

# Recurrent Ascending Colon Cancer Manifesting as Inferior Vena cava Thrombus

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## Key Words

Inferior vena cava · Recurrent colon cancer · Tumor thrombus

## Abstract

We report an extremely rare case of recurrent ascending colon cancer manifesting as inferior vena cava (IVC) thrombus. A 77-year-old woman previously diagnosed with ascending colon cancer underwent right hemicolectomy with lymph node dissection. Though the tumor invaded the retroperitoneum and involved the right ovarian artery and vein, curative operation was performed. The patient took 5-FU p.o. Two and a half years later, tumor thrombus in the IVC extending into the right atrium was incidentally found and diagnosed as recurrence of colon cancer by biopsy. RF-induced hyperthermia using 5-FU and CDDP i.v. was immediately performed, but she died after 6 months because of multiple liver and pulmonary metastases. In treating colon cancers invading the retroperitoneum, it should be recalled that some cases recur as tumor thrombus in the IVC and that close follow-up is therefore necessary.

## Introduction

Renal cell carcinoma invading the inferior vena cava (IVC) is not rare, and treatment has been performed even in cases in whom the tumor thrombus invaded the atrium, though operative procedures sometimes lead to mortality [1–5]. On the other hand, recurrent colon cancer manifesting as IVC thrombus is extremely rare, and only two reported cases of it can be found in the literature [6, 7]. Therefore, the prognosis of such thrombus derived from colon cancer in the IVC and the best treatment of such tumors remain unknown. We present a case of recurrent colon cancer manifesting as IVC thrombus diagnosed by biopsy with an intravenous catheter and treated with RF-induced hyperthermia.

## Case Report

A 77-year-old woman was diagnosed with ascending colon carcinoma and underwent surgery at our hospital in January 2000. The operative procedure was a right colectomy with lymph node dissection. At operation, the tumor was located in the cecum, which had invaded the retroperitoneum (psoas muscle) (T4N1M0), but not the right ureter or common iliac artery. Though serum carcinoembryonic antigen level was elevated to 13.9 ng/ml on admission, it decreased to within normal range (<5.0 ng/ml) after operation. The invasive lesions were removed at the same time, and both the right ovarian artery and vein were ligated and cut ([fig. 1](#)).

The histopathological diagnosis was moderately differentiated adenocarcinoma (G2) (T4N1M0, stage IIIB, Dukes C, V2 [venous invasion grossly evident]) ([fig. 2](#)). Adjuvant chemotherapy was limited to 5'DFUR p.o. as the patient did not want i.v. chemotherapy. The postoperative course was uneventful and no signs of recurrence were detected for two and a half years, although serum carcinoembryonic antigen level gradually increased to 15.0 ng/ml in June 2002. Abdominal CT scan showed tumor thrombus in the IVC. The embolization reached the right atrium at the proximal side and to the level of the lower pole of the right kidney, but no lymph node metastasis or distant metastasis was found ([fig. 3](#)).

Angiography from the right femoral vein revealed cessation of the IVC just proximal to the left renal vein and development of collateral flow of the vertebral veins and collection of it into the left subclavian vein ([fig. 4](#)). Biopsy of the tumor thrombus was performed at the same time, and histopathological findings revealed adenocarcinoma which was compatible with colon cancer ([fig. 5](#)). Therefore the final diagnosis was recurrent colon cancer manifesting as thrombus in the IVC. RF-induced hyperthermia with 5-FU and CDDP i.v. was performed, although multiple liver and pulmonary metastases were detected within 5 months and the patient finally died in another one month.

## Discussion

We report here an asymptomatic patient with an isolated tumor thrombus in the IVC diagnosed two and a half years after right hemicolectomy for ascending colon cancer without lymph node, liver, or lung metastases. Colon cancer can recur anywhere in the body at any time, though recurrence in the IVC without extension to the renal fossa is exceedingly rare. A review of the literature reveals only two previous cases of colon cancer recurrence in the IVC [6, 7].

