Penoscrotal lymphedema associated with metastatic renal cell carcinoma

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A 64-year-old male presented with lower back pain, radiating in a sciatic-type distribution, swelling in his lower abdomen and right leg, and edema of the scrotum and penile shaft. A sonogram and CT imaging indicated an enhancing mass in the right kidney and a spinal metastasis. The right lower extremity and penoscrotal lymphedema was caused by lymphatic obstruction due to a sacral metastasis of renal cell carcinoma. He was treated with cytoreductive nephrectomy, radiation and a systemic tyrosine kinase inhibitor. Pelvic imaging is suggested to determine whether malignant lymphatic obstruction is present when presented with idiopathic penoscrotal edema.

Key Words: penoscrotal lymphedema, metastatic renal cell carcinoma, lymphatic obstruction

Introduction

Abnormal accumulation of lymphatic fluid in subcutaneous tissue, often as a consequence of an obstruction in the lymphatic drainage system, can result in lymphedema of the penis and scrotum.[1,2] Although uncommon, lymphatic obstruction and subsequent lymphedema can occur as a result of tumor growth.[3] In some cases, lymphedema may be the initial or only presenting sign of an as yet undiagnosed malignancy.

Renal cancer remains one of the most prevalent malignancies in the United States and is associated with significant morbidity and mortality. Renal cell carcinoma (RCC) can metastasize via the blood supply or lymphatic chain and deposit at proximal or distant sites including the intestine, brain, and lymph nodes.[4] The complex lymphatic drainage system of the kidney makes this metastatic pathway relatively unpredictable and, as such, RCC has been associated with rare metastatic sites and atypical presenting symptoms from disseminated disease and distant metastatic sites.[4]

The classical clinical presentation of renal cell carcinoma (RCC) is a triad of gross hematuria, a flank mass, and flank pain. More recently, however, the frequent use of modern imaging techniques has translated into an increased rate of RCC diagnosed as an incidental finding on abdominal imaging.[5] While a significant proportion of RCC patients present with symptoms associated with the primary tumor, approximately 48%-66% of patients are asymptomatic at the time of diagnosis.[5]

Here we report on the unusual case of a patient that initially presented with penoscrotal and lower extremity lymphedema and associated urinary symptoms. Subsequent imaging studies revealed a large, right renal cell carcinoma with a bony metastatic lesion to the right sacrum causing lymphatic obstruction and subsequent penoscrotal lymphedema.

This case illustrates that malignancies, such as RCC, should be actively considered as a primary causative factor when presented with a patient with penoscrotal edema.

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Figure 1. Penoscrotal lymphedema in a 64-year-old man with metastatic renal cell carcinoma.

Case report

A 64-year-old Caucasian man presented to the emergency department with swelling in his lower abdomen, right leg, penis, and scrotum. The patient developed radiating pain from the lower back to the right lower extremity in a sciatic-type distribution.

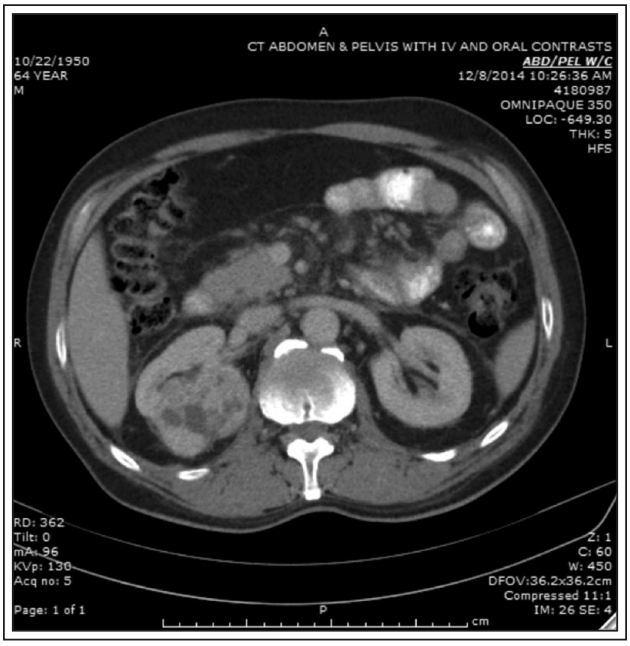

Figure 2. CT demonstrating a large, heterogeneous, enhancing right renal mass.

