Superior sagittal sinus thrombosis as the initial presentation of renal cell carcinoma

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We describe a 68-year-old man who presented with headaches, nausea, and dizziness and was found to have a superior sagittal sinus venous thrombosis on magnetic resonance imaging. His initial hypercoagulable workup was negative. Computed tomography of the abdomen revealed a large mass originating from the kidney. A radical nephrectomy was performed at an outside hospital, and histological study of the excised mass disclosed clear cell renal carcinoma.

Venous thrombosis in the setting of malignancy is a well-known phenomenon explained by multiple factors that lead to a hypercoagulable state. Thrombotic events are potentially dangerous complications of cancer and can be fatal. We describe a patient who was diagnosed with renal cell carcinoma (RCC) after the initial survey revealed a superior sagittal sinus thrombosis.

CASE DESCRIPTION

A 68-year-old white man with a previous history of hypertension presented to the emergency department with a 6-week history of progressively worsening frontal headache. Magnetic resonance imaging (*Figure 1a*) at an outside imaging center disclosed a superior sagittal sinus thrombus. He also had recent dizziness, nausea, and headache, all worsened by lying down. A screening colonoscopy 1 year earlier had revealed polyps, which were excised. He had also had recent unspecified outpatient dental sinus surgery. He denied a personal or family history of hypercoagulable disorders. The patient was afebrile, normotensive, and displayed no focal or neurological deficits on physical examination when admitted.

The patient was started on hydrocodone for headache and a heparin drip. Initial laboratory results, including complete blood count, comprehensive metabolic panel, and urinalysis, were within normal limits. A hypercoagulable workup that included lupus anticoagulant, factor V Leiden, prothrombin G20210A mutation, homocysteine, protein C and S deficiency, and antithrombin III deficiency were negative. An evaluation for the *JAK2* mutation and paroxysmal nocturnal hemoglobinuria were also negative. Cerebral angiography (*Figure 1b*) 2 days after admission revealed a partially occlusive thrombus

within the middle third of the superior sagittal sinus. Computed tomography of the abdomen (*Figure 1c*) demonstrated a 10 × 8.6 cm large necrotic mass emanating from the posterior aspect of the left kidney. The renal vein appeared patent with no lymphadenopathy within the retroperitoneum or other organ involvement. A radical nephrectomy was performed at an outside hospital, and the patient was transitioned to low-molecular-weight heparin. Histological study of the excised kidney disclosed clear cell renal carcinoma.

DISCUSSION

Venous thromboses are found in up to 10% of patients with cancer, with varying rates of occurrence based on tumor type and location (1). Venous thromboembolism is nearly seven times more likely to occur in certain cohorts of cancer patients and acts as a potential cause of mortality (1, 2). The pathogenesis of the hypercoagulable state of malignancy involves multiple factors (3). Tissue factor expression by tumor cells has been implicated as a cause of hypercoagulability due to its role in the extrinsic pathway of coagulation (3, 4). Normal host cell tissue response to tumor cells can also induce procoagulant activity by the effect of tumor necrosis factor stimulation on monocytes, platelets, and endothelial cells (3). The presence of a venous thrombosis can have diagnostic implications in patients with previously undiagnosed malignancy.

Many patients with RCC are asymptomatic at diagnosis and the cancer is discovered incidentally on imaging (5). Studies have shown that only 9% of patients present with the classic triad of RCC (flank pain, palpable renal mass, hematuria), with hematuria being the most common presenting symptom (50%–60% of patients) (6). Secondary symptoms of malignancy, including anemia, cachexia, venous thrombosis, and hepatic dysfunction, may provide the only clues of an underlying

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Figure 1. (a) Unenhanced Sagittal T1-weighted MRI showing altered signal and widening of the superior sagittal sinus in keeping with a partially occlusive thrombus (arrow). (b) Anteroposterior digital subtraction catheter angiographic image reveals a partially occlusive thrombus with diminished venous contrast opacity (arrows). (c) Contrast enhanced CT of the abdomen demonstrates a large heterogeneously enhancing mass (10.0 × 8.6 cm) centered in the posterior aspect of the left kidney (arrows).

malignancy. Hematologic and electrolyte abnormalities may also present as nonspecific signs in patients with RCC via paraneoplastic mechanisms that include but are not limited to hypercalcemia, anemia, amyloidosis, hepatic dysfunction, and anemia (6, 7). In the setting of undiagnosed cancer, seemingly unrelated symptomatology may point to a malignancy when all other diagnostics are negative.

This initial presentation of undiagnosed malignancy demonstrates the diverse manifestations of cancer. Hypercoagulability in cancer can range from abnormal coagulation studies to clinically evident venous thromboembolism (3). Thromboses to the superior vena cava and internal jugular vein have been reported in patients with metastatic RCC (8, 9). There have been no reported cases of superior sagittal sinus thrombosis in the setting of nonmetastatic RCC.

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