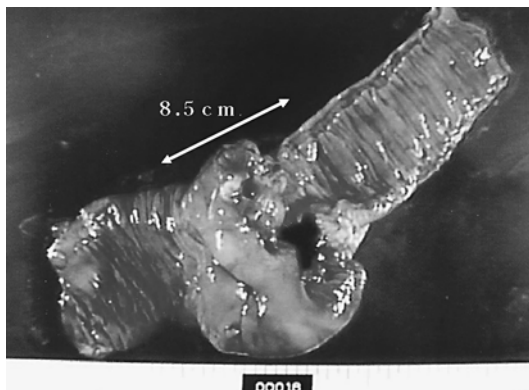
In the case of renal cell carcinoma (RCC), thrombotic extension in the IVC is not rare and occurs in 4–10% of patients with renal cell cancer [8]. Most patients exhibit floating thrombus in the IVC, although some exhibit adherence [9]. When primary RCC with tumor thrombus in the IVC is treated, surgical resection may be recommended even if the thrombus extends above the diaphragm and right atrium [3], since prognosis with treatment is rather good. Operative procedures can be chosen based on evaluation of extension of tumor using modalities such as ultrasound or transesophageal echocardiography [10, 11] in addition to preoperative radiological imaging such as thin-slice CT scanning [12]. Even in cases of recurrent RCC in the IVC, removal of the thrombus is again recommended. Among cases of recurrent RCC in the IVC, asymptomatic slow-growing ones have been reported. However, in cases of recurrent colon cancer such as the present one, no surgical treatment will possibly change the outcome, since the prognosis is poor considering the likelihood of liver metastasis. Moreover, at that time in Japan, no effective chemotherapy menu such as FOLFOX or FOLFIRI was available.

How tumor thrombus extended in the fashion it did in this patient is of interest. When CT scans were examined retrospectively, we found dilatation of the IVC under the level of the right renal vein 2 years and 4 months after operation ([fig. 6](#)). We therefore speculate that recurrent tumor thrombus gradually extended from the stump of the right ovarian

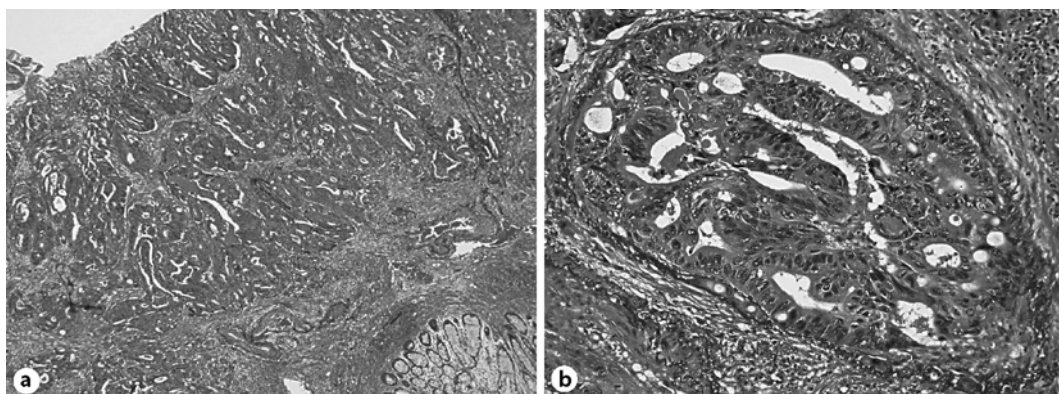
vein to the IVC and further above the diaphragm, as suggested by the fact that invasion of the ovarian vein by RCC has been reported once [13]. Since Parekh et al. [14] pointed out that the clear cell variant of RCC was the most common histological subtype associated with IVC thrombus, tumor biology including histopathological features such as V factor play an important role in outcome. In the present case, at operation, a huge tumor was found to have invaded the retroperitoneum and involved the right ovarian vein, as in the reported case of right RCC invading the right ovarian vein [13].

