

Case Report

An Invasive Tumor Thrombus from Renal Cell Carcinoma in the Right Heart: Case Report

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Abstract

Renal cell carcinoma (RCC) with metastatic tumor thrombus and cardiac involvement is rare, with only a few patients reported to date. Even more rare is extension into the right ventricle. This report describes a patient with the longest documented tumor thrombus in the inferior vena cava reported to date and the clinical course and outcome of this patient.

Keywords: Intracardiac tumor thrombus; Renal cell carcinoma; Transthoracic echocardiogram; Mayo clinic RCC tumor thrombus classification system

Introduction

Renal Cell Carcinoma (RCC) is the most common neoplasm of the kidneys worldwide with an estimated 403,000 people per year diagnosed with these tumors, making it the seventh most common malignancy in the developed world [1]. RCC affects males more than females and is also highly prevalent in patients of Hispanic or Native American heritage. RCC most commonly metastasizes to the lungs, lymph nodes, bones, liver, adrenal glands, and brain, but rarely metastasizes to the heart [2]. Although rare, RCC has tumor thrombi, defined as tumor extensions into a blood vessel. According to the Mayo Clinic RCC tumor thrombus classification system [3], thrombi classified as level 0 are limited to renal veins or its tributaries; those classified as level 1 involve extension into the Inferior Vena Cava (IVC) but are <2 cm above the orifice of the renal vein; level 2 thrombi involve extensions above the orifice of the renal vein but below the orifice of the hepatic veins; level 3 are associated with extensions above the hepatic veins, but do not cross the diaphragm; and level 4 include any extensions above the diaphragm. This case report describes a patient with a newly diagnosed RCC and a level 4 IVC thrombus with extension into the right atrium and right ventricle, a finding previously reported in very few patients. To date, the longest documented IVC tumor thrombus was 11.5 cm in length. The IVC

tumor thrombus in the current patient was 13 cm long, making it the longest reported IVC tumor thrombus to date [4].

Case Presentation

A 71-year-old woman with a prior medical history that included trigeminal neuralgia and hypertension was initially admitted to the hospital for a left open radical nephrectomy. Prior to admission, a Computerized Tomography (CT) scan of the chest, abdomen, and pelvis showed a left renal mass measuring 9.8 cm, suggesting RCC. A few months prior the patient presented to a cardiologist in Mexico for palpitations. A transthoracic echocardiogram (TTE) showed a pedunculated right atrial (RA) mass extending to the right ventricle (RV) measuring 10.2 cm in length. At that time, a CT scan of the chest, abdomen, and pelvis showed a left renal mass. The patient presented to our emergency department for further workup. On admission, she was hemodynamically stable and laboratory test results were within normal limits. Physical examination showed a systolic murmur and a loud “plop” heart sound. Cardiac Magnetic Resonance Imaging (MRI) showed a mass crossing between the RV and RA with thrombus extension into the IVC. A coronary angiogram prior to surgery showed normal coronary blood vessels. She then underwent successful left nephrectomy and removal of the cardiac mass with resection of a portion of the IVC that was involved with the mass. Pathologic examination showed that the cardiac mass was positive for clear cell carcinoma, with the portion invading the IVC identified as a thrombus. Following surgery, the patient was monitored in the intensive care unit. Unfortunately, she developed cardiogenic shock with renal failure and passed away 2 days after surgery from cardiac arrest (Figures 1 and 2).

Discussion

Tumor thrombi involving the IVC and resulting from metastatic RCC are uncommon [5,6]. Classification systems have sought to determine the involvement and extent of the tumor thrombus. Cardiac metastases can present with different signs and symptoms, including tachycardia, arrhythmia, cardiomegaly, heart failure, dyspnea, hypotension and pulsus paradoxus. Tumor thrombi from RCC involving the IVC and heart are typically evaluated by CT imaging and echocardiography, with the CT results used to guide the surgeons in the removal of the thrombi [7]. Tumor thrombi with a higher level on the Mayo Clinic RCC tumor thrombus classification

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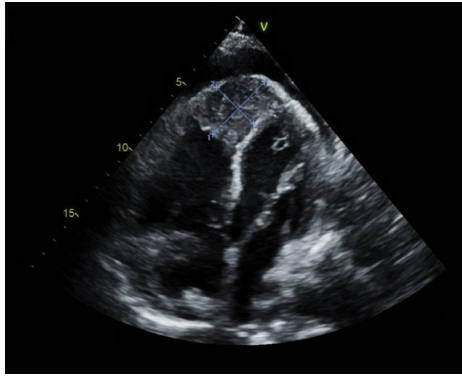


Figure 1: Four chamber TTE view showing the cardiac mass in the right ventricle.



Figure 2: Photograph showing the removed tumor thrombus.

system is more difficult to remove [8,9]. The tumor thrombus in the present patient was the longest reported to date. This resulted in a more difficult surgical treatment plan, which ultimately led to complications from which the patient died.

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