CASE REPORT

Liver metastatic colon cancer in adolescent: A case report

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SUMMARY

Colorectal cancer (CRC) is typically a disease of the elderly, but recent years have shown a rising trend in adolescents and young adults. Pediatric CRC is exceptionally rare, with an incidence of about 1–2 per million, and often presents at an advanced stage with complications such as obstruction or metastasis. We report the case of a 13-year-old female who developed colorectal cancer with synchronous liver metastasis. She initially presented with progressive abdominal pain and constipation, mimicking functional gastrointestinal disorders, which contributed to a delay in diagnosis. Imaging revealed a descending colon mass with liver involvement, and she underwent left hemicolectomy with permanent stoma formation. Histopathology confirmed moderately differentiated adenocarcinoma infiltrating the serosa, with intravascular invasion and metastasis in 10/10 mesocolon lymph nodes (pT3, pN2b). Postoperatively, she recovered well and later underwent liver metastasectomy, followed by surveillance colonoscopy at eight months. She is currently receiving chemotherapy with Capecitabine. This case illustrates the diagnostic challenges of CRC in young patients, where non-specific symptoms can lead to late-stage detection and poorer prognosis. The rarity of pediatric CRC, combined with limited access to genetic and molecular testing in resource-limited settings, further complicates management. Early recognition and timely intervention are essential to improve outcomes and guide long-term care strategies.

CASE PRESENTATION

A 13-year-old female presented to the Emergency Department with a one-week history of persistent abdominal bloating and pain. There was no associated nausea, vomiting, or fever. The patient reported no bowel movement for approximately one week, with the last passage of flatus occurring earlier on the day of admission. Oral intake remained adequate. Her baseline bowel habits included daily bowel movements 1-2 times per day; however, she recently experienced prolonged defecation time and a sensation of incomplete evacuation. The patient has no family history of hereditary polyposis syndromes or colorectal cancer.

On physical examination, the patient appeared weak with normal blood pressure, heart and respiratory rate, no fever and great oxygen saturation. Conjunctivae were non-anemic, and sclerae were non-icteric. Cardiopulmonary examination was unremarkable. Abdominal inspection revealed distension without visible peristalsis or masses. Bowel sounds were present at 9-10 per minute. Palpation was soft with no tenderness or guarding. Percussion elicited hypertympany. Extremities were warm with no peripheral edema.

A rectal exam showed a strong sphincter tone, collapsed rectal ampulla, no tenderness or mass, and small feces present without blood or mucus. Hirschsprung's disease (short segment) was suspected. Supporting tests included abdominal radiograph and blood work, which showed hemoglobin (Hb) 11.5 g/dL, white blood cell count (WBC) 8.8 $\times 10^9$/L, and platelet count (PLT) 278 $\times 10^9$/L. The patient was hospitalized, fasted, and managed with intravenous fluids (D5% ½ NS), omeprazole, nasogastric tube, urine catheter, rectal tube decompression, and twice-daily rectal washing. Colonoscopy was not performed. Contrast-enhanced abdominal Computed Tomography (CT) revealed colonic dilatation, an intraluminal tumor mass in the descending colon, and liver metastasis.

Intraoperatively an intraluminal tumor mass was identified in the descending colon, measuring 6 × 2 × 2 cm. A left hemicolectomy was performed over a length of 20 cm, and end colostomy was performed. There were multiple enlarged mesenteric lymph nodes. On postoperative day one, she had no nausea or vomiting, passed stool via colostomy, and started a clear fluid diet. Vital signs were stable, pain was mild (VAS 2/10), and the colostomy was viable. NGT output was 50 cc of clear yellow fluid. She was gradually advanced to oral feeding via nasogastric tube and tolerated a soft diet by postoperative day four. The patient was discharged on postoperative day five in good condition.

Histopathological examination revealed a moderately differentiated adenocarcinoma, not otherwise specified (NOS), with infiltration reaching the serosal layer. Both proximal and distal resection margins were free of carcinoma. Evidence of intravascular invasion was noted. Metastatic carcinoma cells were identified in all 10 of 10 mesocolon lymph nodes examined. The final pathological staging was pT3, pN2b. Further management included liver metastasectomy. Eight months after surgery, surveillance colonoscopy was performed. The patient is currently undergoing chemotherapy with Capecitabine. The patient remaining in good condition.

