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Case Report

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Colonic Carcinosarcoma: Report of a Rare Colorectal Malignancy and Review of Literature

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Colorectal cancer · Colorectal carcinosarcoma

Abstract
Colonic carcinosarcoma is an extremely rare tumor composed of mixed malignant epithelial and mesenchymal cells. Due to its rarity, its pathogenesis is poorly understood, and there are no specific guidelines for its treatment.

Introduction

Carcinosarcoma, a biphasic tumor, exhibits epithelial and stromal malignant differentiation. The epithelial component is composed of high-grade or mid-grade adenocarcinoma and the sarcomatous part is of mesenchymal origin which may be differentiated or undifferentiated [1]. Carcinosarcomas can occur in different organs and different anatomical locations; following the first report by Virchow [2] in 1864, its occurrence has been described in various organs. However, a predominance is seen in the female genital tract [3, 4], in the head and neck [5], and some isolated reports affecting the gastrointestinal tract, mainly esophagus [6] and stomach [7]. Having said this, colorectal carcinosarcoma is an extremely rare tumor. To the best of our knowledge, 31 cases have been reported as either sarcomatoid carcinoma or carcinosarcoma in the medical literature. Herein, we present a case of cecal carcinosarcoma treated surgically by right hemicolectomy.

Case Report

A 67-year-old male patient known to have hypertension with no previous abdominal surgeries transferred to our institute for surgical management of large bowel obstruction at the cecum diagnosed by CT scan of the abdomen and pelvis with IV contrast done at another institution showing a 15 × 15 cm mass at the level of the cecum with heterogeneous density, with proximal small bowel dilatation, no liver lesions were noted. History goes back to the day of presentation where the patient reported acute onset of abdominal pain in the periumbilical area, non-radiating associated with increase in abdominal girth and inability to pass gas for the last 24 h. Patient reports associated nausea and 2 episodes of biliary vomiting. Patient denies weight loss, blood per rectum, change in bowel habits, and family history of colorectal cancer. Patient also reported that no previous colonoscopy was done. On physical exam, the patient was in pain, with stable blood pressure of 135/80 mm Hg and tachycardia of 110 beats per minute. Abdominal exam revealed a distended abdomen, hypoactive bowel sounds, and mild

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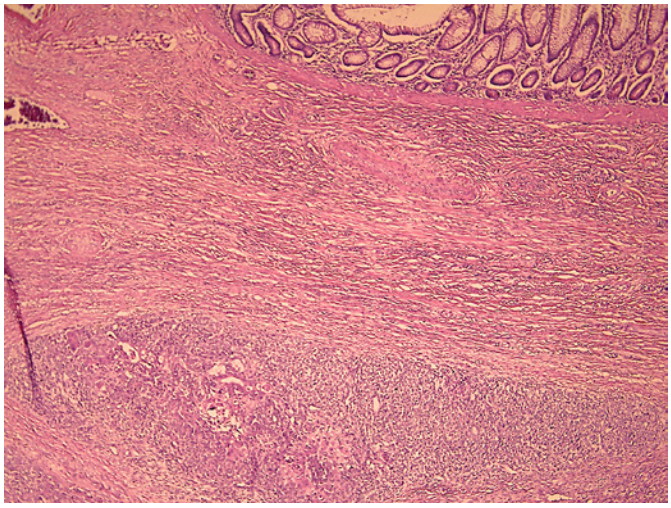

Fig. 1. Tumor with intact overlying bowel mucosa.

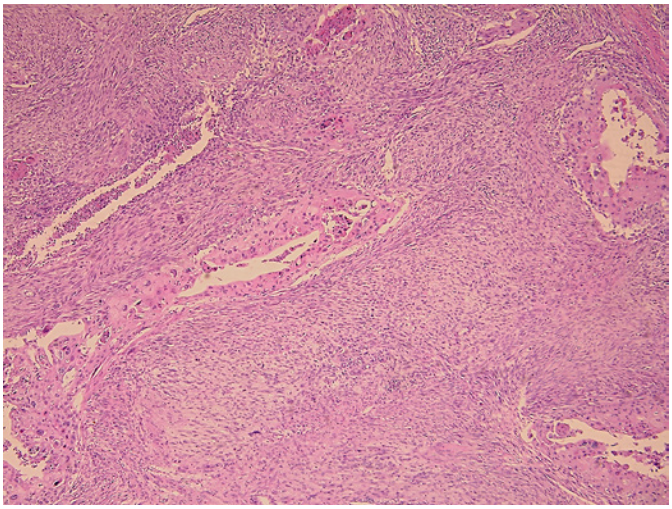

Fig. 2. Central and right evident squamous differentiation, with surrounding spindle mesenchymal elements.

