

Case Report

# Liver Metastasis Originating from Colorectal Cancer with Portal Vein Tumor Thrombosis: a Case Report and Review of the Literature

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**Key Words**

Colorectal cancer;  
Liver metastasis;  
Portal vein tumor thrombosis (PVTT)

**Purpose.** Macroscopic tumor thrombi occupying the main portal branch are rarely seen in patients with liver metastasis and have only been reported in 2.8% of cases. We present a case of liver metastasis from colon cancer with a prominent tumor thrombus in the portal vein.

**Case Report.** A 76-year-old woman underwent a laparoscopic right hemicolectomy for adenocarcinoma of the ascending colon. The postoperative condition was initially satisfactory. Five months after the surgery, the patient was admitted to our hospital due to general fatigue. Magnetic resonance imaging (MRI) showed extensive filling defects over the entire portal vein. No definite metastatic nodules were observed in the liver parenchyma during imaging. The tumor marker levels were increased, and colon cancer with tumor thrombosis within the portal vein was highly suspected. We recommended the patient undergo systemic chemotherapy or surgical intervention; however, she refused. The patient was readmitted to our hospital 3 months later with poor appetite and malaise. Abdominal computed tomography (CT) delineated multiple liver metastases and progression of the tumor thrombosis over the portal vein. Unfortunately, the patient passed away a few weeks later due to sepsis with hepatic failure.

**Conclusions.** There is no consensus on the treatment for colorectal liver metastasis accompanying portal vein tumor thrombosis; a better prognosis may be expected if the tumor can be completely resected en bloc. Multimodality treatments including surgery and adjuvant therapies should be performed to improve the survival rate.

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**P**ortal vein tumor thrombosis (PVTT) is associated with hepatocellular carcinoma (HCC) and is a significant negative prognostic factor. The reported incidence of PVTT ranges between 30% and 70%.<sup>1,2</sup>

In patients with colorectal liver metastasis, macroscopic portal vein thrombosis is rare and has only been reported in 2.8% of cases.<sup>3</sup> Little is known about the exact incidence, characteristics, clinical behavior, or

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prognosis of metastatic PVTT in colorectal cancer.<sup>4</sup> Most reported cases of PVTT in colorectal cancer have had concomitant metastatic nodules in the liver parenchyma, with PVTT that was continuous with the liver nodule.<sup>5</sup> We present a case of liver metastasis in a colon cancer patient with a prominent tumor thrombus in the portal vein along with a literature review.

## Case Report

A 76-year-old woman with a long history of peptic ulcer disease, receiving medication from a local clinic, was admitted to our hospital in February 2013 due to chronic anemia and bowel habit changes for several months. The patient's laboratory data revealed a hemoglobin (Hb) level of 5.8 g/dl and a positive stool test for occult blood. Colonoscopy revealed a circumferential mass in the distal ascending colon near the hepatic flexure. Abdomen computed tomography (CT) disclosed a tumor in the ascending colon with lobular wall thickness and pericolic fat stranding (Fig. 1). Some regional lymph nodes were involved, with a clinical stage of T3N2aM0. No liver metastasis was identified in this CT scan. Tumor marker levels were normal prior to surgery: carcinoembryonic antigen (CEA) 6.6 ng/ml (normal range: 0-3 ng/ml) and carbohydrate antigen 19-9 (CA19-9) 34 IU/ml (normal range: 0-37 IU/ml). The patient underwent a laparoscopic right hemicolectomy (Fig. 2). Pathological

