eInt. J Med. Pharm. Res. (P-ISSN: 2958-3675 | E-ISSN: 2958-3683)
Available on: https://ijmpr.in/

International Journal
of Medical and
Pharmaceutical Research

CASE REPORT OPEN ACCESS

Large Bowel Obstruction Secondary to Signet Ring Cell Carcinoma of the Descending Colon

Dr. Jagruthi R Subramanya [1]*; Dr. Sushil Kumar BV [2]

[1] 2nd year Post Graduate, Dept of General Surgery, The Oxford Medical College and Research Centre, Attibele, Bangalore
[2] Professor & HOD, Dept of General Surgery, The Oxford Medical College and Research Centre, Attibele, Bangalore

OPEN ACCESS

Corresponding Author
Dr. Jagruthi R Subramanya
2nd year Post Graduate, Dept of General Surgery, The Oxford Medical College and Research Centre, Attibele, Bangalore

Received: 09-03-2024
Accepted: 25-05-2024
Available online: 07-06-2024

ABSTRACT

Introduction: Signet ring cell carcinoma is a rare subtype of colorectal cancer with distinct clinical behavior. We present a case of large bowel obstruction secondary to signet ring cell carcinoma of the descending colon.

Case Presentation: A middle-aged multiparous female presented with a 15-day history of progressive abdominal pain, constipation, vomiting, and fever. Imaging revealed near-complete luminal obstruction of the descending colon. Exploratory laparotomy with left hemicolectomy was performed. Histopathology confirmed signet ring cell carcinoma with serosal invasion and lymph node metastasis.

Conclusion: This case highlights the aggressive nature of signet ring cell carcinoma and the importance of prompt diagnosis and treatment. Clinicians should maintain a high index of suspicion for this rare entity in patients presenting with large bowel obstruction.

Keywords: signet ring cell carcinoma, large bowel obstruction, hemicolectomy, septic shock, histopathology.

INTRODUCTION

Colorectal cancer (CRC) is a leading cause of cancer-related morbidity and mortality worldwide. In the United States, CRC is the third most common cancer in both men and women, with an estimated 149,500 new cases and 52,980 deaths in 2021.[1] The majority of CRCs are adenocarcinomas, which can be further classified into several histologic subtypes, including signet ring cell carcinoma (SRCC). SRCC is a rare variant characterized by the presence of >50% of tumor cells with prominent intracytoplasmic mucin, typically with displacement and molding of the nucleus.[2] SRCCs account for approximately 1% of all CRCs and tend to present at a more advanced stage with aggressive clinical behavior.[3] We report a case of large bowel obstruction secondary to SRCC of the descending colon and discuss the unique features and management considerations for this rare histologic subtype.

Case Presentation:

A middle-aged multiparous female presented to the emergency department with a chief complaint of progressive abdominal pain for 15 days. The pain was insidious in onset, gradually worsening over time, and severe in intensity. It was characterized as colicky, localized to the right lower quadrant, and not associated with any aggravating or relieving factors. The patient also reported abdominal distension and constipation for the past 15 days. She had been experiencing multiple episodes of non-bilious, non-bloody vomiting for the last 7 days, which contained partially digested food

particles. Additionally, she had developed high-grade fever for the past 3 days, which was not associated with chills or rigors and did not improve with over-the-counter medications.

Further history revealed no significant changes in appetite or weight. The patient denied any episodes of hematemesis, melena, hematochezia, or diarrhea. She also denied any generalized weakness, dyspnea, or decreased urine output.

Upon arrival to the emergency department, the patient's vital signs were indicative of septic shock. She was tachycardic with a heart rate of 120 beats per minute and hypotensive with a blood pressure of 100/60 mmHg. Her respiratory rate was elevated at 30 breaths per minute, and her oxygen saturation was 90% on room air. She was febrile with a temperature of 101°F (38.3°C). Given her critical condition, the patient was immediately admitted to the surgical intensive care unit (SICU) for close monitoring and management.

Initial management included the initiation of broad-spectrum intravenous (IV) antibiotics to address the underlying sepsis. The patient was also started on IV fluid resuscitation to correct her hemodynamic instability. She was placed on a strict nil per os (NPO) order in anticipation of possible surgical intervention.

