

Case Report

# Portal Vein Thrombosis after Right Hemicolectomy for Appendiceal Cancer: A Case Report

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**Key Words**

Portal vein thrombosis;

Right hemicolectomy

Although right hemicolectomy is not a difficult procedure, sometimes, portal vein thrombosis can lead to postoperative complications, resulting in significant procedure-related morbidity and mortality. The etiology of portal vein thrombosis is unclear. In this case report, a patient with locally advanced appendiceal cancer underwent right hemicolectomy via the open approach, following which there was an unexpected complication due to portal vein thrombosis. However, the patient made a full recovery after appropriate treatment.

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**R**ight hemicolectomy via the open or laparoscopic approach is usually performed in patients presenting with a proximal transverse colon, ascending colon, or cecal or appendiceal malignancy. Surgical morbidities associated with the procedure can range from minor wound infections to severe sepsis related to anastomosis leakage. Although portal vein thrombosis (PVT) is mostly a complication of cirrhosis, pancreatitis or hepatobiliary malignancy, it may also occur as a postoperative complication of abdominal surgery.<sup>1,2</sup> This case report described a rare case of PVT after open right hemicolectomy for appendiceal cancer with cecal invasion in a hepatitis B-carrier patient without liver cirrhosis.

## Case Report

A 44-year-old man experiencing right lower ab-

dominal pain for weeks with elevated carcinoembryonic antigen elevation was examined at his regular health consultation. His body mass index (BMI) was 27 kg/m<sup>2</sup>. Colonoscopy (Fig. 1) and contrast-enhanced computed tomography (CT) confirmed the presence of an appendiceal tumor (Fig. 2). Next, he underwent radical right hemicolectomy with ileocolic lymph nodes dissection by laparotomy. The operation time was 170 minutes and total blood loss was 50 ml. The pathology examination revealed appendiceal adenocarcinoma with cecal invasion without lymph node involvement. The patient was discharged 10 days after the operation with an uncomplicated recovery course.

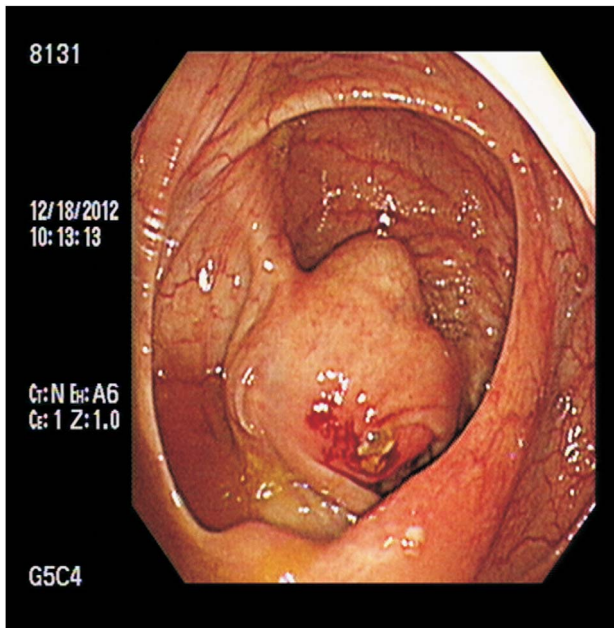
However, approximately 1 week after discharge, he started experiencing right abdominal pain that continued for 2 days. The patient visited the hospital again where physical examination revealed soft abdomen without muscle guarding. No fever was noted. Abdominal imaging revealed some fecal material and

