. By narrowing our review to adult cases, we offer a clearer understanding of the atypical clinical and surgical patterns in this population. Greater awareness of these variations can improve diagnosis and guide management in adult patients.

Abbreviations

CECT, Contrast Enhanced Computed Tomography; CT, Computed Tomography; SMA, Superior Mesenteric Artery; SMV, Superior Mesenteric Vein; MRI, Magnetic Resonance Imaging; NPO, Nil per oral; PM, Post Mortem; IBS, Inflammatory Bowel Syndrome; HWWS, Herlyn-Werner-Wunderlich Syndrome; PJS, Peutz Jeghers Syndrome; USG, Ultrasonogram; IMA, Inferior Mesenteric Artery.

Data Sharing Statement

The dataset regarding the case report can be made available from the corresponding author on reasonable request.

Ethics Statement

In our university, Ethics approval is not required for case reports and case series.

Informed Consent

Written informed consent was obtained from the patient for the research and the publication and may be submitted upon request.

Acknowledgments

This paper was prepared with the assistance of ChatGPT (GPT-4), OpenAI, used for language refinement, grammar correction, and improving readability. The AI tool was not utilized for data analysis, original content generation, or critical interpretation of results. All intellectual contributions, interpretations, and conclusions are solely the responsibility of the authors.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

No funding received.

Disclosure

The authors declare no conflict of interest.

References

1. Mohan P, Ramamoorthy M, Venkataraman J. Clinical vistas: nonrotation of the intestine. *CMAJ*. 2008;179(1):49–50. doi:10.1503/cmaj.080038
2. von Flüe M, Herzog U, Ackermann C, et al. Acute and chronic presentation of intestinal nonrotation in adults. *Dis Colon Rectum*. 1994;37(2):192–198. doi:10.1007/BF02047549
3. Monty MAJL, Gohl MC. Midgut nonrotation in adults. *Am J Surg*. 1975;129(3):319–323. doi:10.1016/0002-9610(75)90249-4
4. McVay MR, Kokoska ER, Jackson RJ, Smith SD. The changing spectrum of intestinal malrotation: diagnosis and management. *Am J Surg*. 2007;194(6):712–719. doi:10.1016/j.amjsurg.2007.08.035
5. Emanuwa OF, Ayantunde AA, Davies TW. Midgut malrotation first presenting as acute bowel obstruction in adulthood: a case report and literature review. *World J Emerg Surg*. 2011;6(1):22. doi:10.1186/1749-7922-6-22
6. Zengin E, Turan A, Calapoğlu AS, Nalbant E, Altuntaş G. Intestinal nonrotation and left-sided perforated appendicitis. *Ulus Travma Acil Cerrahi Derg*. 2018;24(2):178–180. doi:10.5505/tjtes.2017.58726
7. Ayane GN, Kadimo K. Diagnosis and surgical management of congenital intestinal malrotation presenting with midgut volvulus in an adult: high index of suspicion (case report). *Pan Afr Med J*. 2018;29:154. doi:10.11604/pamj.2018.29.154.13910
8. Morino M, Hoshino M, Musha I. Obstructed hemivagina and ipsilateral renal agenesis with intestinal malrotation. *Pediatr Int*. 2013;55(4):e90–e92. doi:10.1111/ped.12088
9. Fernandez Trokhimtchouk T, Flores LF, Morillo Cox Á, Gordillo A, Crespo Martinez JK. Intestinal nonrotation and cecal volvulus: a unique combination of rare pathologies. *Cureus*. 2023;15(5):e39761. doi:10.7759/cureus.39761
10. Kawashima K, Ishihara S, Amano K, et al. Nonrotation of the midgut with appendiceal mucocele in an adult. *J Gastroenterol*. 2001;36(1):44–47. doi:10.1007/s005350170153
11. Kawai K, Koizumi M, Honma S, Tokiyoshi A, Kodama K. A case of nonrotation of the midgut with a middle mesenteric artery. *Ann Anat*. 2006;188(1):13–17. doi:10.1016/j.aanat.2005.05.008
12. Prathanvanich P, Chand B. Laparoscopic Roux-en-Y gastric bypass in a known case of midgut nonrotation with literature review. *Surg Obes Relat Dis*. 2014;10(4):747–754. doi:10.1016/j.soard.2014.04.017
13. Genualdi J, Murray-Ramcharan M, Matos F, Ramcharan A. Incidental discovery of nonrotation in a patient with nonspecific abdominal pain: a surgical diagnostic dilemma. *Cureus*. 2022;14(9):e29153. doi:10.7759/cureus.29153
14. Plackett TP, Myers J, Gagliano Jr RA. Constipation-predominant irritable bowel syndrome complicating asymptomatic nonrotation of the midgut. *J Am Osteopath Assoc*. 2010;110(8):437–440.
15. Kolcún Š, Malý T, Stašek M. Midgut volvulus in adult age associated with congenital malrotation - case report. Volvulus středního střeva u kongenitální poruchy rotace v dospělém věku - kazuistika. *Rozhl Chir*. 2021;100(11):559–562. doi:10.33699/PIS.2021.100.11.559-562
16. Hayashi H, Matsuhisa M, Murase Y, Sano H, Nishio K, Kumazawa I. Laparoscopic surgery for appendiceal cancer with intestinal malrotation in an adult: a case report. *Int J Surg Case Rep*. 2021;78:342–346. doi:10.1016/j.ijscr.2020.12.068
17. Plackett TP, Takamori R, Izawa M. Pancreaticoduodenectomy in the setting of intestinal malrotation. *Hawaii Med J*. 2011;70(11):237–238.
18. Birnbaum DJ, Geffroy Y, Goin G, Balandraud P. Left side appendicitis with midgut malrotation in an adult. *J Surg Tech Case Rep*. 2013;5(1):38–40. doi:10.4103/2006-8808.118627
19. Bohlmann I, Müller W, Schuster A, Falch C. Redo laparoscopic gastric bypass in a patient with intestinal malrotation: report of a case and video vignette. *Obes Surg*. 2023;33(8):2620–2624. doi:10.1007/s11695-023-06694-0
20. Chandraraj S, Briggs CA. Congenital diaphragmatic hernia through the oesophageal hiatus with nonrotation of the midgut. A case report. *J Anat*. 1991;178:265–272.
21. Ozkan F, Yurttutan N, Inci MF, Akpinar E. Type 3B malrotation presented with acute appendicitis as left renal colic. *N Am J Med Sci*. 2012;4(7):328–330. doi:10.4103/1947-2714.98597
22. Kawasaki S, Itoi T, Iwasaki E, Hosoe N, Ogata H, Kanai T. Successful pancreatic duct stent placement for recurrent pancreatitis in a patient with polysplenia with agenesis of the dorsal pancreas and Peutz-Jeghers Syndrome. *Intern Med*. 2016;55(13):1743–1746. doi:10.2169/internalmedicine.55.6128
23. Motomura T, Takahashi I, Noguchi S, et al. Successful surgical management for duodenum obstruction in a 66 year-old woman previously undiagnosed intestinal malrotation. *Fukuoka Igaku Zasshi*. 2013;104(12):569–574.
24. Nehra D, Goldstein AM. Intestinal malrotation: varied clinical presentation from infancy through adulthood. *Surgery*. 2011;149(3):386–393. doi:10.1016/j.surg.2010.07.004