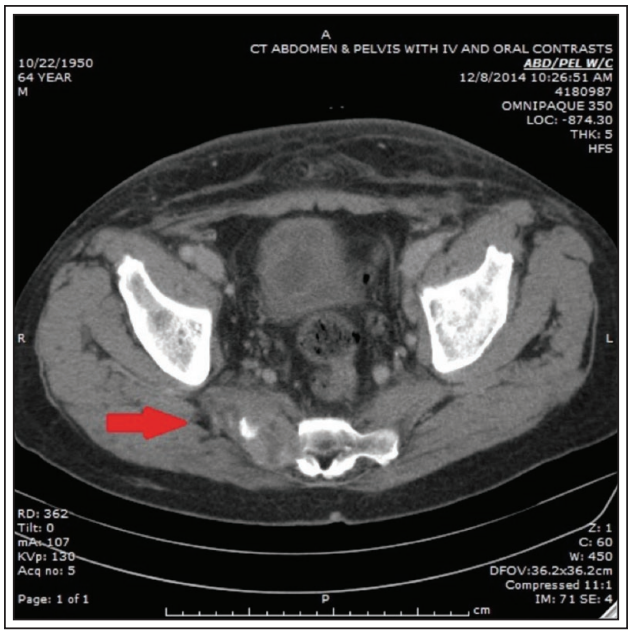

Figure 3. Sacral metastasis of renal cell carcinoma, thought to be compressing pelvic lymphatics, resulting in penoscrotal and right lower extremity lymphedema.

He denied any recent travel history. Blood chemistry, urinalysis, and scrotal ultrasound were unremarkable, and the absence of a deep vein thrombosis was confirmed following a lower extremity venous duplex. It was initially thought that his symptoms were the result of an allergic response to an antihypertensive agent that he had recently been prescribed. However, this possibility was eliminated as the patient's symptoms persisted when he discontinued the new drug.

A thorough physical examination revealed non-pitting edema to the scrotum and penile shaft causing marked deformity of the penis, Figure 1. The skin was grossly intact and not tender, and there were no visible signs of infection. However, his right lower extremity was also edematous.

The patient was found to have urinary retention, which subsequently prompted a sonogram of the kidneys and bladder. This revealed the presence of a large, solid right renal tumor. Additional CT imaging determined the presence of a 6.7 cm heterogeneous, enhancing mass in the mid-pole of the right kidney, Figure 2, and a 4.5 cm enhancing lytic lesion of the lateral aspect of the S4 vertebral body, consistent with a spinal metastasis, Figure 3. Retroperitoneal adenopathy, with the largest node measuring 1.7 cm, and a small pleural nodule were also present on metastatic work up. Repeat laboratory assessment revealed a serum creatinine of 1.2 and serum calcium of

9.6. Hemoglobin, liver function tests, LDH, and serum electrolytes were otherwise within normal limits. The patient had excellent performance status.

After risk stratification, a cytoreductive nephrectomy was performed. Pathologic examination revealed Fuhrmann Grade IV clear cell carcinoma with a large dedifferentiated/high grade unclassified component, tumor necrosis, and extensive lymphatic invasion. Post-surgical palliative radiotherapy was administered to the sacral metastasis. At 2 months follow up, the patient had improvement in his pain and lymphedema. The patient is now undergoing systemic therapy with pazopanib for his metastatic disease.

Discussion

The American Cancer Society estimates that in 2015, an estimated 61,560 new cases of kidney cancer will be diagnosed and 14,080 patients will die of the disease in the United States.[6] Of these, approximately 15%-25% of patients will have metastatic disease at the time of initial presentation.[7,8]

The classic presentation of renal cell carcinoma is flank pain, hematuria, and a palpable abdominal mass. However, this triad of symptoms is rarely observed in the modern era of routine abdominal imaging, with 48%-66% of renal masses discovered incidentally following imaging studies in asymptomatic patients.[5] Nonetheless, a large proportion of patients still present with symptoms due to local or regional effects of disease. This type of symptomatic presentation has been shown to be a predictor of more severe disease stage, as well as an independent predictor of shorter disease-specific survival.[7,9] In these symptomatic patients, the most common presenting complaints are gross hematuria (47%), flank pain (21%), weight loss (3%), abdominal mass, bone pain or fracture, paraneoplastic symptoms, or varicocele.

Lymphedema is the accumulation of interstitial fluid in connective tissue due to abnormalities of lymphatic drainage, and can be classified as primary lymphedema, due to congenital abnormalities of the lymphatic system, or secondary lymphedema resulting from acquired obstruction of lymphatic channels. The specific symptomatology resulting from fluid collection depends upon which organ is affected. In the case of penoscrotal lymphedema, patients may experience discomfort, cosmetic differences, sexual dysfunction, and voiding complaints. Causes of secondary penoscrotal lymphedema include radiation, surgery, tumors, trauma or roundworm infections (e.g. filariasis).[10]

Blockage of the lymphatic system by tumor growth can also cause upstream lymphedema in the tissues or organs drained by that lymphatic distribution. In the case of the penis and scrotum, lymphatic drainage is achieved via the superficial chain of the inguinoscrotal region. The deep lymphatic chain is responsible for drainage of the testes and penile body, and flows into deep inguinal and pelvic lymph nodes.

Here we report the unusual case of a 64-year-old man who presented with penoscrotal lymphedema that was due to a downstream effect of metastatic renal cell carcinoma. Downstream obstruction of sacral and pelvic lymphatics, which drain superficial nodes, resulted in the right lower extremity and penoscrotal edema. This case highlights that malignant obstruction, by renal cell carcinoma or other malignancies, should be considered as a causative factor when evaluating patients with penoscrotal edema. When another cause is not readily identifiable, pelvic imaging is recommended to determine whether malignant lymphatic obstruction is present. □

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