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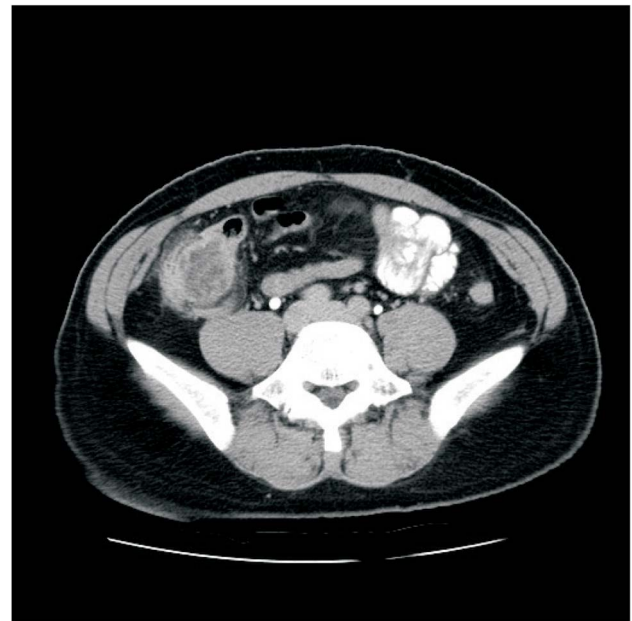
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**Fig. 1.** Bulging mass around the orifice of the appendix.



**Fig. 2.** Thickened appendix and cecal wall.

bowel gas without dilated bowel lumen. The blood tests indicated a normal white blood cell count and liver function with GOT 18 U/L, GPT 25 U/L and total Bilirubin 0.93 mg/dl. Ileus was suspected, for which he was hospitalized and treated with intravenous fluid replacement with no oral intake.

A CT scan of the abdomen was arranged 2 days later due to persistent symptoms without improvement. The results revealed total thrombosis of the main portal vein (Fig. 3) after comparing preoperative CT scan (Fig. 4). However, antithrombin-C, protein-S and protein-C levels were normal. Heparization was chosen as treatment after consultation with cardiovascular doctor, who was concerned about possible side effects of the thrombolytic agent (streptokinase or urokinase) used during the recent abdominal surgery. The treatment procedure was also explained to the patient. We considered an international normalized ratio (INR) of 1.5-2.0 as the normal range for activated partial thromboplastin time (APTT). Symptoms improved after 4 days of treatment, followed by oral warfarin. Finally, after 6 days of treatment, the patient was discharged and prescribed continued use of oral warfarin.

The symptom did not recur thereafter. A CT scan of the abdomen was performed at the 3-month follow-up. The imaging study showed decreased PVT

but increased collateral circulation and cavernous transformation (Fig. 5). Warfarin was discontinued after use for 20 months. The patient also completed postoperative adjuvant chemotherapy using a 5-fluorouracil based regimen. He also underwent regular follow-up for 5 years and no abdominal symptoms or tumor recurrence were found. However, he began to suffer liver cirrhosis 4 years after operation without complication of portal hypertension.

## Discussion

PVT is rarely encountered after abdominal surgery. It accounts for 5-15% of all mesenteric vascular events.<sup>1,3</sup> The incidence of postoperative portomesenteric venous thrombosis (PMVT) after major colorectal resection has been reported to range from 2.8 to 9.0%.<sup>11,12</sup> Its clinical presentation can widely ranges from asymptomatic incidental findings to potentially lethal bowel infarction.<sup>4</sup> Importantly, this condition can also occur without any inciting factors, and even in spite of venous thromboembolism prophylaxis with low molecular weight heparin.<sup>3</sup>

Right hemicolectomy is usually performed for lesions involving the right side of the colon, appendix



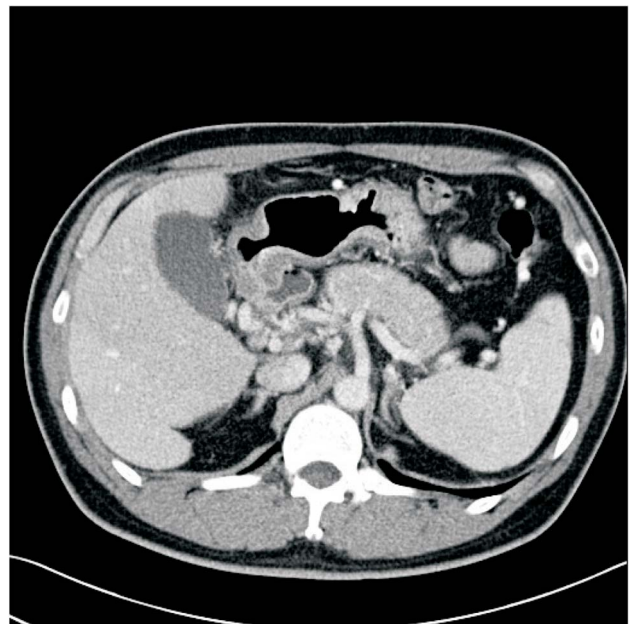
**Fig. 3.** Main portal vein thrombosis.



