Spontaneous resolution of inflammatory myofibroblastic tumor of the kidney

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Inflammatory myofibroblastic tumor (IMT) of the kidney is a rare and benign condition often confused with renal malignancy based on clinical presentation and radiologic evaluation that has commonly been treated with nephrectomy. Utilizing renal mass biopsy to help diagnose and guide therapeutic intervention is increasing but has not been universally adopted to this point. We present a case of an incidentally found atypical renal mass in a 71-year-old female diagnosed as inflammatory myofibroblastic tumor of the kidney after core needle biopsy. This tumor was managed conservatively without surgical intervention and resolved spontaneously.

Key Words: inflammatory myofibroblastic tumor, inflammatory pseudotumor, kidney, renal mass biopsy

Introduction

Inflammatory myofibroblastic (IMT) is a rare and benign condition that has commonly been found to involve the lungs but may occur elsewhere. Genitourinary involvement has been reported with the urinary bladder being the most common location.[1] IMT of the kidney is exceedingly rare with less than 40 cases reported in English in the literature since the initial description of IMT involving the renal parenchyma in 1976.[2] Given the propensity of these tumors to clinically and radiographically mimic malignancy, the diagnosis has commonly been made based on histopathological assessment of nephrectomy specimens.[3]

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Here we present a case of an incidentally found atypical solid renal mass that was biopsied and found to be an IMT of the kidney. Definitive surgical therapy was deferred and the mass was followed with imaging and spontaneously resolved after 3 months.

Case report

A 71-year-old Caucasian female presented to the Emergency Department with low grade fever, nausea, vomiting and abdominal pain. She was admitted for observation after being diagnosed with a urinary tract infection via urinalysis with positive leukocyte esterase and bacteria as well as a white blood count of 15.9. Her urinalysis was without evidence of blood. Because of pre-existing renal insufficiency, a non-contrasted CT scan of the abdomen and pelvis was obtained to rule out an intra-abdominal process. Imaging demonstrated a nonspecific solid appearing right lower pole renal mass approximately 5 cm in size poorly characterized

due to the lack of contrast. Unfortunately, there were no previous scans for comparison. A diagnosis of renal malignancy was favored.

On history and physical examination, the patient denied flank pain, hematuria, lower urinary tract symptoms, recent weight loss or jaundice. Her past medical history included hypertension and chronic kidney disease requiring hemodialysis. She was a lifelong non-smoker and did not have any history of industrial exposure. Physical exam was without any palpable flank masses, costovertebral tenderness, or lymphadenopathy. Laboratory investigations were as previously mentioned. Liver function tests, bilirubin, alkaline phosphatase and pancreatic enzymes were also obtained and were within normal range. Her serum creatinine and eGFR (glomerular filtration rate, MDR) on presentation were 4.78 mg/dL and 9 mL/min, respectively.

Imaging again showed an infiltrating renoform mass of the right somewhat atrophic kidney that was atypical for renal cortical neoplasm or transitional cell carcinoma. There was some mild common and pancreatic duct dilatation that may have been secondary to displacement of the mass however variant of normal changes within the pancreas could not be excluded. No obvious metastatic lesions or enlarged lymph nodes were visualized. The contralateral kidney was mildly atrophic but otherwise normal. To better characterize this mass, a CT of the abdomen and pelvis with intravenous contrast was ordered (on the day prior to hemodialysis) which showed similar non-specific findings as previously described, Figure 1. A renal mass biopsy was recommended and two percutaneous 22-gauge fine needle biopsies and six 20-gauge core needle biopsies were performed.

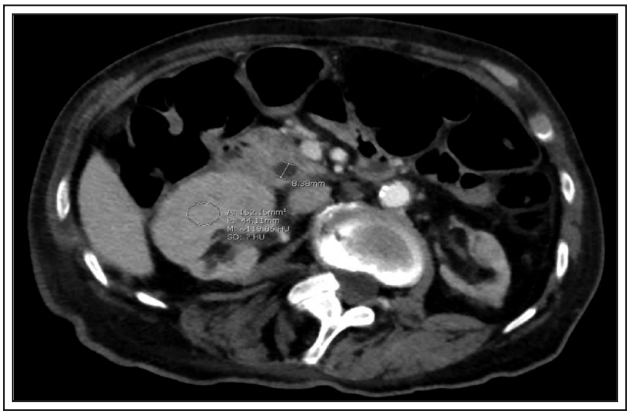

Figure 1. Initial CT with IV contrast of the abdomen and pelvis showing an atypical right renal mass with possible local compression of the biliary tract.