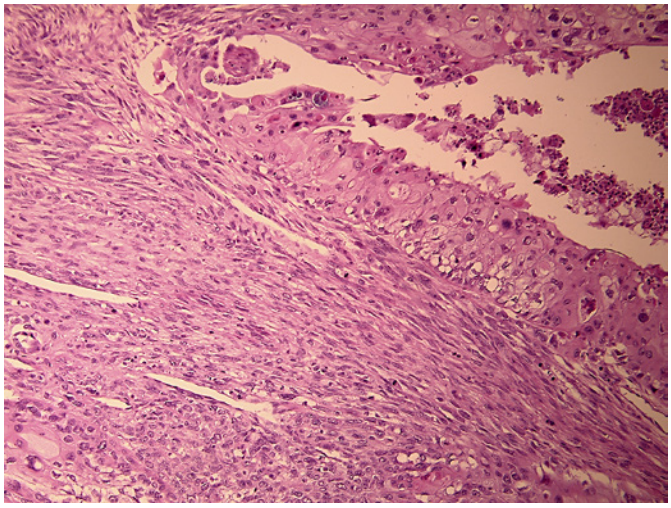

Fig. 3. Higher power magnification showing adjacent squamous and mesenchymal differentiation.

tenderness on deep palpation. Laboratory workup reveals leukocytosis of 17,000 WBC with 80% neutrophils, elevated inflammatory markers and normal Cr, electrolytes, and amylase. Tumor markers, including CEA and CA 19-9 were normal. Given the above, the patient was diagnosed with mechanical large bowel obstruction and an emergency surgery done. The patient was taken to the operating theater where he was placed in supine position, general anesthesia was given and urinary Foley catheter inserted. Midline laparotomy was done, and abdominal exploration showed no liver deposits and there was no carcinomatosis. A large obstructive mass was observed in the cecum measuring around 10 cm in diameter and 25 cm in length, with 20 cm of the terminal ileum adherent to the colonic mass. Furthermore, a tumorous deposit was noted at the mesentery of the right colon. Consequently, an oncologic right hemi-colectomy was done, with side-to-side ileocolic anastomosis. Postoperative course was smooth with no complications, and the patient was discharged home on day 6 post-surgery. Histopathology examination of the specimen revealed the following.

Macroscopic Description

Huge tumor 12 cm in diameter and 25 cm in length occupying the ileocecal area with 18 cm of terminal ileum adherent to the tumor, covered by whitish fibrous adhesions. Opening the specimen revealed a polypoid multilobulated mass occluding the lumen, invading the full thickness of colonic wall reaching the serosal surface. The tumor showed solid white section and glistening mucoid areas and necrosis. A similar-in-appearance 3-cm nodule was identified at the mesocolon.

Microscopic Description

Biphasic tumor which in some areas comprised cohesive sheets of polygonal cells having pleomorphic nucleolated nuclei and abundant cytoplasm focally clear and focally dense eosinophilic featuring central keratinization, while in other areas, it showed abundant myxoid stroma with scattered single- and multinucleated cells having markedly pleomorphic nuclei admixed with fascicles of spindle cells having similarly anaplastic nuclei and fibrillary eosiniphilic cytoplasm. Brisk mitotic activity was

