

# Management of Renal Abscess in a 5-Year-Old Girl, A Case Report

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**Citation:** Mastaneh Moghtaderi (2020) Management of Renal Abscess in a 5-Year-Old Girl, A Case Report No S:1:5 Ann Clin Nephrol, Vol.S.1:5

**Received:** August 24, 2020; **Accepted:** August 26, 2020; **Published:** August 28, 2020

## Abstract

**Introduction:** Renal abscesses are rare in children. They have vague manifestations and any delay in proper diagnosis and treatment could lead to morbidity and mortality. We present a 5-year-old girl with multiple renal abscesses after pyelonephritis that lead to total nephrectomy due to multiple drug resistance. The renal abscess may have subtle symptoms. Early diagnosis and treatment strongly prevent undue mortality and morbidity. This case highlights the need for timely diagnosis and proper treatment. There must be a clinical suspicion of renal abscess if treatments do not affect the patient's clinical condition.

**Keywords:** Acute Pyelonephritis; Renal Abscess; Child

## Introduction

Renal and perirenal abscess is an uncommon potentially lethal disease resulting from infection of the kidney or its surroundings like pyelonephritis or from hematogenous spread of other foci [1, 2]. There may be predisposing conditions like obstructive uropathy, UTI, diabetes mellitus, intravenous drug abuse, trauma, recent abdominal or urologic operation, and immunosuppressive drugs used in malignancies or AIDS [3]. Clinical manifestations are generally non-specific such as fever and vague abdominal pain, elevated levels of erythrocyte sedimentation rate (ESR) and C reactive protein (CRP), leukocytosis, and less often positive blood and urine cultures. Therefore, a delayed definite diagnosis can be quiet common. Gram-negative pathogens mainly *Escherichia coli* are the most common pathogens found in cases following urinary tract infection. A staphylococcal renal abscess (*S. aureus*) is predominant when the route of infection is hematogenous [2]. Differential diagnoses include emphysematous pyelonephritis, papillary necrosis following acute pyelonephritis, acute malacoplakia, lobar tuberculosis, nephronia, renal cell carcinoma or Wilms' tumor.

Therefore, a full diagnostic study is recommended [4]. Any delay in diagnosis of renal abscess may lead to increased morbidity and mortality. Nowadays, its frequency has reduced because the more sophisticated procedures like computed tomography (CT) and magnetic resonance imaging (MRI) [1]. Classic treatment of renal abscesses includes antibiotics, surgical exploration, incision, and drainage when necessary, or nephrectomy as the last option. Small renal abscesses can be treated efficiently with the proper drainage and a full course of intravenous antibiotics [1]. We describe a case of multiple renal abscesses following pyelonephritis that eventually led to total nephrectomy because of microbial drug resistance.

## Case Report

A 5-year-old girl was referred to our hospital with abdominal pain and fever from 3 days ago. The pain was periumbilical and radiated to the left flank. Other symptoms were malaise, anorexia, vomiting, fever, and dysuria. She reported a long period of constipation and voiding dysfunction lasting for several months. She did not have any history of urinary tract infection in the past. On physical examination, she had left costovertebral angle tenderness, fever, and a dimple in the upper anal verge. She had received cefixime before hospital admission.

Laboratory findings included leukocytosis (25000) with neutrophil predominance, ESR=97, CRP=31, and active urine analysis with negative urine and blood culture. Serum immunoglobulin levels were within the normal range, and immunodeficiency disorders including late-onset common variable immunodeficiency were unlikely. The biochemistry study was normal. First performed sonography was normal. Ceftriaxone was started at first but as the fever continued beyond 3 days, amikacin was added. The fever continued for 7 days, and unilateral lymphadenopathy and leukocytosis appeared. ESR increased, so rheumatologic consultation was requested because of suspicion of Kawasaki disease, and IVIG and aspirin were started.

Echocardiography was normal. However, fever did not subside, so renal sonography was repeated that revealed three hypoechoic lesions without vascularity in the upper pole of the left kidney (38×25 mm), lower pole of left kidney (24×10 mm), and subcortical middle lobe of the left kidney (9×7 mm) with perinephric liquid accumulation. DMSA scan showed multiple defects in the left kidney. CT angiography of the left kidney revealed enlargement and heterogeneity of the kidney, fat stranding, and inflammation in the perinephric area, several lesions with low attenuation in the upper (44×30 mm) and lower pole (16×9 mm), and also three para aortic lymphnodes in the left renal hilum (6×9 mm) (figure 1). On VCUG, she had grade III reflux in the left kidney and widening of the left pyelocaliceal system due to abscess formation (Figure 2). As a result, ceftriaxone was discontinued, and meropenem and vancomycin were added to amikacin. However, because of no response to medical treatment, nephrectomy was performed after urologic consultation. After 6 months follow-up, BUN, Cr, and electrolytes were normal.

### Discussion

Renal abscesses occur in all ages and are three times more common in males than females. These abscesses are walled-off cavities and most of them are unilateral single lesions (77%). They occur in the right kidney more frequently (63%). The incidence of renal abscess in children is unknown [4]. Interestingly, our patient was a girl with multiple renal abscesses in her left kidney. Diagnosis of renal abscess is a clinical challenge due to diversity of the source of infection and different pathogenetic mechanisms, such as complications of UTI, hematogenous spread of a far infectious focus, or a staphylococcal carbuncle proximal to kidneys in rare cases [5,6]. Our case had pyuria with a negative urine and blood culture. The clinical diagnosis of renal or perinephric abscess should be suspected in a patient with inconsistent signs and symptoms, including prolonged fever and flank pain, and laboratory evidence of chronic inflammation such as elevated ESR and CRP. Detection of renal abscess on imaging, ideally computed tomography, confirms the diagnosis [7]. Our patient had a prolonged fever, leukocytosis with neutrophilia, elevated ESR and CRP, and normal ultrasound results at first. In most children, the pathogenesis may be associated with an ascending infection superimposed on a pre-existing malformation of the urinary tract, particularly vesicoureteral reflux (VUR) [8]. She had left VUR (grade 3) but did not have any history of previous urinary tract infection. Classic treatment of renal abscesses is surgical exploration, incision, and drainage, or nephrectomy. In fact, simple invasive treatments that were applied in early 1970s are replaced with more conservative treatments due to advances in imaging techniques and discovery of new antibiotics. Small renal abscesses can be effectively treated with complete drainage and a full course of intravenous antibiotics [9]. Large size abscesses, presence of obstructive uropathy, severe vesicoureteral reflux, diabetes, old age, and gas forming organisms are the major factors associated with treatment failure. If there is a large abscess or obstructive uropathy and no clinical improvement

occurs after 48 to 72 hours of appropriate antibiotic therapy, nephrostomy should be considered [1]. Our patient received proper antibiotics for about 3 weeks with no improvement, so eventually radical nephrectomy was done. After 6 months follow-up, she had a normal blood pressure and renal function tests.

### Conclusion

The diagnosis of renal abscess is frequently delayed, and the mortality and morbidity are extensive in most cases. Thus, proper diagnosis and treatment are necessary. Renal abscesses should be seriously considered when a patient presents with symptoms of pyelonephritis but does not respond to standard treatments. Renal abscess that cannot be treated with proper medical treatments may lead to partial or even total nephrectomy.

### Conflict of Interest

None declared

### Financial Support

None declared

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