DISCUSSION

Colorectal cancer (CRC) in childhood and early adolescence is exceptionally rare, with an incidence of 1–2 per million, but it often presents at advanced stages with complications

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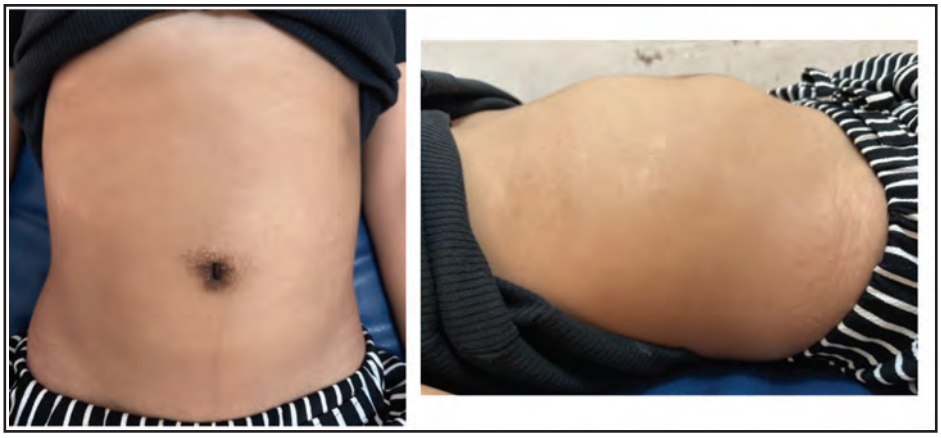

Fig. 1: Physical Examination Results

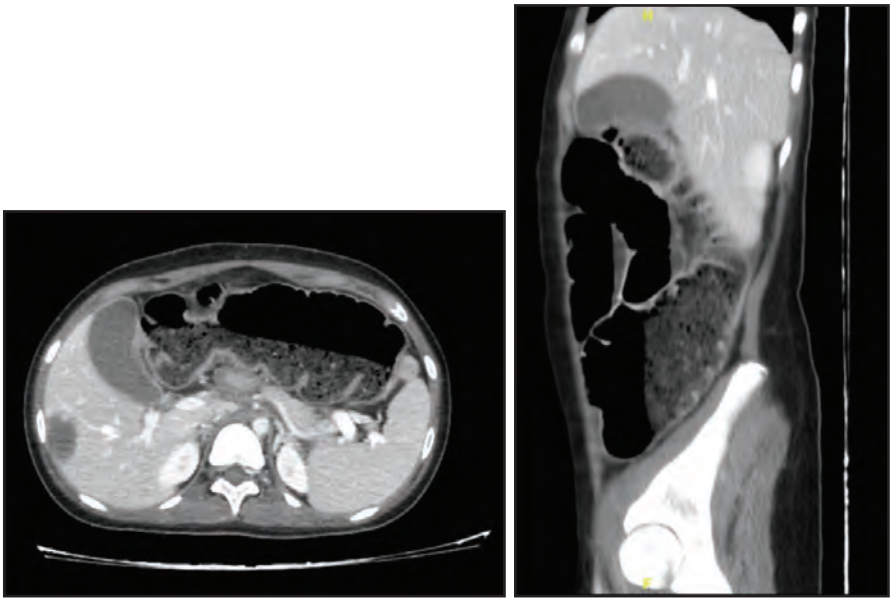

Fig. 2: Pre surgery Abdominal CT Scan with contrast showing the tumor has metastasized to the liver

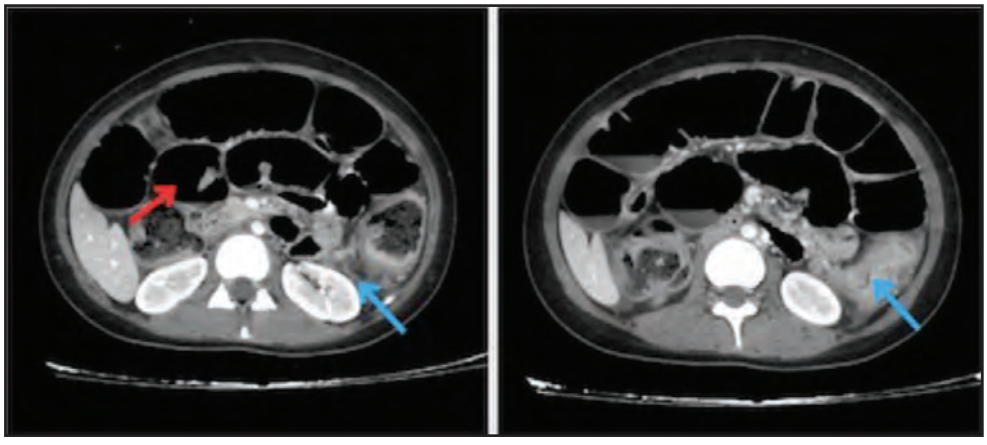

Fig. 3: Pre Surgery Abdominal CT Scan with contrast (Blue arrow: Descending colon tumor ; Red Arrow: Bowel dilatation from the proximal part of the liver)