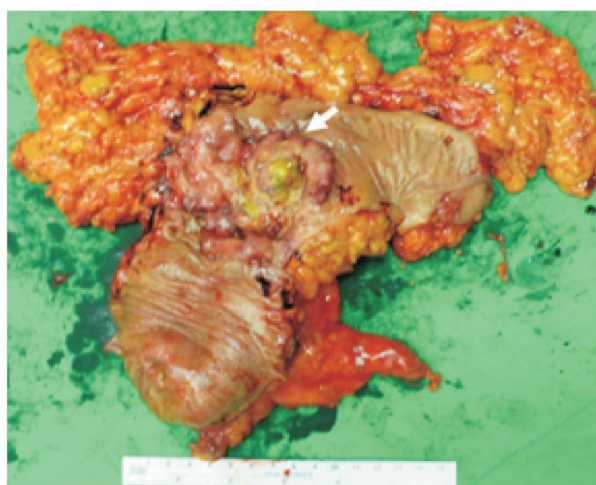
examination of the specimen revealed a moderately differentiated adenocarcinoma with omentum invasion (pT4b) and lymph node metastasis (pN2b, 14/17), lymphovascular invasion (LVI) without perineural invasion, and a cancer stage of IIIC (pT4bN2bM0) according to the American Joint Committee on Cancer (AJCC), 7<sup>th</sup> edition. Following the surgery, the patient refused intravenous systemic adjuvant chemotherapy but instead chose oral capecitabine.

The patient's postoperative condition was initially uneventful. However, in July 2013, five months after the surgery, she was rehospitalized due to general fatigue. Magnetic resonance imaging (MRI) showed extensive filling defects with non-opacification of the entire portal vein (Fig. 3). Conclusive evidence of metastatic nodules was not found in the liver parenchyma. Hepatitis B surface antigen, hepatitis B core antibody, and hepatitis C antibody test results were negative. The  $\alpha$ -fetoprotein level was within the normal range (7.4 ng/ml). However, there were increases in the following tumor marker levels: CEA 46.4 ng/ml and CA19-9 263 IU/ml. Colon cancer with tumor thrombosis in the portal vein was highly suspected. Systemic chemotherapy or surgical intervention was suggested; however, the patient refused and stayed on the capecitabine treatment. She was subsequently discharged and followed up in the outpatient department.

The patient revisited our emergency department in October 2013 due to poor appetite and general malaise. Physical examination revealed icteric sclera,



**Fig. 1.** Abdominal CT scan showed ascending colon cancer, stage: cT3N2aM0 (arrow: tumor site).



**Fig. 2.** The gross specimen (arrow: tumor site).

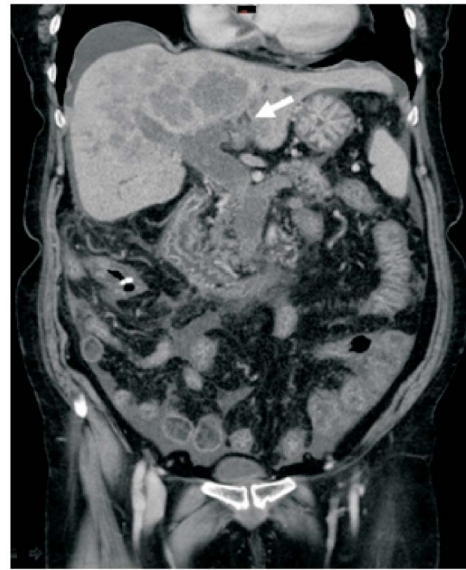


**Fig. 3.** MRI showed extensive bilateral and main portal vein thrombosis with superior mesenteric vein (SMV) and proximal splenic vein involvement.

with a total bilirubin level of 24.21 mg/dl. The tumor marker levels were higher: CEA 176.1 ng/ml and CA19-9 2310 IU/ml. Abdominal CT (Fig. 4) delineated multiple metastases in both lobes of the liver and progression of the PVTT. The patient was under hospice care and passed away a few weeks later due to sepsis with hepatic failure.