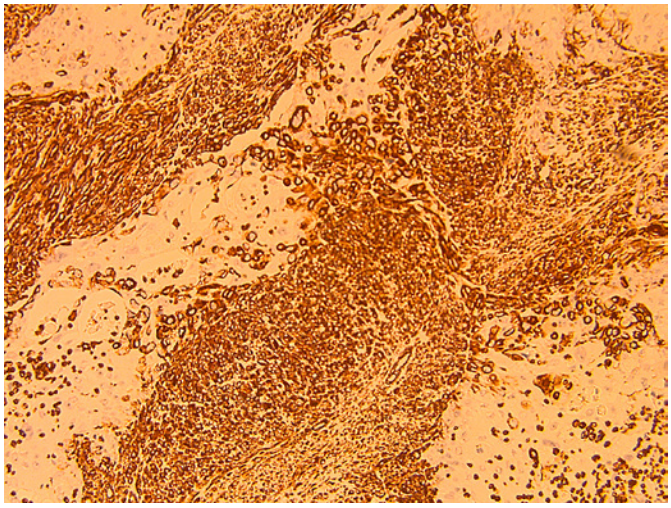

Fig. 4. Vimentin IHC, positive spindle component.

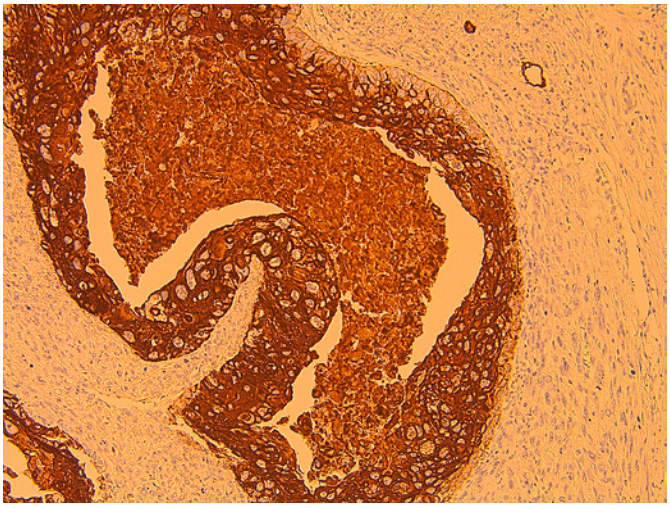

Fig. 5. Cytokeratin IHC, positive squamous epithelial component.

noted throughout. Rare mucin vacuole or glandular lumens were identified among the epithelial elements. Tumor infiltrates the full thickness of the colonic wall till reaching the serosal surface. Lymphatic embolization and absence of vascular invasion was noted. Fibrous adhesions to the terminal ileum with no invasion were observed. One lymph node was positive for malignancy out of 18 (1/18) (Fig. 1–3).

IHC was done and showed prominent delineation between the cell components expressed. Vimentin was positive in mesenchymal, spindle cells (Fig. 4) and cytokeratin in the squamous component (Fig. 5).

Final Diagnosis

Carcinosarcoma of the cecum with adenosquamous epithelial element and myxoid chondroid and leiomyosarcomatous stromal element with negative margins and 1/18 lymph node positive for malignancy. The patient refused postoperative chemotherapy and was followed up to 1 month after surgery and then lost to follow-up.

Discussion

Colorectal carcinosarcoma is an extremely rare entity. The first reported case dates back to 1986 by Weidner and Zekan [8], and since then, 31 cases have been reported till date (Table 1) [9, 12–15, 18, 19, 21–25, 30–32, 35–37]. Reviewing the characteristics of the reported cases in the medical literature (Table 2) revealed that the mean age of presentation is 64 years with a range between 13 and 86 years, a male to female ratio of 13:18 with 42% of reported cases being male and 58% females. Fresh blood per rectum was the most common presenting symptom. The rectum is the most common site of involvement with 9 out of 31 (29%) cases involving the rectum; this is followed by the same number of reported cases involving the ascending colon, descending colon, and the sigmoid colon. The least common site reported to be involved is the transverse colon with only 1 case reported in the medical literature. Only 2 cases have been reported to involve the cecum, and our case is the third cecal involvement to be reported worldwide. Furthermore, what makes our case special is the relatively large size of the tumor when compared to other reported cases.

