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## A Rare Case of Intestinal Non Rotation in an Adult Presenting with Acute Appendicitis

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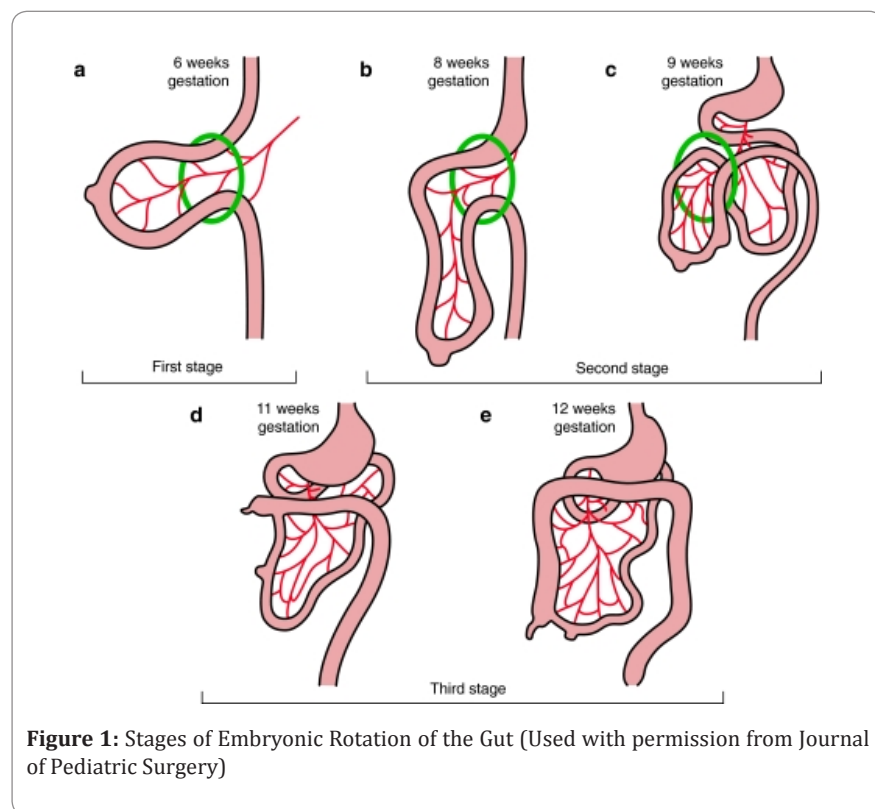
### Summary

Non rotation of the gut is a rare pathological condition that frequently remains asymptomatic in adults and is only identified on incidental imaging. It may result in the delay of diagnosis of several common conditions; due to an atypical presentation. It tends to be identified in the paediatric population, because it is diagnosed secondary to an intestinal obstruction or volvulus. Here we present the case of a 49 year old patient who presented to the Emergency room with left lower quadrant tenderness. Initially, thought to be diverticulitis, however, a diagnostic CT scan of our patient revealed malrotation of the gut with the caecum in the left iliac fossa and duodeno-jejunal flexure and small bowel loops predominantly on the right. It revealed a dilated appendix with a distended lumen in the left mid lower quadrant of the abdomen with associated fat stranding. We proceeded with a laparoscopic appendectomy and a decision to not reverse the non-rotation of the gut. The purpose of this case report is to highlight an uncommon presentation of a common condition and to prevent delayed diagnosis.

### Background

In 1923 Dott outlined the abnormalities associated with intestinal rotation; he divided the process into 3 stages, and stated that aberrations in different stages of the process can result in varying stages of malrotation [1]. With alternate presentations it is essential to understand normal embryology of the developing bowel so that abnormal variants of rotation can be identified (Figure 1).

During the first stage which occurs between the 5th and 10th week of fetal development; the bowel herniated through the umbilicus. The duodenojejunal loop starts superior to SMA and rotates 270 degrees counterclockwise, until it comes to lie beneath the SMA. The cecocolic loop begins beneath the SMA and ends up to the anatomic left of the SMA. During this process, the midgut lengthens and the mesentery becomes broader. The broad base of the



**Figure 1:** Stages of Embryonic Rotation of the Gut (Used with permission from Journal of Pediatric Surgery)

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mesentery protects against volvulus.

The second stage refers to the return of the bowel into the abdominal cavity, the duodenojejunal loop rotates another 90 degrees and winds up to the left of the SMA and the ceco-colic loop turns another 180 degrees and finishes at the anatomical right of the SMA.

Third stage lasts from 11 weeks until term, with the cecum descending into the right lower quadrant and fixation of the mesentery [2].