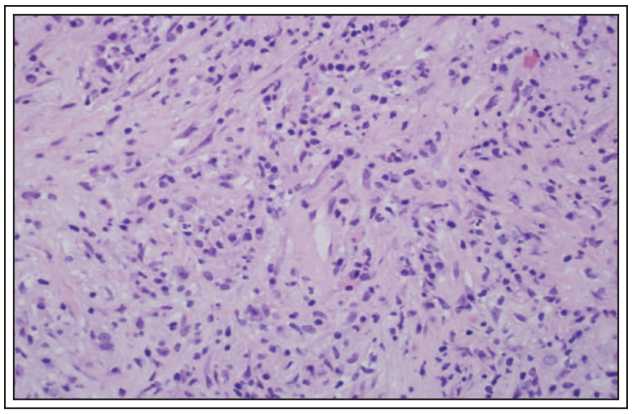

Figure 2. H&E of renal mass biopsy showing spindle cell proliferation ablating most of the renal parenchyma, with scattered entrapped residual tubules and glomeruli.

Pathology review

The pathology reports and slides were retrieved from the files and reviewed by two pathologists who agreed on the final interpretation. Morphologically, H&E-stained renal mass biopsies displayed a spindle cell proliferation ablating most of the renal parenchyma, with scattered entrapped residual tubules and glomeruli, Figure 2. The spindle cells did not exhibit pleomorphism and varied from small and fusiform cells to somewhat stellate forms. The nuclei showed fine chromatin without conspicuous nucleoli and mitotic activity. The spindle cells were dispersed in a collagenous and somewhat myxoid background. Prominent inflammatory component, including lymphocytes, neutrophils, histiocytes, and plasma cells, were observed and dispersed among the tumor cells. Neoplastic spindle cells displayed strong smooth muscle actin cytoplasmic immunoexpression; ALK1 and cytokeratin AE1/AE3 were negative. IgG4 did not stain plasma cells, excluding the possibility of IgG4-associated tubulointerstitial nephritis. Due to negative ALK1 staining, IgG4 negative plasma cells, and relatively bland morphology, the tumor is best classified as an inflammatory myofibroblastic tumor.

Therapeutic management

Surgical management was deferred given that the patient was asymptomatic from the lesion and the typically benign clinical course of the diagnosis. Because of its utilization in prior reports, steroid therapy was considered, however, a trial of observation was elected for initial management secondary to the patients poorly controlled hypertension.[3-6]

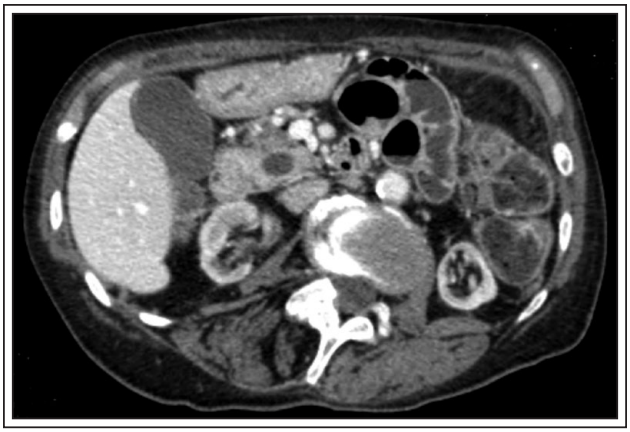

Figure 3. CT abdomen and pelvis with IV contrast at 3 months follow up showing resolution of the right renal mass and bilateral atrophic kidneys.

Interestingly, findings on follow up contrast enhanced CT imaging at 3 months post-hospitalization showed no evidence of the lesion and was initially erroneously interpreted by the radiologist as a kidney "status post partial nephrectomy revealing surgical removal of the right renal tumor without recurrence", Figure 3.

Discussion

Inflammatory myofibroblastic tumor is known by numerous different monikers including plasma cell granuloma and inflammatory pseudotumor. This array of nomenclature reflects the relatively complex and variable nature of pathologic analysis of the specimens. Traditionally, microscopic description of the cells involved in these lesions characterizes a background of spindle cells consisting of fibroblasts and myofibroblasts intermixed with a predominantly lymophocytic infiltrate.

The etiology of inflammatory myofibroblastic tumor is relatively unknown. Chronic inflammation and autoimmune reactions have been hypothesized to play a role in IMT given the classical histopathologic appearance and clinical response to steroids.[3-6] Conversely, cases of IMT in patients on chronic immunosuppression have also been described suggesting that immunosuppression may actually be responsible.[6] Chromosomal rearrangements on 2p23, the site of the anaplastic lymphoma kinase (ALK) gene, have been discovered in cases of IMT suggesting an oncogenic/malignant etiology and a possible association with lymphoma. Epstein-Barr virus, mycobacteria and actinomycetes have been implicated in a few cases of IMT thus suggesting chronic infections may have a role.[3] Interestingly, our patient did not provide a history of chronic infection although she did meet systemic inflammatory response syndrome (SIRS) criteria upon presentation. Additionally, steroids were never implemented during her treatment course because of spontaneous tumor resolution, but may have been initiated prior to surgical intervention had the tumor demonstrated interval growth on subsequent imaging.

