Case Report

Sarcomatoid Carcinoma of the Transverse Colon With Extremely Aggressive Brain Metastases

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Introduction: Sarcomatoid carcinoma (SC) is a rare subtype of malignant neoplasm with a poor prognosis that involves both carcinomatous and sarcomatous components. Although it may develop in various organs, SC in the large intestine has rarely been reported. It is not rare for patients with SC to have distant metastasis, reflecting its highly aggressive oncologic features, but cases with brain metastasis on initial visit are rare. In this report, we described a case of SC in the transverse colon with brain metastases whose initial symptom was neurological disorder, and reviewed 31 reported cases of SC.

Case presentation: A 70-year-old man was admitted to our hospital with the chief complaints of gait disorder and severe dizziness. Head magnetic resonance imaging revealed tumor masses in the anterior lobe and cerebellum. A large tumor in the transverse colon was detected by colonoscopy and abdominal enhanced computed tomography (CT), and was diagnosed as undifferentiated adenocarcinoma by histology. Laparoscopic extended right hemicolectomy was performed to remove the obstruction, and the resected specimens revealed an invasive tumor consisting of a mixture of carcinomatous and sarcomatous components. According to the immunopathological study, the patient was diagnosed with SC. The clinical course was extremely aggressive, and the patient died on the 28th postoperative day because of disease progression.

Conclusion: To the best of our knowledge, this is the first case of SC in the transverse colon with a neurological disorder derived from brain metastases. This experience may contribute to the guidance regarding proper therapeutic options for SC.

Key words: Sarcomatoid carcinoma – Carcinosarcoma – Brain metastases – Transverse colon

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Sarcomatoid carcinoma (SC) is a rare and highly aggressive tumor with an uncertain histogenesis that contains mixed carcinomatous and sarcomatous components. It is known to occur in various organs, including the head and neck, lung, female genital tract, and gastrointestinal tract. Among the gastrointestinal tract, SC is most commonly found in the esophagus and is rarely observed in the large intestine. To our knowledge, only 31 cases of colorectal SC have been reported in the English literature; however, there have been no reported cases with brain metastasis and neurologic disorders on initial visit. Here, we present a case of SC in the transverse colon with multiple brain metastases that was extremely aggressive and review previous reports in the literature.

Case Report

A 70-year-old man was admitted to our hospital with the chief complaints of gait disorder and severe dizziness. Head magnetic resonance imaging revealed some tumor masses in the anterior lobe and cerebellum (Fig. 1A and 1B), which were suspected to be metastatic lesions. An enhanced computed...
tomography (CT) scan of the abdomen was performed to identify the primary lesion, which revealed a large concentric tumor in the transverse colon with multiple swollen regional lymph nodes (Fig. 1C). Colonoscopy detected a tumor lesion in the transverse colon with severe stenosis, which the scope could not pass through (Fig. 1D). A diagnosis of undifferentiated adenocarcinoma was made from a biopsy of the primary tumor. The serum levels of carcinoembryonic antigen and carbohydrate antigen 19–9 were 5.1 mg/mL and 5000 U/mL, respectively. Based on these findings, the patient was diagnosed with adenocarcinoma of the transverse colon with multiple brain metastases. Laparoscopic extended right hemicolectomy was performed to remove the obstruction. No liver metastasis or peritoneal dissemination was detected during surgery. On macroscopic examination of the resected specimen, the tumor mass was gray and hard with central ulceration (Fig. 2A). In the cross section, tumor invasion to the pericolic tissue and several enlarged regional lymph nodes was observed. The histologic findings revealed that the primary tumor

Table 1 Summary of the immunopathological study

| Antibody         | Source, dilution | AC component | Sarcomatous component |
|------------------|------------------|--------------|-----------------------|
| Cytokeratin (AE/AE3) | DAKO, ×10         | +            | +                     |
| Vimentin         | Roche, RTU       | –            | +                     |
| CEA              | Roche, RTU       | Focally (+)  | –                     |
| c-kit            | DAKO, ×400       | –            | –                     |
| EMA              | Roche, RTU       | +            | Almost (–)            |
| SMA              | Roche, RTU       | –            | +                     |
| Desmin           | Roche, RTU       | –            | –                     |