Delay in diagnosis and intervention for appendicitis in a patient with non-rotation can result in increased morbidity and mortality. This deferral can result in appendiceal perforation, abscess or gangrenous appendix; increasing the patients' risk of developing peritonitis and sepsis [3].

## Case Presentation

Our patient was a 49 year old gentleman, who presented to the emergency room with a 3 day history of diffuse abdominal pain which had localized to the left lower abdomen. The pain had started abruptly, and he had been discharged thrice from three separate emergency rooms at various hospitals labeling it as nonspecific and prescribing him with oral pain killers which failed to alleviate his complaints. Pain would subside for a few hours and then return, this pain was associated with nausea and 3 episodes of vomiting without any fever. There was no other positive finding in his review of symptoms. His past medical, surgical and family history was unremarkable.

The patients' general physical exam was normal whereas the abdominal examination revealed left lower quadrant tenderness with associated guarding. His hemoglobin was 14.5, hematocrit was 42.8%, white blood cell count if  $15.2 \times 10^9/L$ .

## Imaging

A diagnostic CT scan was done which revealed intestinal non-rotation with the caecum in the left iliac fossa and duodenojejunal flexure and small bowel loops predominantly on the right side (Figure 2). A dilated appendix measuring 11 mm in maximum diameter was identified in the left mid lower quadrant (Figure 3). There was thickening of the appendiceal wall with peri-appendiceal fat stranding representing inflammation. Findings were consistent with acute appendicitis.

## Management

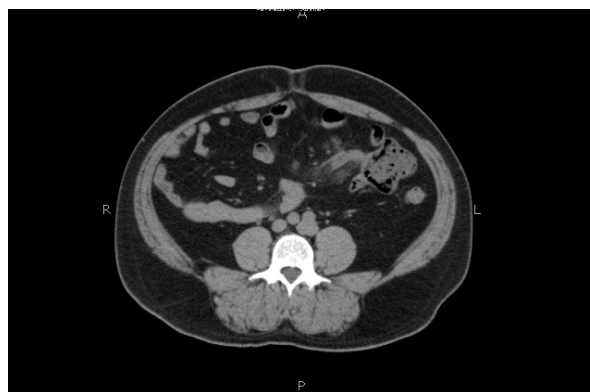
Our patient was taken to the operating room and a laparoscopic appendectomy was performed. We decided to not correct the non-rotation as our patient was asymptomatic; he had been unaware of his condition up until he had been diagnosed with acute appendicitis. The surgery was uneventful and our patient was shifted into the main ward, he was kept under observation for 24 hours, during which time he remained vitally stable with a good post-operative course. He was kept NPO for 4 hours post operatively, and quickly progressed from clear liquid diet to full diet.

The patient followed up in clinic a week later and had no active complaints; histopathology of the appendix was read as acute suppurative appendicitis with serositis.

## Discussion

Non rotation of the bowel is said to occur if the bowel returns to the abdominal cavity without rotating around the SMA. This results in a shortened mesentery and predisposes the affected individual to developing a volvulus.

Non rotation of the gut is a congenital abnormality present in approximately 1:500 of the population; exact figures are unknown due to the fact that this condition remains asymptomatic and is usually an incidental finding [4]. In this pathology; we find that the large bowel and small bowel are both displaced to the right side of the abdomen. Complete non-rotation occurs due to failure of completion of the first stage of gut development, this can result in abnormal positioning of the duodenojejunal junction i.e. it does not lay inferiorly or to the



**Figure 2:** CT scan cross-sectional view showing dilated inflamed appendix on the left side with evidence of non-rotation as shown by arrow



**Figure 3:** CT sagittal section of the abdomen showing caecum with appendix on the left side with peri-appendiceal fat stranding

left of the superior mesenteric artery. This abnormality can result in a shortened mesentery and increased risk of volvulus or intestinal obstruction [5]. The imaging of choice for diagnosis of non-rotation is CT scan. Unfortunately, when patients with an unknown history of non-rotation of the gut present with abdominal pain, their diagnosis may be delayed, and may result in increased morbidity or mortality.

A case report published in 2012, reported the case of a 54 year old male who presented with atypical symptoms of appendicitis due to malrotation of gut; appendectomy was only performed after the patient had developed a gangrenous appendix and perforation [6].

Similarly a reported case in 2015, identified the case of a 27 year old male with missed appendicitis, he had been treated for 2 weeks with a diagnosis of strain of abdominal musculature. Classical signs of appendicitis; psoas, obturator and mc Burney's points were negative. The patient eventually underwent a left hemicolectomy due to ensuing phlegmonous mass [7].

In our case the CT scan was vital in redirecting the diagnosis for appendicitis and intervening with the required medical intervention.

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