We note that recurrence in the IVC in the form of thrombus should be considered and checked for by modalities such as thin-slice CT scanning when colon cancer with retroperitoneal invasion or high-grade V factor is followed up after surgery.

**Fig. 1.** Resected specimen reveals type 3 tumor in the cecum, 8.5 cm in diameter, with retroperitoneal invasion.



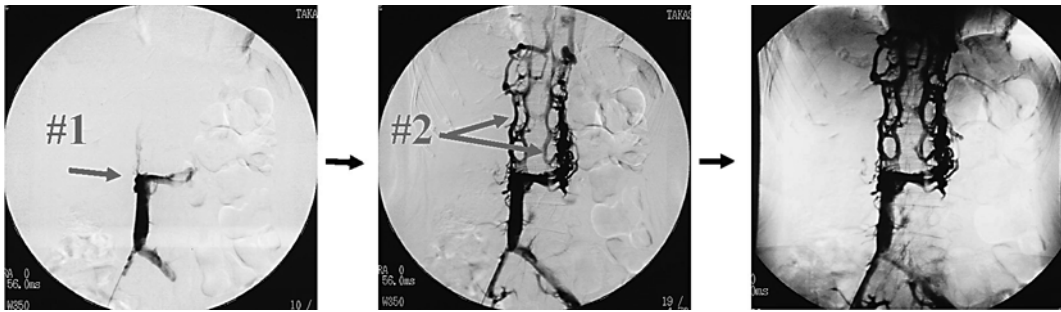
**Fig. 2.** Microscopically, the tumor is a moderately differentiated adenocarcinoma (G2) (T4N1M0, stage IIIB, Dukes C) (a). Remarkable tumor thrombus was detected in microcapillary vessels around the tumor (V2) (b).



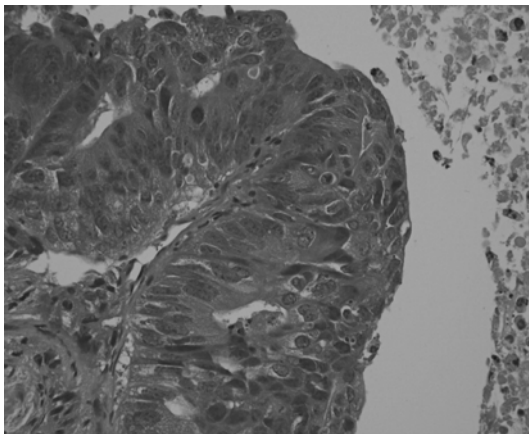
**Fig. 3.** CT scan shows huge tumor thrombus in the IVC. **a** Tumor thrombus extends above the diaphragm. **b** Tumor thrombus is detected in the right hepatic vein. **c** Tumor thrombus extends below the right hepatic vein, involving it.



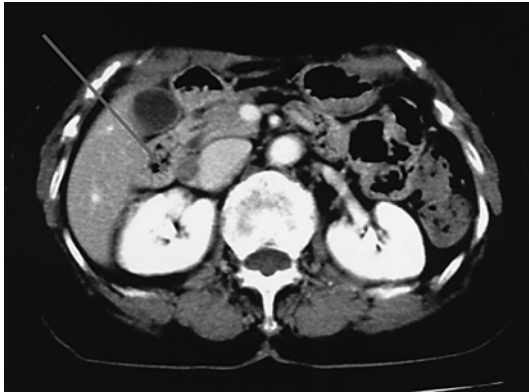
**Fig. 4.** Venography from the right femoral vein shows obstruction of the IVC by tumor thrombus at the level of the left renal vein (arrow #1), with development of collateral veins including vertebral veins (arrows #2).



**Fig. 5.** Biopsy by catheter from the femoral vein revealed adenocarcinoma consistent with the former histopathological findings of ascending colon cancer.



**Fig. 6.** CT scan six months before the biopsy shows a small low-density area beside the IVC suggestive of tumor thrombus in the right ovarian vein (arrow).





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