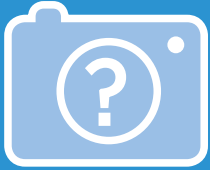


Diagnostic Snapshot



What Caused This Left Renal Infiltrate in a Young, Healthy Woman?

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HISTORY

VD is a 44-year-old female who presented on July 10, 2018, to the Urology clinic with a left renal pelvis lesion. She initially had an episode of abdominal pain on March 29, 2018, that prompted a CT scan of the abdomen and pelvis. The CT showed an abnormality in the left upper pole with concomitant hypoperfusion to the upper pole of the left kidney. Delayed imaging demonstrated what appeared to be a filling defect in the left upper calyx of the renal pelvis. At that time, she was felt to have possible diverticulitis causing the abdominal pain and a possible renal infarction. She had not yet been seen by Urology for the renal issue when she experienced a second episode of severe abdominal pain on June 26, 2018, which resulted in a repeat CT scan. The CT showed a filling defect in the left upper calyx and associated periaortic lymphadenopathy up to 1 cm in size. No other concerning findings were detected in the remainder of the genitourinary tract, in bilateral adrenals, nor the remainder of the CT.

Presentation

VD came for an opinion about the left renal findings. At that time, she had no hematuria, no risk factors, and no personal history of smoking. She was afebrile, with no systemic signs of illness once her abdominal pain resolved. Labs at that time showed a normal white blood cell count (WBC), with slight left shift/neutrophils at 70.9%. Other labs were normal: She had a glomerular filtration rate (GFR) of 85, blood urea nitrogen (BUN) of 9 mg/dL, and creatinine (Cr) of 0.84 mg/dL. Urine was abnormal, with a large amount of blood and red blood cells: 5

to 10 WBCs but scant bacteria. Urine culture grew fewer than 50,000 colonies of normal site flora. Cytology was negative for any cancer cells. Due to the possibility of urothelial cancer, and based on the appearance on CT, attempts were made to get a tissue diagnosis. In addition to diverticulitis, she had a history of pulmonary tuberculosis (TB) that was treated to resolution in 2010.

Workup

Imaging and visualization of the urinary tract with cystourethroscopy showed that the urethra and bladder were unremarkable as were the right ureter and kidney. There were no lesions within the left ureter, left renal pelvis, left lower pole calyces, or left midpole calyces. There was a narrowing of the infundibulum to the left upper pole that could not be navigated with the ureteroscope. Biopsies were taken from the orifice of the upper pole infundibulum to the renal pelvis and showed denuded urothelial cells and inflammation with no malignant cells. Due to the narrowing and the possibility of sampling error, plans were made for interventional radiology (IR) biopsy.

An IR biopsy of a retroperitoneal lymph node was performed on July 24, 2018, which showed no malignant cells. Given that there were no other means of getting tissue, an IR biopsy of the renal hilum was performed on August 14, 2018, which showed cellular debris, inflammatory cells, and clot. There was, however, a great deal of difficulty getting tissue from the hilum.

When VD returned to discuss the renal hilum biopsy, her GFR had fallen to 40 with a BUN of

22 mg/dL and a Cr of 1.58 mg/dL. These findings indicated that VD's overall renal function had declined. An MR angiogram to rule out decreased blood flow to the kidney(s) was performed on August 27, 2018, and showed an infiltrative mass encasing the branches of the left renal artery and vein (Figures 1 and 2).

Images show an infiltrative soft tissue process involving the mid portion to upper pole of VD's left kidney medially, replacing the renal sinus fat, and encasing the left renal artery, vein, and their branches in the hilum of the kidney. The differential includes infiltrative malignancies (either renal or urothelial), lymphomatous tumors, atypical infectious/inflammatory processes, and pseudotumor of the kidney, among others.

A Lasix renal scan on August 27, 2018, showed suspected obstruction of the left kidney. Split renal function favored the right kidney greater than the left (83.7% vs. 16.3%). These numbers should be closer to 50% and 50%, and showed that VD's right kidney was performing the bulk of the work for both kidneys. Tuberculosis cultures at 2 weeks showed no growth.

