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Review Article

Colorectal cancer with venous tumor thrombosis

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Summary Colorectal cancer is seldom accompanied by venous tumor thrombosis, and little is known about the features of venous tumor thrombosis in colorectal cancer. However, some reports show that colorectal cancer patients can develop venous tumor thrombosis and warn clinicians not to overlook this complication. In this report, we perform a review of 43 previously reported cases and investigate the characteristics of colorectal cancer accompanied by venous tumor thrombosis. The histological type of more than half of the cases was moderately differentiated adenocarcinoma, which is known to be aggressive. Among 41 cases with available data on liver metastasis, eight patients had synchronous liver metastasis, and liver metastatic recurrence after surgical resection was indicated in 10 patients. This liver metastatic rate was high compared to general colorectal cancer. However, 11 of 43 patients with venous tumor thrombosis could survive for more than 2 years after the diagnosis, although five of the 11 patients had liver metastasis. A long survival can be anticipated for patients following complete tumor resection and adjuvant chemotherapy. A greater accumulation of cases will help elucidate the characteristics of colorectal cancer with venous tumor thrombosis and improve the treatment strategy.

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1. Introduction

Venous tumor thrombosis occasionally accompanies renal cell carcinoma, adrenal cortical carcinoma, hepatoma, pancreatic carcinoma, gastric carcinoma, Wilms' tumor, and testicular carcinoma^{1–3}; however, colorectal cancer with tumor thrombosis in the portal or superior, inferior mesenteric vein is quite rare.⁴ Sato et al⁵ reported that venous tumor thrombosis was detected in three cases (1.7%) out of 176 patients with advanced colorectal cancer. Regarding renal cell carcinoma, it has a high propensity to invade adjacent renal veins and the inferior vena cava. Renal cell carcinoma is an aggressive neoplasm that causes dissemination to the renal veins and inferior vena cava in 24% and 12% of all cases, respectively, and this venous involvement implies a poor prognosis.^{6,7} Regarding hepatic cell cancers, portal vein tumor thrombosis is a risk factor of a poor prognosis.²

As diagnostic methods, contrast-enhanced computed tomography (CT), magnetic resonance, and ultrasound (US) are useful to detect venous tumor thrombosis.^{7–11} Venous tumor thrombosis may be noted on CT as a low-attenuation area; however, blood clot thrombosis remains to be diagnosed.^{12–15} Recently, the usefulness of positron emission tomography (PET) in detecting venous tumor thrombosis has been shown by intense radiotracer accumulation, which distinguishes thrombosis from blood clots.^{1,16–19}

A few reports have shown that colorectal cancer can develop venous tumor thrombosis and warn not to overlook this complication. Little is known about the causes of venous tumor thrombosis and the characteristics or prognosis of colorectal cancer with venous tumor thrombosis. In this report, we perform a literature review and investigate the characteristics of colorectal cancer accompanied by venous tumor thrombosis.

2. Analysis of the cases

Only 43 cases of venous tumor thrombosis in colorectal cancer patients were found in a search of the pertinent literature, most of which were reported in Japanese literature.^{4,5,12,14,19,20–53} According to the 1997 Annual of Pathological Autopsy Cases in Japan, the incidence of portal vein metastasis in colorectal cancer was reported to be 0.6% (9/1604). The report also revealed that the incidence of liver metastasis from colorectal cancer was 38.1% (611/1604) and showed the rate of portal vein thrombosis to be fairly low.⁵⁴ In 2010, Sato et al⁵ showed in their Japanese report that three cases (1.7%) of 176 patients with advanced colorectal carcinoma were found to have venous tumor thrombosis.

2.1. Clinical data

We identified 43 cases of colorectal cancer with venous tumor thrombosis from international and domestic reports (written in Japanese) from 1992 to 2014. Although colorectal cancer with venous tumor thrombosis remains rare, the number of reports of these cases is increasing because of the development of diagnostic imaging technology. Among 43 patients, there was a slight female

predominance [$n = 24$ (female) vs. $n = 19$ (male)]. Most patients were in their 60s ($n = 16$) or 70s ($n = 15$) (Figure 1), and the median age was 67 years (range, 47–84 years). Regarding the location of the tumor, the ascending colon ($n = 12$) and rectum ($n = 11$) were the most frequent sites, followed by the sigmoid colon ($n = 8$), transverse colon ($n = 6$), and descending colon ($n = 5$) (Figure 2). No cases of cecum cancer with venous tumor thrombosis were reported. The invaded vein was dependent on the tumor site—that is, ascending and transverse colon cancer invaded the superior mesenteric vein ($n = 17$; including the ileocolic vein and right colic vein), whereas descending, sigmoid colon, and rectal cancer invaded the inferior mesenteric vein ($n = 24$). One case with diffuse colon cancer, which spread over the transverse, descending, sigmoid colon, developed tumor thrombosis in the portal vein,²⁸ and one case of rectal cancer that invaded the internal iliac vein was observed.¹⁹ Regarding the frequency of cancer in each part of the colorectum (right hemicolon: 29.5% vs. left hemicolon: 70.5%⁵⁵), the superior mesenteric vein was thus considered to more likely be invaded by tumor thrombosis.

2.2. Pathological type

Interestingly enough, the histological type of more than half of the cases was moderately differentiated adenocarcinoma (Figure 3). In epidemiological studies, the histological types of colorectal cancer are commonly divided into two types: well differentiated (including well and moderately differentiated type) versus poorly differentiated (including poorly differentiated, signet ring cell, and mucinous carcinoma). Previous reports about clinicopathological studies of colorectal cancer revealed that patients with well differentiated tumors have a better prognosis compared to those with poorly differentiated tumors.^{56–58} Poorly differentiated adenocarcinomas of the rectum are considered to behave more aggressively than well or moderately differentiated adenocarcinomas.⁵⁹ However, compared to well differentiated adenocarcinoma, moderately differentiated carcinoma

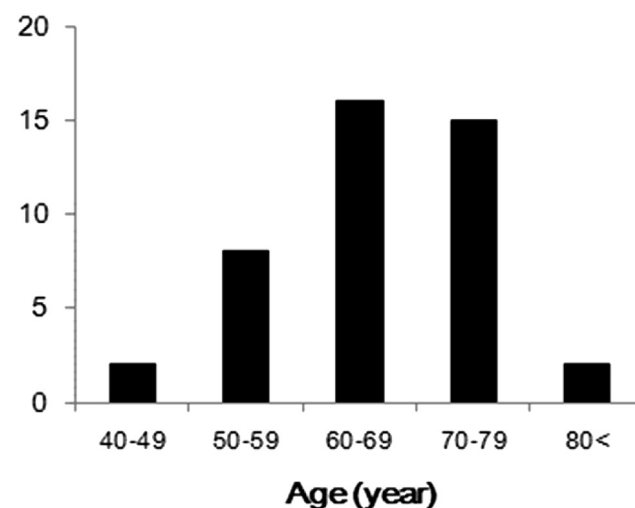


Figure 1 Age distribution of the 43 cases.

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