An emergent contrast-enhanced computed tomography (CECT) scan of the abdomen and pelvis was performed to investigate the cause of the patient's symptoms. The imaging study revealed a long segment of asymmetrical circumferential wall thickening involving the proximal descending colon. This thickening resulted in near-total luminal narrowing, raising concern for a neoplastic process. The CT scan also demonstrated a few prominent lymph nodes adjacent to the affected colonic segment. Proximal to the obstruction, there was evidence of colonic and small bowel dilation, consistent with a subacute intestinal obstruction. Additionally, a small amount of ascites was noted.

Given the patient's clinical deterioration and the CT findings suggestive of a malignant obstruction, the decision was made to proceed with an emergent exploratory laparotomy. The patient was taken to the operating room and placed under general anesthesia.

In the operating room, a midline laparotomy incision was made, and the abdomen was entered. Upon initial inspection, the surgeon noted diffusely dilated large and small bowel loops. The bowel appeared edematous and inflamed, but there were no overt signs of ischemia or necrosis. Further exploration revealed a perforation in the cecum, likely secondary to the increased intraluminal pressure from the distal obstruction. The perforated area was repaired using a two-layer closure technique after thorough suctioning of the spillage.

Attention was then turned to the descending colon, where a stricture was palpated. This stricture was causing a complete obstruction of the large bowel. Upon closer examination, a firm mass measuring approximately 5 x 4 cm was identified at the site of the stricture.

Given the presence of the obstructing mass and the cecal perforation, the decision was made to proceed with a left hemicolectomy. The involved segment of the descending colon, including the mass, was resected with adequate proximal and distal margins. An end-to-end anastomosis was then performed to restore bowel continuity. The abdominal cavity was thoroughly irrigated with warm saline solution, and a thorough inspection was performed to ensure hemostasis. The abdomen was then closed in layers using standard surgical techniques.

The patient tolerated the procedure well and was transferred back to the SICU for close postoperative monitoring and continued supportive care. The resected specimen was sent to the pathology department for histopathologic examination.

In the postoperative period, the patient's condition gradually improved. Her sepsis resolved with continued antibiotic therapy, and her bowel function returned to normal. She was successfully extubated and weaned off vasopressor support. The patient was eventually discharged from the SICU and continued her recovery on the surgical ward.

The histopathology report from the resected specimen provided a definitive diagnosis. The report described a tumor composed of cells arranged in sheets, clusters, and scattered singly. The tumor cells exhibited a signet ring cell morphology, characterized by abundant intracytoplasmic mucin pushing the nucleus to the periphery, creating a crescent-shaped appearance. The tumor had infiltrated through the colonic wall, reaching the serosal layer and breaching the visceral peritoneum. Foci of tumor necrosis were also noted.

The distal surgical margin was involved by tumor cells, while the proximal margin was free of tumor. All four lymph nodes isolated from the specimen contained metastatic deposits. Notably, two of the four lymph nodes were completely replaced by tumor cells, with no residual lymphoid tissue identified.

Based on these histopathologic findings, a final diagnosis of signet ring cell carcinoma of the descending colon was made. The tumor had reached an advanced stage, with serosal invasion and regional lymph node metastasis.

The patient and her family were informed of the diagnosis and the need for further oncologic management. A referral was made to the medical oncology team for evaluation and initiation of appropriate adjuvant chemotherapy. The patient was also scheduled for close follow-up with the surgical team to monitor her postoperative recovery and discuss long-term surveillance plans.End ileostomy was performed due to the patient's critical condition. Despite surgical intervention, the patient succumbed to death 16 hours post-procedure. The cause of death was determined to be sepsis with multiple organ dysfunction syndrome (MODS).