AC, adenocarcinoma; CEA, carcinoembryonic antigen; EMA, epithelial membrane antigen; RTU, ready-to-use; SMA, smooth muscle actin; +, immunostaining positive; -, immunostaining negative.
was an invasive biphasic tumor with malignant epithelial and malignant mesenchymal components (Table 1, Fig. 2C and 2D). Eighteen of 20 excised lymph nodes were metastatic lymph nodes. Most of these lymph nodes were replaced with spindle-shaped atypical cells. On immunohistochemical study (Fig. 3), most of the carcinomatous area was strongly positive for cytokeratin and epithelial membrane antigen. The sarcomatous spindle cell component of the tumor was largely positive for vimentin and epithelial membrane antigen but negative for desmin, which is a sarcoma marker.

Following surgery, oral intake was started on postoperative day (POD) 2; however, his gait disorder and dizziness were rapidly worsening. His consciousness level also rapidly declined and he finally fell into a coma on POD 14. A head CT on POD 14 demonstrated remarkable enlargement of the cerebellar lesions and progressed hydrocephalus. Ventricular drainage was performed by neurosurgeons to improve the hydrocephalus. The cytology of the cerebrospinal fluid revealed atypical cells, consistent with meningeal dissemination. He died on POD 28 because of disease progression.

Discussion

SC is a rare, highly aggressive neoplasm composed of both carcinomatous and sarcomatous elements, which occurs most commonly in the head and neck or the female genital tract. Among the gastrointestinal tract, its development in the esophagus, stomach, biliary tract, and small intestine was reported in previous studies. Nevertheless, its
development in the colorectal area is rare. Since the first case of colonic SC reported by Weidner and Zekan,\(^7\) most colorectal SC cases have been considered to have an aggressive clinical course, often presenting with signs related to distant metastasis on initial visit.

We reviewed the clinicopathologic features of 31 previously reported cases (Table 2). The ages of the patients ranged from 13 to 86 (median 67) years. Nineteen patients were female and 12 were male. Most cases occurred in the left-side colon (22 patients, 71.0%), including the descending and sigmoid colon and the rectum. Only a single case occurred in the transverse colon other than the present case. SC often spreads to distant organs (20 cases, 64.5%). Metastasis sites in previous reports were liver (10 cases), lung (3 cases), peritoneum (4 cases, including positive cytology), and skin (1 case), whereas only 1 case of brain metastasis in the follow-up period has been reported besides the present study. The median overall survival time (MST) was 6 months, and the 1-year overall survival rate was 45.4%. Patients without distant metastases on initial visit had a significantly better MST than patients with distant metastases (5 months versus 25 months; \(P = 0.0001\)).

We identified an important clinical issue from this case. Once SC metastasizes to the brain, the tumor grows so aggressively that the clinical symptoms, such as gait disturbance, dizziness, and disturbance of consciousness, become worse day by day. Finally, the patient will undergo no further treatments after resection of the primary lesion. Although there are no established guidelines for the treatment of SC because of the rarity of this neoplasm, radical surgery with adjuvant chemotherapy and close follow-up were recommended in some past reports.\(^{15,26,33}\) However, considering the preceding, it

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### Table 2 Previous cases of colon carcinosarcomas reported in the literature

