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Case Report

Colon cancer in a young adult with intestinal malrotation: a case report

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ABSTRACT

Background

Intestinal malrotation is a congenital anomaly defined as a deviation from the normal 270-degree counterclockwise rotation around the SMA axis during embryologic development. The incidence in adults is only 0.2% with a majority of symptomatic cases diagnosed shortly after birth. Moreover, intestinal malrotation in adults associated with colon cancer is extremely rare with few case reports in the literature.

Case Presentation

We report a 28 year-old male a bowel obstruction and concern for malrotation of the midgut. He was taken for emergent exploratory laparotomy, finding dense adhesions and strictured transverse colon at the transition point. He underwent resection, primary anastomosis and a Ladd's procedure. The pathology report revealed a moderate to well-differentiated adenocarcinoma with invasion through the muscularis propria (T3) with positive lymph nodes. He completed 20 cycles of chemotherapy.

Conclusion

This report represents the first case to our knowledge of colon cancer associated with intestinal malrotation found in an adult under the age of thirty. A possible cause of these cases associated with malrotation is chronic inflammation.

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Introduction

Intestinal malrotation is a congenital anomaly defined as a deviation from the normal 270-degree counterclockwise rotation around the SMA axis during embryologic development. The incidence in adults is only 0.2% with a majority of symptomatic cases diagnosed shortly after birth. Intestinal malrotation in adults associated with colon cancer is extremely rare with few case reports in the literature [2, 14]. To the best of our knowledge this is the first case report of intestinal malrotation with associated colon cancer in an adult under the age of 30.

Case Presentation

A 28-year-old male presented with nausea, vomiting, abdominal pain and history of intermittent diarrhea and constipation. He had a history of chronic abdominal discomfort with CT scan evidence of renal stones but was otherwise healthy. The patient presented with a white blood cell count of 12,150/mm³. He had an abdominal CT scan showing an internal

hernia with closed-loop obstruction from likely malrotation. The cecum was located within central abdomen and a mesenteric swirl was seen (Figure 1). Of note, he had a CT with a similar mesenteric swirl present in 2015. He underwent exploratory laparotomy. Malrotation with dense adhesions was encountered. The transverse colon was adherent to the retroperitoneum and appeared narrowed in caliber. Because of the structured appearance, a resection with primary anastomosis as well as incidental appendectomy as part of Ladd's procedure was performed. Unfortunately, his post-operative course was complicated by an anastomotic leak on post-operative day four, when he returned to the operating room for an end colostomy. His pathology report returned, showing a 3.8 cm moderate to well-differentiated adenocarcinoma, T3 (through the muscularis propria and into serosal adipose), with one of three lymph nodes positive for metastatic disease. He had no family history of colon cancer. Staging work-up was completed. No distant metastasis was found, and CEA was 0.5. Testing did not demonstrate microsatellite instability. He completed FOLFOX (Folinic acid, fluorouracil, and oxaliplatin) regimen for 20 cycles.

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Figure 1A: CT scan showed twisting and swirling of the mesentery (arrow) in the left upper quadrant at the ligament of Treitz with associated fluid and air-filled dilation of both large and small bowel loops.



Figure 1B: Coronal CT scan showed dilated, fluid-filled loops of small bowel in the right abdomen. The cecum is located in the central abdomen with a normal appearing appendix (asterisk). C cecum.

Discussion

Malrotation of the midgut can be defined as an interruption from the normal rotation and fixation of the GI tract during development. Normally, the intestines grow faster than the body early in development and form outside of the body. During the 10-12th week of development they begin to migrate back into the abdominal cavity making a 270-degree counterclockwise rotation around the superior mesentery artery axis. This has been estimated to occur in about 1 in 500 live births with even less being symptomatic at birth (1 in 6,000) [1, 2]. The incidence of midgut malrotation in adults has been previously estimated at 0.2% [2]. While imaging studies can diagnose some cases, many are found coincidentally at surgery for some other disease process. The incidence of both malrotation of the midgut and colon cancer is extremely rare with few case reports in the literature [2, 14, 16].

Review of current literature shows less than 20 cases of intestinal malrotation with synchronous colon cancer (excluding situs inversus or complex congenital disorders). Four of those were in patients under the age of 50 with the youngest at age 34 [3-17]. This is the first case of an adult under the age of thirty presenting with synchronous malrotation of the midgut and colon cancer. While older patients with intestinal malrotation are more likely to have colon cancer in general, it remains unclear why the younger subset has synchronous cancer [1]. Previous case reports show increased prevalence of right-sided colon cancer with the left side being rarer. This is in contrast to the incidence of left-sided colon cancers in the general population which is more common. Almost 30% of the cases involved the transverse colon as seen in our case. It has been hypothesized that the chronic inflammation from obstruction causes changes at a cellular level, leading to carcinogenesis [6]. Further

investigation is needed especially in the young adult population with no family history and without microsatellite instability (MSI).

Conclusion

This report represents the first case to our knowledge of colon cancer associated with intestinal malrotation found in an adult under the age of thirty. A possible cause of these cases associated with malrotation is chronic inflammation.

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