

## From the Clinic

### Combined pulmonary venous thromboembolism and renal artery thrombosis in a patient with non-small cell lung cancer

#### Introduction

The incidence of clinically significant thrombosis in a cancer patient varies from 5 to 60%. Venous thrombosis remains more common than arterial thrombosis, and combined arterial and venous thrombosis in cancer patients is rare [1]. We report a rare case of combined pulmonary thromboembolism and complete thrombotic occlusion of the renal artery in a patient with non-small cell lung cancer (NSCLC) while receiving chemotherapy.

#### Case summary

A 70-year-old female with Stage 4 NSCLC receiving chemotherapy up to 1 week previously presented to the emergency room (ER) with generalized weakness, fatigue, decreased oral intake, diarrhea and generalized body pain for the previous 3 weeks. She denied severe abdominal pain or flank pain. She also has a known history of chronic kidney disease (CKD) with creatinine 114.92  $\mu\text{mol/L}$  (1.3 mg/dL), hypertension and coronary artery disease. She looked markedly dehydrated and malnourished. She had tachycardia, with a heart rate of 120/min and blood pressure of 100/70 mmHg. She did not have abdominal or flank tenderness.

Initial laboratory workup revealed BUN 10.26 mmol/L (29 mg/dL) and creatinine 171.68  $\mu\text{mol/L}$  (1.94 mg/dL). Urine analysis showed a large amount of blood and 1+ protein without cast.

In the ER she was given normal saline at 100 mL/h and was admitted to the hospital for rehydration and further fluid and electrolyte management. She developed hypotension with a systolic blood pressure (SBP) 60 mmHg; the heart rate was 150/min and associated with mild shortness of breath. Chest X-ray revealed widening of the mediastinum. A computerized tomogram (CT) angiogram of the chest and abdomen with intravenous contrast was done to rule out aortic dissection. She was resuscitated with 5 L of normal saline. Sinus tachycardia and blood pressure stabilized. There was no evidence of aortic dissection on CT scan; however, it showed pulmonary emboli in both the left upper and lower lobes, focal areas of thrombus throughout the entire abdominal aorta, thrombus in the abdominal aorta at the level of right renal artery, complete thrombotic occlusion of the right renal artery and complete thrombotic occlusion of the inferior mesenteric artery. The right kidney showed a marked decrease in functional nephrogram (Figure 1). The size of the right kidney was 9 cm and left kidney 11.2 cm. A heparin drip was started. Vascular surgery was consulted for possible renal artery thrombectomy. Conservative management with heparin was advised because of her comorbid conditions.

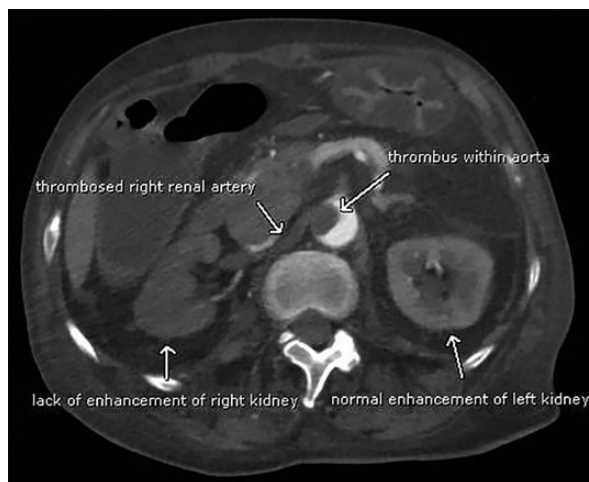


Fig. 1. Axial CT angiogram of the aorta reveals complete thrombotic occlusion of the right renal artery.

From this point onward her condition deteriorated. She developed oliguria and then eventually anuria. Creatinine gradually increased to 251.33  $\mu\text{mol/L}$  (2.84 mg/dL). Differential diagnosis of acute kidney injury (AKI) included contrast-induced nephropathy, renal hypoperfusion secondary to hypotension. Thrombotic complete occlusion of the right renal artery also may have contributed to AKI since she had CKD and poor renal reserve due to age. Repeat urinalysis revealed a large number of red blood cells. Most likely she had a right renal infarct. She did not complain of severe flank pain; hence the exact time of the right renal infarct could not be ascertained. It is likely that she had a renal infarction prior to this hospitalization. She developed uremic symptoms such as confusion and vomiting. Comfort care was advised.

#### Discussion

Cancer activates coagulation systems through multiple mechanisms leading to the development of prothrombotic states. Cancer can also cause disseminated intravascular coagulation (DIC) which may lead to serious hemorrhagic complications. Patients having a central venous catheter, receiving chemotherapy and undergoing surgical treatment are at increased risk of vascular thrombosis. Inflammation, type and stage of cancer play a significant role in the development of thrombosis [1].

Amer *et al.* conducted a retrospective review of 1874 cancer patients between 2005 and 2012. He observed that 12.3% of patients developed venous thrombosis, 1.5% developed arterial thrombosis and only 0.6% developed combined arterial and venous thrombosis. Median survival of patients after the diagnosis of venous thrombosis was only 16.7 months. None of the patients in this study had renal artery thrombosis [2]. Saphner *et al.* [3] showed that the incidence of arterial thrombosis was 0.9% in breast cancer

patients receiving adjuvant chemotherapy and none of these patients had renal artery thrombosis.

Pyelonephritis, renal stones and other causes of acute abdomen should be initially excluded by non-contrast spiral CT of the abdomen. Modes of diagnosis vary in their sensitivity. Contrast CT of the abdomen is 80%, renal isotope scan 97%, angiography 100% and renal ultrasound 11%. Elevation of LDH occurs in almost all patients with renal infarction [4].

Therapy of renal artery thrombosis in the cancer patients should be individualized, keeping in mind the overall therapeutic goal based on the prognosis of cancer. Patients should be treated with heparin infusion if they are not actively bleeding and are not at an extremely high risk of bleeding [1]. Percutaneous endovascular procedures should be considered in large infarction of the kidney. Percutaneous rheolytic thrombectomy can be used as a minimally invasive procedure [5].

*Conflict of interest statement.* None declared.

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