such as obstruction.[1,2] While CRC typically affects individuals over 50, early-onset colorectal cancer (EOCRC) cases are increasing, raising concerns about genetic and environmental factors as well as delayed diagnosis. Nonspecific symptoms such as abdominal pain, bloating, and altered bowel habits often overlap with benign conditions, causing diagnostic delay and poorer prognosis compared with adults.[3] Although incidence rates in Southeast Asian countries such as Indonesia, Malaysia, and Thailand remain lower than in other Asian regions, they are steadily increasing due to lifestyle changes, urbanization, and limited screening access.[4]

Our patient presented with symptoms resembling functional constipation or Hirschsprung's disease, but imaging revealed a descending colon mass with synchronous liver metastasis, confirming malignant large-bowel obstruction. Pediatric CRCs are frequently aggressive, with histologies such as mucinous adenocarcinoma or signet-ring cell carcinoma and advanced stage at presentation, consistent with previous series of early-onset CRC.[5,6]

Intestinal obstruction in adolescents has a broad differential diagnosis, which includes congenital causes such as Hirschsprung's disease or malrotation, as well as acquired conditions like intussusception, adhesions, inflammatory bowel disease, and, rarely, malignancy.[2,3,6] In younger patients, colorectal carcinoma is seldom suspected because symptoms such as constipation or abdominal distension are more commonly attributed to benign disorders.[3] In this case, the patient initially had normal bowel habits followed by sudden cessation of defecation and progressive abdominal distension, a presentation that could mimic functional constipation or acute intestinal obstruction from other causes. However, the absence of prior surgery (excluding adhesions), the left-sided colonic dilatation on imaging, and the presence of a discrete mural mass favored a diagnosis of large-bowel obstruction secondary to malignancy. This emphasizes the importance of maintaining a high index of suspicion for colorectal cancer in adolescents presenting with abrupt-onset obstructive symptoms unresponsive to standard management.

Genetic predisposition contributes to EOCRC development, particularly in syndromes such as Lynch syndrome, caused by mutations in mismatch repair genes (MLH1, MSH2, MSH6, PMS2), and familial adenomatous polyposis (FAP) due to APC mutations.[1,7] However, most early-onset cases occur sporadically. Only about 11.9% of patients under 35 have a first-degree relative with CRC, though this increases the risk up to fourfold.[1,7] Beyond hereditary factors, modern dietary patterns high in processed foods, red meats, and sugars contribute carcinogenesis through obesity, chronic inflammation, and altered gut microbiota.[7,8] These findings emphasize that, in addition to genetic predisposition, modifiable lifestyle factors play an important role in the rising incidence of CRC among adolescents and young adults. Although this patient had no family history of CRC or polyposis syndromes, universal testing for mismatch repair deficiency is recommended in all CRC cases to detect Lynch syndrome, which is common in early-onset disease.8,9 Genetic evaluation has important implications for prognosis, therapy (e.g., immune checkpoint inhibitors in MSI-H tumors), and familial counseling.

The presence of synchronous liver metastasis at diagnosis indicates stage IV disease. In adults, resection of colorectal liver metastases combined with perioperative chemotherapy (FOLFOX-based regimens) improves survival.[7] Pediatric oncologists often extrapolate these regimens, with reports of successful use in adolescents with metastatic CRC.[3,7] In our patient, surgical resection (left hemicolectomy and liver metastasectomy) followed by Capecitabine-based chemotherapy resulted in favorable short-term outcomes, consistent with previous reports.[4,9]

Histopathological examination revealed moderately differentiated adenocarcinoma with serosal infiltration, intravascular invasion, and extensive nodal involvement (pT3, pN2b), reflecting aggressive tumor biology typical of pediatric CRC.[6,8] Although confirmatory genetic testing was not available in this setting, hereditary causes should be suspected at such a young age. The absence of molecular profiling limited consideration of targeted or immunotherapies despite their established role in MSI-H or dMMR tumors.[9,10]

Pediatric CRC poses unique challenges due to delayed diagnosis, absence of pediatric-specific guidelines, and limited access to molecular testing.[2,9] Management generally follows adult protocols, though differences in tumor biology, chemotherapy tolerance, and psychosocial aspects such as fertility and quality of life should be considered.[7,10] This case underscores the importance of early recognition of colorectal cancer in adolescents and the need for greater access to genetic and molecular diagnostics to improve management and outcomes.

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