DISCUSSION

The IR biopsy from VD's flank revealed necrosis. This finding is commonly seen in high-grade malignancies. An MR angiogram, while not showing renal artery stenosis, did show the ongoing issue in the left kidney was also involving the left renal vessels.

VD's preliminary tests for renal TB came back as negative. While extrapulmonary TB remained in the differential, with a negative polymerase chain reaction test, it was felt she did not need empiric TB treatment for this renal lesion. It was concerning that she had a marked decline in her renal function since presentation, and additionally, the lesion was seen to have spread medially to the left renal vessels and had impaired the blood supply to that kidney. There was compelling evidence that the decline in blood flow to the kidney was due to a progression of the process.

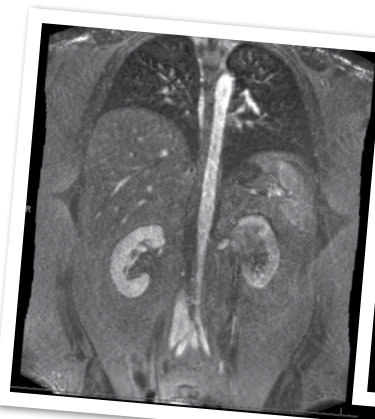


Figure 1

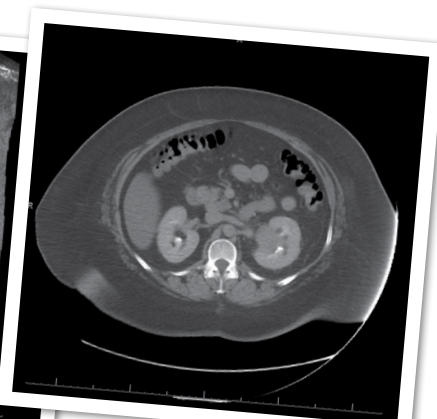


Figure 2

PLAN

This process was concerning because of the possibility that the mass could represent a tumor (either renal cell carcinoma, transitional cell carcinoma, a sarcoma, or less typical cancers), and the left kidney was only contributing 15% of her renal function. The standard of care for suspicious renal masses is surgery to remove the mass if the patient is healthy enough to undergo surgery, as was the case here. The renal surgery offered for a specific mass has marked differences based on the behavior and features of the mass itself. More specifically, a patient may be offered nephroureterectomy, partial nephrectomy, or radical nephrectomy, and either a robotic, open, or laparoscopic approach.

The abnormality did not look like a cystic lesion, a lipomatous lesion, a metastatic lesion, or lymphoma. The final TB cultures would take an additional 2 months. After the multidisciplinary input of Interventional Radiology, Urologic Oncology, Radiology, and Infectious Disease, it was decided that a delay in surgery might allow for the process to spread further along the renal vessels toward the aorta. If spread in this manner, resection of a part of the aorta would involve aortic reconstruction and the possibility of long-term anticoagulation. If malignant, the disease could become unresectable. Tests to that point did not result in a definitive diagnosis, and a partial nephrectomy was not possible given the location of the lesion. Radical nephrectomy was performed on October 19, 2018, in order to prevent the possibility of a more complex course of treatment in the future.

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- A Renal tuberculosis
- B Renal cancer
- C Renal infarction
- D Autoimmune disorder

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- D Autoimmune disorder (correct answer)

A Renal Tuberculosis. Outside of the lungs, the kidneys are a common site of TB. The genitourinary tract has about 27% of extrapulmonary TB (Rieder, Snider, & Cauthen, 1990). Genitourinary TB can be a localized disease and usually occurs in an immunocompromised person presenting with a lower GFR and an increased Cr (Daher, da Silva, & Barros, 2013).

Extrapulmonary TB should always be in the differential diagnosis of someone with a history of TB, but in this case, preoperative cultures, intraoperative cultures, and tissue did not support that diagnosis.

