

Case Report

Progression of malrotation into volvulus in an adult after appendectomy

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Among the pediatric population malrotation is the most common cause of volvulus. This paper describes a case of adult malrotation, which progressed to volvulus shortly after appendectomy. It also reviews clinical presentations and diagnostic tools, discusses the recommended management, and considerations when addressing of this rare malady.

INTRODUCTION

Volvulus is a type of bowel obstruction involving the twisting of bowel loops around the axis of the mesentery, causing strangulation and eventual necrosis of the intestines. Its etiologies are categorized as primary, without associated underlying anatomic abnormalities, and secondary, due to congenital malrotation of the gut, adhesions after prior surgery, and anatomic bands. Among the pediatric population, malrotation is the most common cause of volvulus. One in 500 children are born with malrotation annually [1], 85% present within the first 2 weeks of life [2]. In adults, malrotation is extremely uncommon. Although there are reports that found many cases of adult malrotation without overt symptoms. These cases of adult malrotation were discovered upon autopsy [2]. It is estimated that 1 in 6000 individuals are affected [1] and it is rarely the cause of volvulus; rather, it is most often due to adhesive bands which form after abdominal surgery. The standard treatment of malrotation volvulus in the pediatric population is Ladd's procedure; however, repair of incidental malrotation in adults remains controversial. There is very little published regarding progression of malrotation into volvulus after abdominal surgery for another etiology. This paper describes a case of adult malrotation which progressed to volvulus shortly after abdominal surgery. It also reviews clinical presentations and diagnostic tools, discusses the recommended management, and considerations when addressing of this rare malady.

CASE REPORT

Our patient was a 19-year-old male who presented to the emergency room with 1-day history of new onset right lower

quadrant abdominal pain, denying fever, nausea, vomiting, change in appetite or bowel habits. His vital signs were stable and physical examination revealed right lower quadrant tenderness without rebound or guarding. Laboratory tests were unremarkable. Abdominal computed tomography (CT) scan diagnosed appendicitis with malrotation, the appendix was located deep to the umbilicus. Due to the location of the appendix, limited laparotomy and appendectomy of midline appendix was performed. The malrotation was not addressed because there are no definitive recommendation for repair of this finding incidentally in adults. Additionally, as the surgeon was not a formally trained pediatric surgeon, the decision was made to proceed with appendectomy alone. The patient was discharged home without complication the following day. On post-operative Day 5, the patient returned with nausea, bilious vomiting and constipation. Vital signs were stable. Abdominal examination was benign, noting a well healed epigastric scar. Laboratories were unremarkable. A CT scan revealed dilation of the stomach and proximal small bowel, indicating a malrotation volvulus. Exploratory laparotomy and Ladd's procedure was performed by a pediatric surgeon. The patient's post-operative course was unremarkable and he was discharged 5 days later.

DISCUSSION

Malrotation remains the most common etiology of volvulus in neonates, though a rare cause in adults. It is due to an error in embryologic gut development. Neonates classically present with acute bilious vomiting, abdominal distension and bloody stools. However, adults have less specific symptoms. Some

patients presented with acute or chronic abdominal pain, while our patient denied any pain at all. Some reported 'normal' bowel movements and others reported constipation. Nausea and bilious vomiting were fairly consistent symptoms. Regardless, the differential diagnosis of an adult presenting with any combination of these symptoms is wide, making the diagnosis of malrotation volvulus particularly challenging. Several imaging studies aid in diagnosing malrotation volvulus. In neonates, upper gastrointestinal series, along with ultrasonography, are most commonly utilized. Classic GI series findings show a 'corkscrew' appearance of the duodenal–jejunal junction. In adults, however, abdominal X-ray is typically first obtained, though there is a significant rate of false negatives. A CT scan is commonly utilized revealing sequestration of the small bowel and colon to the right and left sides of the abdomen, respectively, and an inversion of the superior mesenteric vessels [3]. The vast majority of malrotation is incidentally found on CT scan [4].

In pediatric patients with asymptomatic or symptomatic malrotation, the standard recommendation is to perform Ladd's procedure. This is the same in the treatment of symptomatic malrotation volvulus in adults. The controversy lies in how to treat incidental, asymptomatic malrotation in adults. More specifically, there is a scarcity of information regarding acute progression of malrotation into volvulus after abdominal surgery for a separate cause. Only a handful of other cases

[3–6] describe patients to have appendicitis with an incidental malrotation. And, among those who underwent surgery, the malrotation was never treated. As diagnostic imaging improves and is utilized more, incidental diagnosis of malrotation in adults is becoming increasingly common [1], thus investigating treatment of incidental malrotation in adults will become increasingly significant. Perhaps, this complication would have been avoided if a pediatric surgeon was consulted for the initial operation. Or, perhaps, this was an unlikely complication, and correction should not have been considered at all. As more cases like ours are published, surgical considerations are likely to be affected.

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