Fever and Renal Mass in a Young Child
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A 22-month-old African refugee male was referred to our emergency department by his pediatrician for prolonged fever. He was previously healthy and had just moved from Tanzania to Dallas, TX, 9 months before presentation. He had intermittent high fevers to 103°F, along with chills and night sweats for 7 days. Upper respiratory symptoms, including nasal congestion and cough, were noted for a few days. Review of systems was negative for localized pain, irritability, skin rash, conjunctivitis, dysuria, or choluria. He was still catching up with immunizations.

Abdomen was negative for hepatosplenomegaly or masses. No rashes or peripheral edema were present. Neurologic evaluation was normal.

Initial ED diagnostic workup included a hemogram that showed marked leukocytosis with neutrophilia (WBC: 36,100/mm³ and ANC: 20,700/mm³) and normocytic, hypochromic anemia (hemoglobin 9.1 g/dL, MCV 64 and MCH 21). Urinalysis and chest X-ray were normal. He was admitted for further evaluation of his fever.

As an inpatient, testing included a viral respiratory panel, malaria smear, urine culture, blood culture, PPD, and HIV, all of which were negative. Because of the patient’s persistent high fevers, an abdominal ultrasound was obtained to rule out an occult abscess or malignant mass. The ultrasound revealed a 4.7 x 3.8 x 5.5 cm complex, hypovascular left renal mass.

For diagnosis, see page 422.
THE PATIENT
Further evaluation with a renal dimercaptosuccinic acid (DMSA) scan confirmed decreased accumulation of radiopharmaceutical tracer in the left upper pole, suggestive of a kidney abscess or tumor. The next day, a CT scan of the abdomen revealed a large heterogeneous, multiloculated mass that measured approximately 4.5 x 5.8 x 4.3 cm in the upper moiety of a duplicated collecting system (see Figure 1). This was of concern for a renal abscess, so the antibiotic regimen was changed to intravenous ampicillin and gentamicin to expand coverage.

The urology team was consulted and recommended conservative management with broad-spectrum antibiotics. After 2 weeks of intravenous antibiotic therapy, the fever resolved, and C-reactive protein (CRP) decreased from 28.6 mg/dL to 15.9 mg/dL before discharge. He was prescribed oral amoxicillin and trimethoprim-sulfamethoxazole.

Finally, 5 months after initial presentation, renal ultrasound showed the mass had decreased to 2.3 x 2.0 cm. Oral antibiotics were discontinued, with a plan to do another ultrasound in 6 months.

DISCUSSION
A renal abscess is a collection of purulent material within or adjacent to the kidney. A phlegmon or lobar pyelonephritis indicates an acute bacterial infection of the kidney without definitive limits.

Renal abscesses can be classified as intrarenal or perirenal depending on their anatomical site. Intrarenal abscesses refer to a collection of purulent material within the kidney, which can be subdivided into cortical or corticomedullary according to their localization. A perirenal abscess represents a purulent localized collection of material outside the kidney but within the renal fascia.

Renal abscesses are uncommon in children, although the exact incidence is unknown. Boys and girls are affected equally. No age or ethnic group is known to have an increased risk for developing these abscesses.

Most renal abscesses are either a consequence of hematogenous seeding or an ascending urinary tract infection. Perirenal abscesses may result from the rupture of an intrarenal abscess, or from an inflamed or infected area close to the kidney, as may be seen with surgical contamination.

Renal cortical abscess formation follows the coalescence of several cortical micro-abscesses originating from hematogenous seeding. In contrast, corticomedullary abscesses usually result from an ascending urinary tract infection.

Historically, case series have reported that *Staphylococcus aureus*...
and *Escherichia coli* are the most frequently isolated bacteria. Other pathogens that may be responsible for these infections include *Streptococci*, *Citrobacter*, and *Enterobacter*. *Nocardia, Listeria, Mycobacterium tuberculosis*, and even various anaerobes also have been implicated.1,2,3,4

*S. aureus* is the most common cause of renal cortical abscesses due to hematogenous seeding.2 Gram-negative bacteria, such as *Enterobacteriaceae*, are predominant pathogens, resulting in renal corticomedullary or perirenal abscesses. These are likely secondary to an ascending urinary process and may often be associated with a urological abnormality.

Patients with renal abscesses may present with nonspecific constitutional symptoms, such as fever, general malaise, nausea, decreased appetite, and weight loss. Urinary tract complaints, such as dysuria or malodorous or cloudy urine, are sometimes reported.1,2 The child may appear ill on physical examination. Unilateral flank or abdominal pain on the affected side may also be noted and sometimes may radiate to the back, with bilateral involvement seldom present. Although rare, in infants, a mass may be palpated on physical examination.

Renal abscesses in pediatrics often may occur in otherwise healthy patients, but various risk factors that predispose children have been found. Urinary tract conditions, such as nephrolithiasis, neurogenic bladder, and anomalies, such as vesicoureteral reflux and duplications, have been implicated.1,2,3 Additionally, seeding from a dental process, skin and soft-tissue infections, injection drug use, hemodialysis, or an intra-abdominal process may result in bacteremia and associated renal abscess. Unlike in adults, diabetes mellitus is rarely an associated pre-existing condition in children.

Differential diagnosis includes obstructive hydronephrosis, Wilms’ tumor, renal venous thrombosis, and posttraumatic renal hematoma. Laboratory studies to consider in the diagnostic workup include a CBC, erythocyte sedimentation rate (ESR), CRP, blood culture (aerobic and anaerobic), urinalysis, and urine culture.

Leukocytosis with neutrophilia is usually present. Urinalysis may reveal pyuria, but urine culture is often negative. Blood culture is a fairly sensitive study that may be positive in up to one-third of cases.2 Acute phase reactants, including ESR and CRP, are invariably elevated.

A renal ultrasound is a good initial imaging study. However, it may not differentiate an abscess from an uncomplicated pyelonephritis. Computerized tomography (CT) is often necessary to characterize the renal abscess further.

Management of renal abscesses is controversial. Some experts suggest an initial trial of intravenous antibiotics alone; others favor a more aggressive management. Clinical response is often noted within 72 hours. Some suggest abscesses larger than 3 cm may need percutaneous or surgical drainage.3 Early drainage is also recommended in immunocompromised hosts. If specimens are collected, cultures for aerobic and anaerobic bacteria, fungi, and mycobacteria should be sent.

At minimum, antibiotics should cover *S. aureus* and *E. coli*. Ten to 14 days of intravenous antibiotics followed by 2 to 4 weeks of oral therapy have been recommended by most case series, although a longer course may sometimes be necessary.1,2 Serial renal ultrasounds and laboratory studies may be useful to monitor the child’s progress, although clinical and laboratory signs of improvement often precede changes on sonography.

**CONCLUSION**

It is important to consider renal abscess in patients who present with prolonged fever without a clear source. Additionally, keep renal abscess in mind if there is no response to conventional therapy of presumed pyelonephritis. In general, the data suggest prognosis of renal abscesses in children is good with the appropriate management.

**REFERENCES**