## Discussion

We present a rare case of colorectal cancer with liver metastasis in which gross tumor thrombi were identified in the portal vein but with no initial definite metastatic mass in the liver parenchyma. PVTT is commonly associated with HCC and is a significant negative prognostic indicator. Microscopic invasions of the portal vein, hepatic vein, and intrahepatic biliary duct are reportedly present at rates of 22.5%, 7.5%, and 40%, respectively.<sup>6</sup> Colorectal liver metastases are usually accompanied by microscopic tumor invasion into the intrahepatic portal vein in approximately 20% of cases.<sup>7</sup> Our review of previously reported cases revealed few instances of PVTT in the main portal branch, and the incidence of macroscopic tumor thrombi in the trunk of the portal vein has been estimated to be 2.8%.<sup>8</sup> Recent advances in liver surgery have made surgery common for the treatment of liver tumors, especially in cases of metastases from



**Fig. 4.** Abdominal CT showed multiple liver metastases and extensive filling defects with non-opacification of the entire portal vein and its branches.

colorectal carcinomas. The reported overall 5-year survival rate after hepatectomy is approximately 40%.<sup>9</sup>

Even in patients with a macroscopic tumor thrombus in the main branch and/or the trunk of the portal vein originating from colorectal cancer, a better prognosis may be expected if the tumor can be completely resected en bloc.<sup>3,4</sup> In general, resection for liver metastasis is considered adequate if a 1 cm margin around the tumor can be obtained. However, a non-anatomic liver resection would not be adequate in the presence of a portal vein thrombus, as the tumor is likely to spread along the portal vein branches.<sup>7</sup> Therefore, anatomic liver resection is indispensable for curative treatment in macroscopic portal invasion. Because most patients with liver metastasis have normal liver function, they can often tolerate an anatomic major hepatic resection and, consequently, have a good opportunity for cure.<sup>10</sup>

The prognosis of patients with metastasis of colorectal cancer into the liver accompanied by PVTT is relatively favorable after surgery. However, because the possibility of residual tumor cells is high, postoperative adjuvant chemotherapy should be performed when possible. Even for patients who have no indications for surgical intervention, several new drug therapies have recently been introduced that can improve therapeutic outcomes. These therapies include

oxaliplatin + infusional fluorouracil + leucovorin (FOLFOX) and irinotecan + infusional fluorouracil + leucovorin (FOLFIRI), along with various molecularly targeted drugs.<sup>11</sup> In our case, the initial postoperative stage was pT4bN2bM0 stage IIIC. The metastasis rate was high, and adjuvant systemic chemotherapy was suggested. However, our patient chose oral capecitabine. Due to the multiple liver metastases and progression of the PVTT, neither surgery nor systemic chemotherapy was suitable in this situation. Thus, the patient was placed under hospice care and passed away due to sepsis with hepatic failure.

The prognosis for patients with macroscopic portal thrombi is unknown, as little is known about the prognostic significance of portal vein invasion by colorectal liver metastasis.<sup>9</sup> Although there is no consensus treatment for colorectal liver metastasis accompanying PVTT, a better prognosis may be expected if the tumor can be completely resected en bloc. Multimodality treatments, including surgery and adjuvant therapies, should be performed to improve survival rate.

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**病例報告****大腸直腸癌合併門靜脈腫瘤栓塞及肝轉移**林怡成<sup>1</sup> 方川尹<sup>1</sup> 黃允中<sup>1</sup> 戴元昌<sup>2</sup> 謝明芝<sup>3</sup><sup>1</sup>戴德森醫療財團法人嘉義基督教醫院 外科部 大腸直腸外科<sup>2</sup>戴德森醫療財團法人嘉義基督教醫院 病理科<sup>3</sup>戴德森醫療財團法人嘉義基督教醫院 影像醫學科

大腸直腸癌合併肝轉移的患者中，有少數比例會有門靜脈腫瘤栓塞。我們報告一位 76 歲女性患者因升結腸癌接受腹腔鏡右半大腸切除術。術前檢查並無肝轉移情形，術後患者接受口服方式化學治療，在手術後 5 個月追蹤發現有門靜脈腫瘤栓塞情形，可能與大腸癌轉移有關。此時有建議患者更改化療方式或接受手術治療，但患者仍選擇繼續口服化療。於 3 個月後再次檢查，此時除了門靜脈腫瘤栓塞，同時合併多發性肝轉移，而患者也於數週後因肝衰竭死亡。

**關鍵詞** 大腸直腸癌、肝轉移、門靜脈腫瘤栓塞。