Discussion:

SRCC is a rare and aggressive variant of CRC, characterized by the presence of >50% of tumor cells with prominent intracytoplasmic mucin and eccentrically displaced nuclei.[2] The World Health Organization (WHO) defines SRCC as a poorly cohesive carcinoma composed of tumor cells with intracytoplasmic mucin and an eccentric crescent-shaped nucleus.[4] CRCs with signet ring cells comprising <50% of the tumor are categorized as adenocarcinomas with a signet ring cell component and do not share the same clinical implications as pure SRCC.[5]

Compared to conventional adenocarcinoma, SRCC has a lower incidence (0.9-2.6%), younger age at diagnosis, and a higher proportion of distant metastasis at presentation.[6,7] SRCCs exhibit a predilection for the right colon and tend to present at a more advanced stage.[3,8] Patients with SRCC have a poorer prognosis than those with other CRC subtypes, even after adjusting for stage.[9] The aggressive behavior of SRCC may be attributed to its distinct molecular profile, including a high incidence of microsatellite instability (MSI), frequent BRAF mutations, and overexpression of mucin genes.[10,11]

The clinical presentation of SRCC is similar to that of other colorectal malignancies. Patients may experience abdominal pain, change in bowel habits, hematochezia, or symptoms related to obstruction or metastatic disease. In the case presented here, the patient developed acute large bowel obstruction secondary to the SRCC in the descending colon. Large bowel obstruction is a well-recognized complication of CRC, occurring in 8-29% of cases.[12] Typical symptoms include abdominal pain, distension, constipation, and vomiting. Imaging studies, such as CECT, play a crucial role in diagnosing the site and cause of obstruction, as well as assessing for potential complications like perforation or ischemia.

Management of SRCC follows the same general principles as other CRCs, with surgery being the mainstay of treatment for localized disease. However, the optimal surgical approach may differ depending on the stage and location of the tumor. In the setting of acute obstruction, urgent surgical intervention is often necessary to relieve the obstruction and prevent complications. Options include resection with primary anastomosis, resection with stoma creation, or stoma creation alone as a bridge to definitive surgery.[13] In our case, the patient underwent a left hemicolectomy with primary anastomosis, as the perforation was located in the cecum and the remaining bowel appeared viable.

Adjuvant chemotherapy is typically recommended for patients with stage III or high-risk stage II CRC. However, the efficacy of conventional chemotherapy regimens in SRCC remains controversial. Some studies have suggested that SRCC may be less responsive to 5-fluorouracil-based chemotherapy compared to conventional adenocarcinoma.[14,15] Given the high prevalence of MSI in SRCC, immunotherapy with checkpoint inhibitors has emerged as a promising treatment option for metastatic disease.[16] Ongoing research is aimed at identifying novel therapeutic targets and biomarkers to guide personalized treatment strategies for this aggressive CRC subtype.

Conclusion:

SRCC is a rare and aggressive variant of CRC characterized by distinct clinicopathologic features and poor prognosis. This case highlights the importance of considering SRCC in the differential diagnosis of patients presenting with large bowel obstruction and emphasizes the need for prompt surgical intervention to prevent complications. Familiarity with the unique molecular profile and clinical behavior of SRCC is crucial for optimizing management strategies and improving outcomes for these patients. Further research is warranted to develop targeted therapies and refine prognostic markers for this challenging disease entity.

References:

1. Siegel RL, Miller KD, Fuchs HE, Jemal A. Cancer statistics, 2021. CA Cancer J Clin. 2021;71(1):7-33.
2. Tung SY, Wu CS, Chen PC. Primary signet ring cell carcinoma of colorectum: an age- and sex-matched controlled study. Am J Gastroenterol. 1996;91(10):2195-2199.
3. Gopalan V, Smith RA, Ho YH, Lam AK. Signet-ring cell carcinoma of colorectum--current perspectives and molecular biology. Int J Colorectal Dis. 2011;26(2):127-133.
4. Nagtegaal ID, Arends MJ, Odze RD, Lam AK. Tumors of the colon and rectum. In: WHO Classification of Tumors Editorial Board. Digestive System Tumors. 5th ed. Lyon: International Agency for Research on Cancer; 2019:177-187.
5. Kang H, O'Connell JB, Maggard MA, Sack J, Ko CY. A 10-year outcomes evaluation of mucinous and signet-ring cell carcinoma of the colon and rectum. Dis Colon Rectum. 2005;48(6):1161-1168.
6. Mizushima T, Nomura M, Fujii M, et al. Primary colorectal signet-ring cell carcinoma: clinicopathological features and postoperative survival. Surg Today. 2010;40(3):234-238.
7. Nitsche U, Zimmermann A, Späth C, et al. Mucinous and signet-ring cell colorectal cancers differ from classical adenocarcinomas in tumor biology and prognosis. Ann Surg. 2013;258(5):775-783.
8. Lee WS, Chun HK, Lee WY, et al. Treatment outcomes in patients with signet ring cell carcinoma of the colorectum. Am J Surg. 2007;194(3):294-298.
9. Hyngstrom JR, Hu CY, Xing Y, et al. Clinicopathology and outcomes for mucinous and signet ring colorectal adenocarcinoma: analysis from the National Cancer Data Base. Ann Surg Oncol. 2012;19(9):2814-2821.
10. Kakar S, Aksoy S, Burgart LJ, Smyrk TC. Mucinous carcinoma of the colon: correlation of loss of mismatch repair enzymes with clinicopathologic features and survival. Mod Pathol. 2004;17(6):696-700.
11. Inamura K, Yamauchi M, Nishihara R, et al. Prognostic significance and molecular features of signet-ring cell and mucinous components in colorectal carcinoma. Ann Surg Oncol. 2015;22(4):1226-1235.
12. Gainant A. Emergency management of acute colonic cancer obstruction. J Visc Surg. 2012;149(1):e3-e10.
13. Finan PJ, Campbell S, Verma R, et al. The management of malignant large bowel obstruction: ACPGBI position statement. Colorectal Dis. 2007;9 Suppl 4:1-17.
14. Hugen N, Verhoeven RH, Lemmens VE, et al. Colorectal signet-ring cell carcinoma: benefit from adjuvant chemotherapy but a poor prognostic factor. Int J Cancer. 2015;136(2):333-339.
15. Pande R, Sunga A, Levea C, et al. Significance of signet-ring cells in patients with colorectal cancer. Dis Colon Rectum. 2008;51(1):50-55.
16. Le DT, Uram JN, Wang H, et al. PD-1 blockade in tumors with mismatch-repair deficiency. N Engl J Med. 2015;372(26):2509-2520.

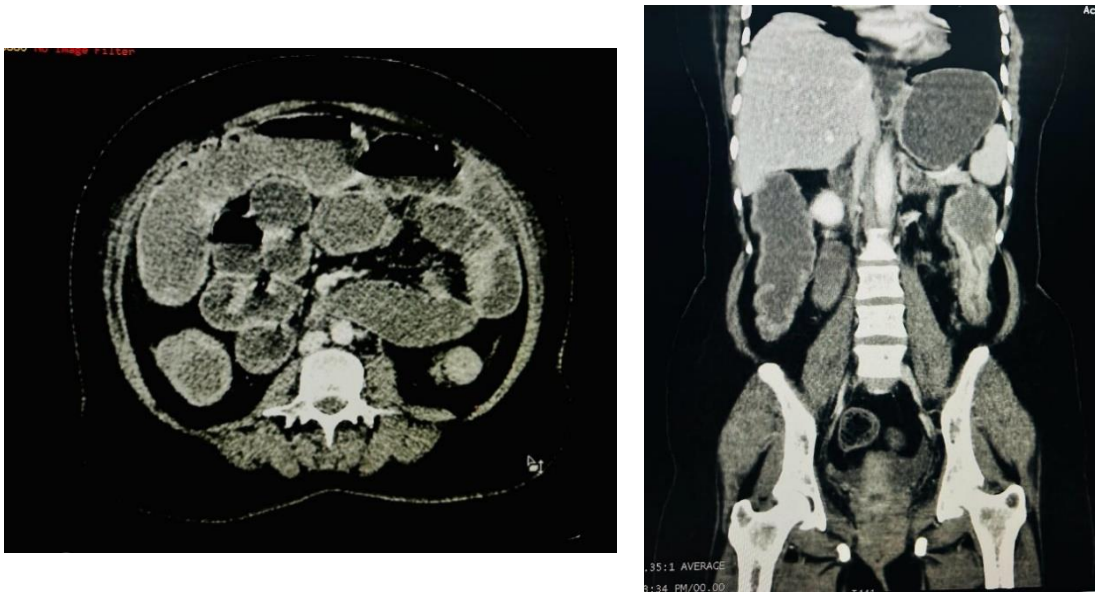

Figure 1: CT abdomen pelvis showing long segmental circumferential wall thickening of proximal part of descending colon causing near total luminal narrowing.