B Renal Cancer. Filling defects in the upper tract are malignancies until proven otherwise and are suggestive of urothelial cancers. Urothelial cancers account for about 10% of cancers of the genitourinary tract (Browne, Meehan, Colville, Power, & Torreggiani, 2005). Utilizing CT urography (not plain CT imaging) allows delineation of the entire tract, which can show the presence of anatomical variants or renal calculi, allows assessment of perirenal tissues, and can often stage lesions (Silverman, Leyendecker, & Amis, 2009). This mass effect was more in keeping with a urothelial cancer (lining of the genitourinary tract), but there was also a possibility of a solid renal mass. Solid renal masses have a wide differential, and preoperative testing did not assist in narrowing the possibilities. Renal cancers represent 2% to 3% of all adult malignant neoplasms and are the most lethal of the common urologic cancers (Campbell & Lane, 2016). There was a high suspicion this was a malignancy. Attempts to get tissue prior to the nephrectomy were not diagnostic. At the time of the operation, the left adrenal gland was removed en bloc with the kidney.

Upon taking the kidney to pathology and having it bivalved, there was no mass in the collecting system, and thus, a total ureterectomy was not indicated. There was no infiltrative involvement seen in the vessels. Final pathology did not show any malignancy.

C Renal Infarction. Renal infarction is caused by disruption in the usual blood flow to the kidney. Illnesses that cause inflammation, infection, or any process that may decrease blood flow to all or part of the kidney, may cause renal infarction (Yang et al., 2016). Examples of diseases that may cause or appear similar to a renal infarction are pyelonephritis, tumors, thromboembolism, vascular dissection, injury from angiography, atrial fibrillation, and malignant hypertension. Renal infarction is rare, and clinical suspicion along with a CT scan with contrast are important in this diagnosis (Lumerman, Hom, Eiley, & Smith, 1999).

D Autoimmune Disorder. IgG4-related disease is a relatively recently recognized disorder that results in systemic inflammatory response and can affect multiple organs and tissues. The kidney is a commonly affected organ. Decreased renal function and an altered appearance of the kidney on CT are common. In cases of moderate to severe decrease in renal function, the kidney function may not return fully (Kawano & Saeki, 2015). Inflammation and fibrosis caused by this process results in acute or chronic renal dysfunction. On imaging, several abnormalities may be noted, and of course, the lesions may imitate tumors, as was the case in this patient (Saeki & Kawano, 2014). Though VD did not have any of the classic signs of IgG4 disease, it was officially diagnosed through histology studies after her nephrectomy.

FOLLOW-UP

VD was referred to Rheumatology. Additional rheumatologic blood tests (14 in total) were negative for IgG-mediated disease. Physical exam for the first 4 months after resection of her kidney did not reveal any other signs of IgG4 disease. She continued to have no skin findings, asthma, or enlarged salivary glands or arthralgias, which would be common in IgG4 disease. She will be seen again every 3 months until stability of her disease is proven. It is

uncertain why her disease was manifested in only one organ, as it is more common to have multi-site involvement. Due to the negative blood tests post operatively, it was decided that she did not need steroids. She was seen once in the ER since her resection for nonspecific back pain that was considered to be muscular and unrelated to this diagnosis.

CONCLUSION

The role of the clinician in creating a differential diagnosis can be challenging. Clinicians are instructed to formulate the most common and compelling diagnoses as well as those that might be less common. Tests are then done to narrow the diagnosis. In our clinical roles, we are compelled to continually search for the answers when information does not immediately yield a result.

Autoimmune-mediated diseases are impacting care in our clinical cancer population and in internal medicine practice globally. In this particular case, imaging tests by multiple modalities revealed highly concerning results for potential cancer. Consideration was given to extrapulmonary TB, but test results did not support that diagnosis. Although the patient had complained of intermittent nonspecific pain, there were no typical findings that might lead one to suspect IgG4 disease. The risk of potential malignancy and delay in care prompted a need for tissue diagnosis and ultimately provided the diagnosis. In the future, when faced with clinical conundrums, a provider might consider additional testing for autoimmune diseases if typical testing does not lead to an obvious diagnosis. ●

Disclosure

The author has no conflicts of interest to disclose.

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