**Fig. 4.** No portal vein thrombosis before operation.

and terminal ileum. Its overall complication rate is low with anastomosis leakage as the most commonly reported event. The risk of PVT after colectomy may be due to ligation of the ileocolic vessels, mobilization of the small bowel intestinal mesentery from the posterior abdominal wall, tension on the mesenteric vessels at the time of bowel loop anastomosis, and direct trauma to the portal vein.<sup>5,6</sup> Inflammatory disease and coagulopathy have been recommended for PVT. A study by Robinson et al. suggested BMI > 30 kg/m<sup>2</sup>, thrombocytosis, and restorative proctectomy were significant predictors of PMVT.<sup>11</sup> Another study by Manigrasso et al. revealed operative time was significantly higher in patients with PMVT after surgery by comparing 2 to 4 hours.<sup>12</sup> However, none of these problems occurred in our patient.

Clinical signs and symptoms of PVT manifests after an average of 14-15 days post surgery.<sup>2</sup> Symptoms include fever, diffuse abdominal pain, peritonitis, severe hypotension, or excessive pain during regular physical examination. The patient may also be asymptomatic. Laboratory tests such as complete blood count (CBC) or liver functions tests may be abnormal but these findings are usually not helpful.<sup>2</sup> A CT scan has been shown to have sensitivity as high as 90% in diagnosing PVT.<sup>3,4,7</sup> Invasive angiography is the gold stan-



**Fig. 5.** Collateral circulation around the previous portal vein thrombosis area.

dard test for diagnosis, with sensitivity and specificity reaching nearly 100%.<sup>8</sup> Our patient was experiencing abdominal pain with normal CBC and liver function. The PVT was diagnosed approximately 18 days after operation using CT.

Since PVT is rare condition, standardized treat-

ment and management protocols have not been established. Most patients are treated with 6 to 12 months of anticoagulation therapy using a heparin-to-oral anticoagulation bridge.<sup>2</sup> Another study<sup>9</sup> recommended anticoagulation therapy for approximately 6 months in acute PVT with recanalization in at least 69% of patients if therapy was started within the first week after diagnosis and complete recanalization in 50% of patients. A study by Naymagon et al. suggested heparin protocol is 80 u/kg bolus followed by 18 u/kg/hr, titrated to target APTT range of 60-85 seconds and three months of anticoagulation including oral form appeared to be sufficient for many patients.<sup>13</sup>

However, anticoagulation fails in approximately 10% of patients.<sup>9</sup> Some patients have been shown to fail oral or intravenous anticoagulation requiring tissue plasminogen activator catheter infusion for successful management and restoration of blood flow to the portal system.<sup>2</sup> A study by Hollingshead et al. showed that transcatheter thrombolysis can be an effective treatment for PVT in patients not responsive to medical therapy.<sup>10</sup> However, this procedure has an intrinsic risk of complications and should be reserved for patients with severe, symptomatic PVT.<sup>10</sup> Our patient improved showing no symptoms after anticoagulation therapy and continued usage of warfarin for 20 months. The treatment was prolonged due to the patient's fear of recurrence and the attending surgeon's lack of experience in treating this condition.

In conclusion, persistent postoperative abdominal pain after conservative treatment for ileus can be indicative of a rare etiology. In such cases, a CT scan of the abdomen with enhancement is a quick and safe diagnostic examination, if no contraindications are present. Once symptomatic PVT is diagnosed, anticoagulation therapy should be started as soon as possible.

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病例報告

## 盲腸癌術後併發肝門靜脈栓塞之病例報告

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右側大腸切除手術是常施行之大腸直腸手術之一。偶而有輕微傷口感染及吻合處癒合不良併發症。

在此提出一病例，在右側大腸切除手術後，產生因肝門靜脈栓塞引起腹痛併發症。經適當抗凝劑治療後，順利出院之病例報告。

**關鍵詞** 肝門靜脈栓塞、右側大腸切除手術。