There's no universal agreement on its nomenclature. Historically, carcinosarcoma has also been known as sarcomatoid carcinoma, carcinoma with mesenchymal stroma, carcinoma with sarcomatous change, spindle cell carcinoma, and pleomorphic anaplastic carcinoma; but the term "carcinosarcoma" is officially used in World Health Organization classification [16].

The histogenesis of carcinosarcoma is poorly understood, and multiple hypotheses have been proposed in an attempt to determine its pathogenesis and its biphasic nature. Regarding gastrointestinal carcinosarcomas, the metaplastic theory is favored, whereby it is believed that the carcinoma component precedes and that it is differ-

Table 1. Colorectal carcinosarcoma reported in literature

No.	Author	Age/sex	Primary presentation	Site/size, cm	Treatment	Distant metastasis	LN metastasis	Adjuvant treatment	Survival post-surgery
1	Weidner and Zekan [8]	73/M	Large bowel obstruction	Sigmoid/?	LHC + colostomy (reversal 4 months post-operatively)	Metachronous (8 cm mesenteric mass at aortic bifurcation + 7 cm pelvic mass/liver)	Negative	3 sessions: 5-FU/mitomycin C, 2 sessions: cyclophosphamide/doxorubicin/cisplatinum	48 months (DOD)
2	Staroz et al. [9]	64/M	?	Descending/?	LHC	Metachronous	Positive	None	4 months (DOD)
3	Roncaroli et al. [10]	71/F	?	Rectum/?	LAR	Metachronous	Positive	None	6 months (DOD)
4	Isimbaldi et al. [11]	86/F	Melena/right lower quadrant pain/constipation	Ascending/?	RHC	None	Negative	None	Alive at 24-month follow-up
5	Gentile and Castellaneta [12]	40/F	?	Cecum/?	RHC	Synchronous (liver)	–	None	2 months (DOD)
6	Bertram et al. [13]	79/F	Bloody diarrhea/weight loss/endoscopically obstructed	Ascending/?	RHC	Synchronous (liver)	Positive	4 sessions: leucovorin/5-FU	5 months (DOD)
7	Serio and Aguzzi [14]	69/F	Blood per rectum	Descending/5.5	LHC	None	Negative	None	Alive at 6-month follow-up
8	Shoji et al. [15]	78/M	Bloody diarrhea/continuous abdominal pain	Descending/5×2×3	LHC	None	Negative	Chemotherapy: mitomycin C	Alive at 16-month follow-up
9	Nakao et al. [16]	68/F	Investigations of occult blood	Transverse/3 × 4.2 × 0.8	RHC	None	Positive	Chemotherapy: 5-FU/cisplatin	Alive up to 14-month follow-up
10	Takeyoshi et al. [17]	82/M	Blood per rectum/palpable rectal mass 2 cm from AV	Rectum/?	LAR	Metachronous (skin)	Positive	None	6 months (DOD)
11	Shah et al. [18]	57/F	Left upper quadrant pain/fever	Rectoigmoid/?	LAR	Synchronous (peritoneum/liver/pelvic), metachronous (lungs/liver/pelvis)	Positive	None	5 months (DOD)

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Table 1 (continued)