| Author     | Age/Sex | Site     | Metastasis       | Symptom                      | Survival |
|------------|---------|----------|------------------|------------------------------|----------|
| Weidner 1986 | 73/M    | S        | HEP, local in 3.5 y, F/U | Abdominal pain, constipation | 4 y, DOD |
| Chetty 1993  | 72/F    | C        | HEP, on initial visit | Abdominal mass                | 3 mo, DOD |
| Staroz 1995  | 64/M    | D        | Yes (N/D for details) | Diverticulitis                | 3 mo, DOD |
| Roncaroli 1995 | 71/F   | R        | Pelvis, in 2 mo, follow-up | Abdominal pain, diarrhea      | 6 mo, DOD |
| Isimbaldi 1996 | 86/F   | A        | None              | Abdominal pain, constipation  | 2 y, NED |
| Gentile 1997  | 40/F    | C        | Initial (N/D for details) | Constipation                  | 5 mo, DOD |
| Bertram 1997  | 79/F    | A        | HEP, on initial visit | Bloody diarrhea               | 5 mo, DOD |
| Serio 1997    | 69/F    | D        | None              | Melena                        | 6 mo, NED |
| Nakao 1998    | 60/F    | T        | None              | Melena                        | 14 mo, NED |
| Shoji 1998    | 78/M    | D        | None              | Abdominal pain, melena        | 16 mo, NED |
| Takeyoshi 2000 | 82/M   | R        | Skin, on follow-up | Abdominal pain, melena        | 6 mo, DOD |
| Shah 2001     | 57/F    | RS       | HEP, PM, during surgery | Abdominal pain                | 5 mo, DOD |
| Di Vizio 2001 | 56/F    | D        | HEP, on F/U       | Fever                         | 21 mo, DOD |
| Kim JH 2001   | 41/F    | S        | HEP, PUL, brain, on F/U | Melena                        | 4 mo, DOD |
| Aramendi 2003  | 84/M   | S        | None              | Abdominal pain, melena        | 4 d, DOO |
| Ishida H 2003  | 80/F   | RS       | Pelvis, in 5 mo, F/U | Abdominal pain                | 6 mo, DOD |
| Conzo 2003    | 57/F    | D        | HEP, PM, in 5 mo, F/U | Fever                         | 21 mo, DOD |
| Macaigne 2004 | 67/F    | S        | HEP, local, in 2 mo, F/U | Melena, anemia                | 2 mo, DOD |
| Kim N 2005    | 71/M    | A        | On initial visit, (N/D for details) | Abdominal pain | N/D |
| Oztürk 2006   | 65/F    | R        | None              | Abdominal pain, constipation  | 5 y, NED |
| Tsekouras 2006 | 60/M  | R        | HEP, PUL, at 4 mo, F/U | Constipation                  | 6 mo, DOD |
| Ambrosini 2006 | 81/M  | A        | HEP, during surgery | Weight loss, asthenia         | 2 y, NED |
| Lee JK 2008   | 52/F    | R        | None              | Bleeding                      | 8 mo, NED |
| Jeong 2008    | 13/F    | R        | Pelvis, on initial visit | Abdominal pain, fever         | 4 mo, alive |
| Patel 2009    | 43/F    | S        | On initial visit (N/D for details) | N/D                             | 2 mo, NED |
| Mori 2010     | 65/M    | S        | PM, during surgery | Abdominal pain, diarrhea      | 1 y, DOD |
| Shim 2010     | 65/M    | A        | CY, during surgery | Abdominal pain                | 1 mo, DOD |
| Choi 2011     | 59/M    | S        | HEP, on initial visit | Abdominal pain                | 1 mo, DOD |
| Ryu 2012      | 72/F    | C        | None              | Melena                        | 20 mo, NED |
| Kołodziejczak 2013 | 83/M | R        | None              | Bleeding                      | 5 w, DOO |
| Sudlow 2015   | 80/F    | R        | PUL, local, 16 mo, F/U | Bleeding                      | 25 mo, DOD |
| Present case 2016 | 70/M | T        | Brain, on initial visit | Gait disorder, dizziness      | 1 mo, DOD |

A, ascending colon; C, cecum; CY, cytology; D, descending colon; DOD, died of disease; DOO, died of other causes; F, female; F/U, follow-up; HEP, hepatic; M, male; N/D, no data; NED, (alive with) no evidence of disease; PM, peritoneal metastasis; PUL, pulmonary; R, rectum; S, sigmoid colon; T, transverse colon.
may be controversial to prioritize primary lesion resection in patients with brain metastasis. In some cases, treatments such as gamma-knife radiosurgery may be recommended to prevent the progression of neurologic symptoms. Otherwise, there may be no opportunity to undergo further treatments after resection of the primary lesion, as evident in the present case. However, there are limited data to elucidate the optimal treatment strategy for SC with brain metastasis.

To summarize, SC of colorectal cancer with brain metastasis is an extremely rare disease that has a poor prognosis and can result in symptoms such as gait disturbance and dizziness. The patient in our case unfortunately had no chance to receive further treatment. The findings of the present study will contribute to the accumulation of knowledge to guide therapeutic options for SC with brain metastases.

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Author Contributions

TI and YK wrote the manuscript. YT, KM, ST, and KK supervised the study. TG, MY, and SN contributed to the pathologic findings. AN, KK, TH, and AT served as attending physicians of the presented patient. All authors read and approved the final manuscript.

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