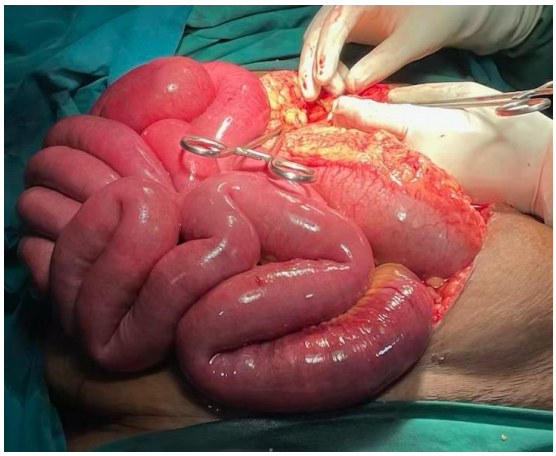

Figure 2: Intra op image showing dilated large bowel loops

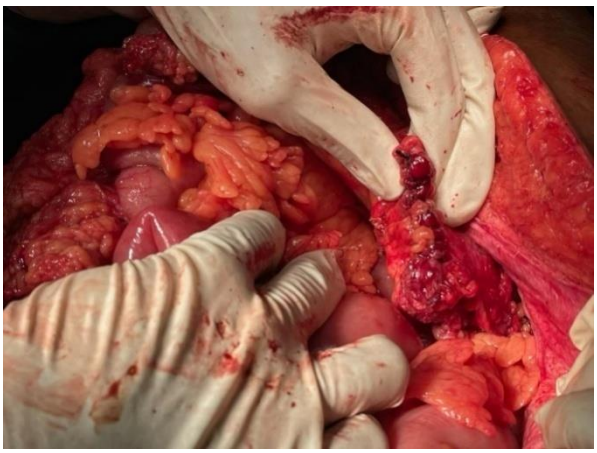

Figure 3: Intra op image showing a growth of size 5 x 4 cm in the proximal part of descending colon

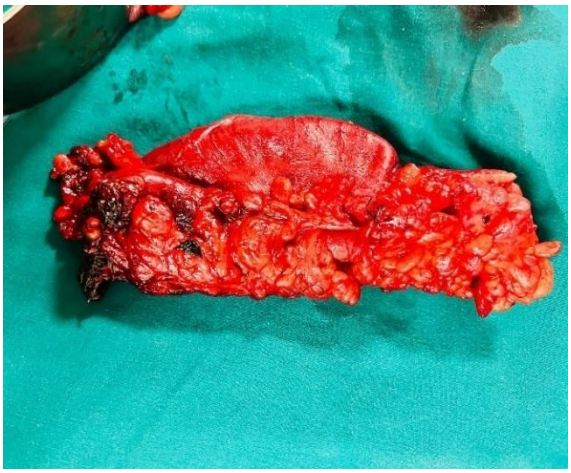

Figure 4: Hemi-colectomy specimen along with growth measuring size of 5x4cm sutured with

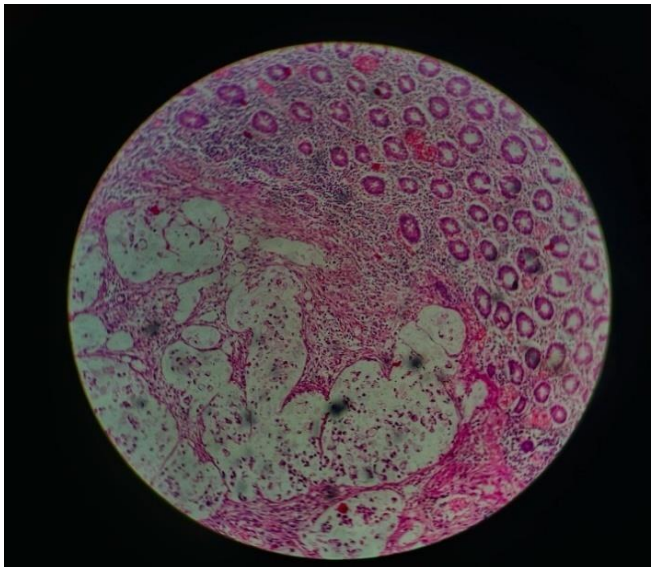

Figure 5: High power (40x magnification) clusters of signet ring cells with abundant vacuolated cytoplasm with peripherally pushed nucleus