No.	Author	Age/sex	Primary presentation	Site/size, cm	Treatment	Distant metastasis	LN metastasis	Adjuvant treatment	Survival post-surgery
12	Di Vizio et al. [19]	56/F	Septic fever	Descending/20	LHC + splenectomy/ omentectomy	Metachronous (peritoneal carcinomatosis) then liver metastasis	Positive		5 months: relapse (surgery LHC/TAHBSO/ Cholecystectomy + HIPEC), 12 months: relapse (liver metastasis at portal confluence and total gastrectomy with wide resection of small bowel), 21 months (DOD)
13	Kim et al. [20]	41/F	Melena/change in bowel habits	Sigmoid/5×3.3	LAR	Metachronous (liver, lung, and brain)	Positive	Chemotherapy: 5-FU/ leucovorin	4 months DOD
14	Armendi et al. [21]	84/M	Fever/acute abdominal pain	Descending (splenic flexure)/0×6×8	LHC	None	Negative	None	Died 4 days postoperatively
15	Ishida et al. [22]	80/F	Lower abdominal pain	Rectosigmoid/18	Hartmann's procedure + RHC	Metachronous (intrapelvic metastasis)	Positive	None	6 months (DOD)
16	Macaigne et al. [23]	67/F	Rectorrhagia/ anemia	Rectum/8	LHC + partial cystectomy + TAHBSO	Metachronous (liver/ pelvic involving the right ureter)	–	Adriamycin	2 months (DOD)
17	Ekinci et al. [24]	39/F	Large bowel obstruction	Rectosigmoid/ 6×5	LAR	None	Positive	3 sessions of chemotherapy/ radiotherapy	Alive at 4-month follow-up
18	Kim et al. [25]	71/M	Abdominal pain	Ascending/10	Exploratory laparotomy (unresectable tumor)	Synchronous (bloody abdominal wall, omental cake, extensive carcinomatosis)	NA	?	Palliative care/lost to follow-up
19	Ambrosini-Spaltro et al. [26]	81/M	Asthenia/weight loss	Ascending/7	RHC	Synchronous (liver)	Positive	Chemotherapy: capecitabine	Alive at 24-month at follow-up
20	Tsekouras et al. [27]	60/M	Constipation/ hypogastric discomfort	Rectum/7	APR	Metachronous (liver/ lungs/peritoneal implants)	Positive	4 cycles of 5-FU/ leucovorin chemotherapy	6 months (DOD)
21	Öztürk et al. [28]	65/F	Blood per rectum	Rectum/2×1.5	APR	None	Negative	None	Alive at 60-month follow-up
22	Lee et al. [1]	52/F	Prolapsed rectal mass/rectal bleeding	Rectum/ 5.5×1.3×6.2	APR	None	Negative	None	Alive at 8-month follow-up
23	Jeong et al. [29]	13/F	Lower abdominal pain	Rectosigmoid/ 13×8.6	ULAR	Metachronous (pelvic LNs)	Positive	Chemotherapy	Alive at 2-month follow-up

Table 1 (continued)

No.	Author	Age/ sex	Primary presentation	Site/size, cm	Treatment	Distant metastasis	LN metastasis	Adjuvant treatment	Survival post-surgery
24	Patel et al. [30]	43/F	Unintentional weight loss/blood per rectum/ tenesmus	Sigmoid/?	Hartmann's + en bloc partial cystectomy (colovesical fistula)	Synchronous (pelvic LNs, liver)		Chemotherapy (gemcitabine/taxotere)	Alive at 2-month follow-up
25	Shim et al. [31]	65/M	Surgical abdomen	Ascending/ 11×9	RHC	Metachronous (malignant ascites: peritoneal carcinomtosis)	Positive	–	1 month (DOD)
26	Mori et al. [32]	65/M	Abdominal fullness	Sigmoid/15	LAR with en bloc partial cystectomy	Synchronous (peritoneal carcinomatosis)/ metachronous (lung)	Negative	Chemotherapy: capecitabine, 8 cycles FOLFIRI + bevacizumab	10 months (DOD)
27	Ryu et al. [33]	72/F	Hematochezia/ anemia	Cecum/3	RHC	None	Negative	None	Alive at 20-month follow-up
28	Kolodziejz-ak et al. [34]	83/M	Lower GI bleed	Rectum/ 30×53×40	Loop colostomy (non-resectable locally advanced tumor)	None	–	None	1 month (DOD)
29	Peris Tomas et al. [35]	59/?	Abdominal pain/ weight loss/ palpable mass in left iliac fossa	Sigmoid/10×7	Hartmann's procedure (R2 resection)	Synchronous (liver)	–	None	3 months postoperative progression of liver metastasis, 18 × 8 cm heterogeneous pelvic mass with infiltration of bladder, 6 months (DOD)
30	Sudlow et al. [36]	80/F	Bleeding per rectum/weight loss	Low rectum/?	APR	Metachronous (lungs)	Negative	None	16 months postoperative locoregional recurrence + distant metastasis, 25 months (DOD)
31	Osholowu et al. [37]	68/M	Lower abdominal pain/diarrhea/ weight loss	Rectum/?	None (locally advanced)	Synchronous (lungs/ omentum)	Positive	Palliative chemotherapy	NA
32	Our case	67/M	Large bowel obstruction	Cecum/12×25	RHC	Synchronous (mesentery)	Positive	Chemotherapy refused by the patient	Lost to follow-up

RHC, right hemi-colectomy; LHC, left hemi-colectomy; LAR, low anterior resection; ULAR, ultra-low anterior resection; APR, abdominoperineal resection; DOD, died of disease; NA, not applicable.