Cases of IMT of the kidney have been reported across a wide spectrum of patients. The condition has been described in both the pediatric and adult populations over a wide array of age ranges. There appears to be no significant sex difference with respect to incidence.[6] The clinical presentation of IMT of the kidney is often vague and non-specific. Patients seek medical attention for a variety of symptoms ranging from genitourinary complaints such as flank pain, hematuria, and abdominal mass to non-specific complaints such as lethargy, weight loss, and gastrointestinal symptoms. Additionally, like many renal tumors, IMT of the kidney may be diagnosed incidentally on imaging studies completed for other reasons. Physical examination in patients with IMT is often nondescript. Various laboratory abnormalities may be seen given the individual patients comorbidities. Renal insufficiency may either be preexisting or secondary to IMT.[4] Our patient had preexisting chronic renal insufficiency which may have been exacerbated by IMT, however, resolution of IMT did not coincide with a return to baseline renal function as the patient continues to be dependent on hemodialysis. In fact, serum creatinine and eGFR one month prior to the diagnosis of IMT were 11.29 mg/dL and 3 mL/min and these values remained elevated at 5.6 mg/dL and 7 mL/min 2 months after the resolution of IMT.

Imaging studies of IMT of the kidney tend to be inconclusive and nonspecific. Given the predominantly solid nature of these lesions, a diagnosis of renal malignancy is often favored via radiological interpretation. Ultrasound, CT, MRI and PET scans have been advocated in numerous case studies to provide diagnostic aid, but reports have been minimal. Ultrasound may demonstrate a variable pattern of echogenicity with either poorly defined or well-circumscribed margins. CT scan images are variable with masses described as hypo-, iso- or hyperdense with or without contrast enhancement. MRI images of IMT have reported to display a hypointense lesion on T2 weighted imaging. Onur et al suggested that MRI might be a valuable test to differentiate IMT and renal cell carcinoma with respect to local infiltration and enhancement properties.[7]

Given the tendency of renal IMT to mimic malignancy, it is not surprising the differential diagnosis of these lesions include renal cell carcinoma and transitional cell carcinoma involving the renal pelvis. Other disorders such as angiomyolipoma, xanthrogranulomatous pyelonephritis, and renal abscess may also need to be considered. With the inability to determine a definitive diagnosis on imaging studies alone, pathological diagnosis has often been necessary. Unfortunately, the vast majority of reported cases are based on pathological review of nephrectomy specimens.[6]

Percutaneous renal biopsies of solid renal masses have often been reserved for lesions with a high level of suspicion of metastasis, abscess, and lymphoma. Biopsies have historically been avoided due the high likelihood of malignancy in solid renal masses, unacceptable non-diagnostic rates, and the risk of tumor spillage or bleeding. Recently, a paradigm shift has occurred with many urologic oncologists advocating biopsy for many newly diagnosed small renal masses as up to 30% of these tumors may be benign.[8] Observation of small renal masses, even with malignant diagnoses, has gained popularity and tissue acquisition may play a role in patient selection for surveillance pathways.[8,9] Refinements in biopsy technique have demonstrated minimal side effects and high histologic correlation with final pathology.[10] Collectively, these findings support consideration of renal mass biopsy for urologists evaluating the majority of today's diagnosed renal tumors. Moreover, renal mass biopsy prior to definitive surgical management is exceedingly important in patients with chronic renal insufficiency as partial or complete nephrectomy may lead to hemodialysis and patient morbidity, although this was not as imperative in our patient who was already requiring renal replacement therapy.

Data on renal mass biopsy specifically for IMT of the kidney is limited. Previously, there were two reported cases diagnosed prior to operative intervention based on the pathological interpretation of renal biopsies.[4,5] Interestingly, both of these cases had bilateral renal involvement and thus biopsies were undertaken given the severe morbidity associated with bilateral nephrectomies and dialysis. Kobayashi et al reported a case of renal IMT diagnosed after fine needle aspiration (FNA) and was successfully treated with steroid therapy.[4] Williams et al also reported a case of diagnosed by core needle biopsy that was treated successfully with oral corticosteroids.[3] These findings underscore the role of renal biopsy for patients presenting with renal IMT.

Conservative management for renal IMT has been described in five previously.[3-6] Each of these cases resulted in complete resolution of the tumor without evidence of recurrence or malignant transformation. Additionally, metastasis or malignant transformation has not been reported, again supporting the benign nature of these tumors.

Conclusion

Patients with atypical solid renal lesions should obtain renal biopsies prior to medical or surgical management as histologic diagnosis may impact management. IMT of the kidney is a rare disorder that is classically benign in nature and may initially be managed conservatively utilizing surveillance imaging without medical or surgical intervention. □

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