Table 2. Characteristics of reported cases

Cases reported in the literature, *n*	31
Mean age of presentation, range, years	64 (13–86)
Gender, *n* (%)	
Male	13 (42)
Female	18 (58)
Primary presentation	
Large bowel obstruction	2
Melena	2
Fresh blood per rectum	11
Abdominal pain	9
Diarrhea	3
Site, *n* (%)	
Cecum	2 (7)
Ascending	5 (16)
Transverse colon	1 (3)
Descending	5 (16)
Sigmoid	5 (16)
Recto sigmoid	4 (13)
Rectum	9 (29)
Distant metastasis, *n* (%)	
Synchronous	9 (29)
Metachronous	12 (39)
No metastasis	10 (32)
Lymph node status	
Positive	15
Negative	9
Adjuvant chemotherapy	
Yes	12
No	15

entiated into the sarcomatoid component in accordance with the development of cancer clones [38]. Furthermore, it has been also proposed that the phenotype of the carcinoma is converted to a sarcoma due to a viral infection or a mutation of the p53 gene [10, 11]. The most commonly observed pattern of staining is reactivity in the adenocarcinomatous component to the epithelial markers, CK20 and CEA [29, 33]. The sarcomatous cells frequently stain positively for vimentin, desmin, and SMA [1, 8, 33].

Patients with colonic carcinosarcoma have similar clinical presentation to that of colonic adenocarcinoma. The spectrum of symptoms ranges from rectal bleeding [1, 17, 34], weight loss [26], abdominal pain [29], and reaching obstructive symptoms [27]. From a surgical point of view, colorectal carcinosarcomas are treated similar to general colorectal cancer; however, given the poor prognosis reported in the medical literature, a more aggressive treatment and closer follow-up is recommended when compared to general colorectal cancer. On the other hand, as colorectal carcinosarcoma is an extremely rare entity, prognostic factors and the optimal adjuvant chemotherapy regimen are yet to be determined. Furthermore, suggested prognostic indicators include size, stage, lymphatic or vascular invasion, and histology of the carcinomatous component [29]. On the other hand, adjuvant therapies, chemotherapy (5-fluorouracil, leucovorin, doxorubicin, and cisplatin), and radiation therapy have been attempted, but their effectiveness has not been proven yet [16, 20, 28].

The malignant behavior of colorectal carcinosarcoma is very similar to that of adenocarcinoma with the carcinomatous component showing a strong tendency to metastasize to lymph nodes and distant sites, whereas the sarcoma plays only a very minor role in metastatic spread [33]. Having said this, early diagnosis and appropriate oncologic surgery is the cornerstone of successful outcome.

Conclusion

Colorectal carcinosarcoma is a biphasic tumor, exhibiting epithelial and stromal malignant differentiation. Immunohistochemistry is the gold standard for diagnosis. Due to its rarity, no specific treatment guidelines exist, and its treatment depends solely on the previously described case reports, which suggest treating colorectal carcinosarcoma in a similar fashion to colorectal adenocarcinoma. Further studies and collection of cases are needed to establish proper therapeutic guidelines.

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Statement of Ethics

Written informed consent was obtained from the patient to publish the case as well as all the images.

Conflict of Interest Statement

No conflict of interest by all authors.

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Author Contributions

Melissa Kyriakos Saad wrote the article and did the review of literature. Elias Saikaly wrote the article and did the review of literature. Fatme Ghandour wrote the pathology section and prepared the slides. Fatmeh Ghandour El Hajj wrote the pathology section and prepared the slides. Imad El Hajj reviewed the article and the literature.

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