

# Medical Management of Acute Pyelonephritis Leading to Renal Abscess in 16-Year-Old Male Child: A Case Report

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**Abstract:** *Peri nephric and renal abscesses are uncommon in children<sup>1</sup>. Most of the times, these present with vague symptoms like fever, vomiting, dysuria and flank pain. These are usually associated with underlying predisposing conditions like obstructive or infectious urinary tract diseases, diabetes mellitus, trauma, recent abdominal or urological surgery.<sup>2</sup> Prompt treatment is required as delay in diagnosis and management can lead to morbidity and mortality. Here we present a case report on the management of 16-year-old male child with perirenal abscess following acute pyelonephritis. This case highlights the need for timely diagnosis and proper treatment. There must be a clinical suspicion of renal abscess if treatment does not affect the patient's clinical condition.*

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

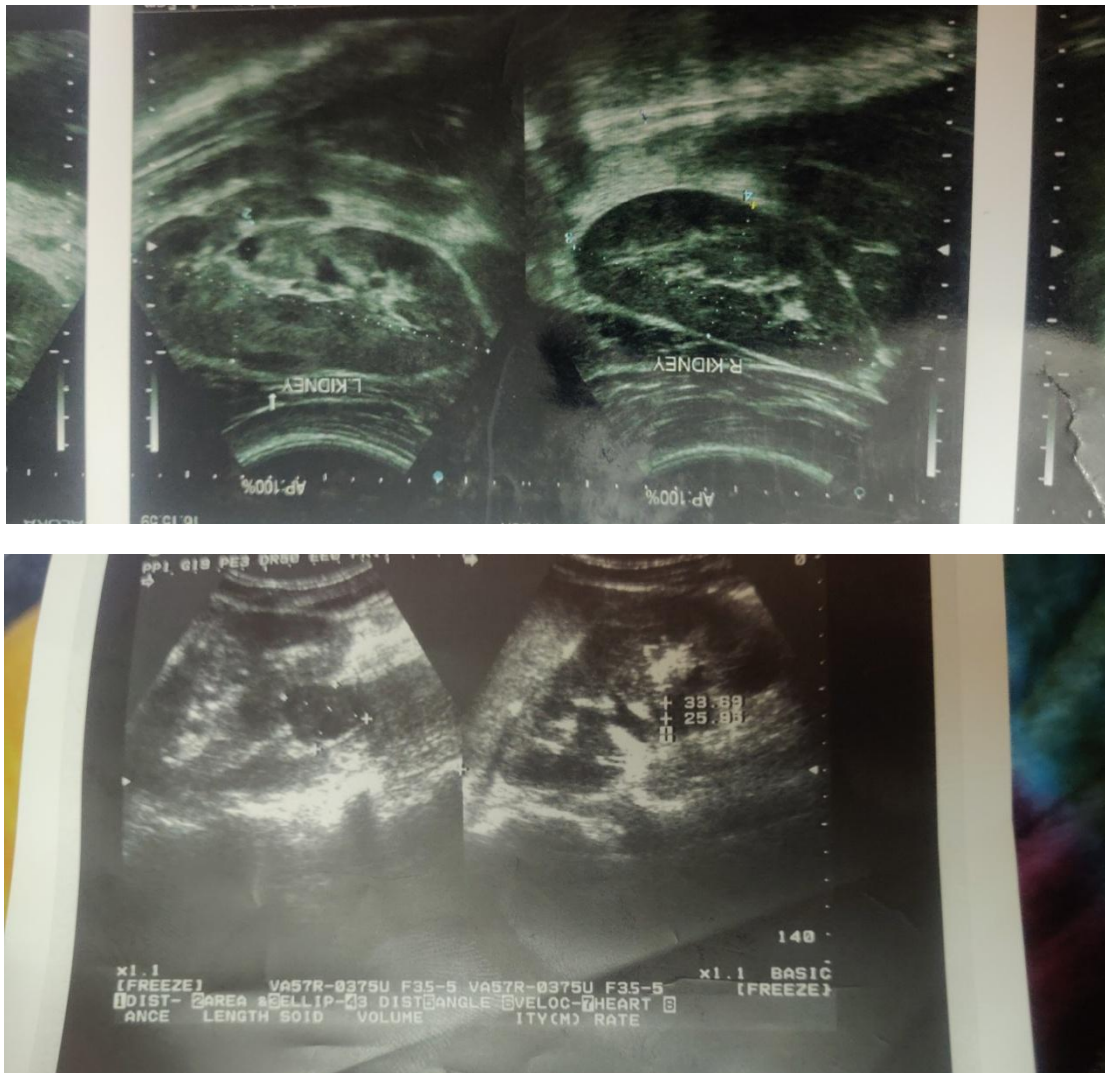
## 1. Introduction

Renal and perirenal abscess are uncommon potentially lethal diseases resulting from infection of the kidney or its surroundings like pyelonephritis or from hematogenous spread of other foci [1, 2]. The 2 most common symptoms are usually fever and flank pain. Acute pyelonephritis can be divided into uncomplicated and complicated. Complicated pyelonephritis includes pregnant patients, patients with uncontrolled diabetes, kidney transplants, urinary anatomical abnormalities, acute or chronic kidney failure, as well as immunocompromised patients and those with hospital-acquired bacterial infections. It is important to make a distinction between complicated and uncomplicated pyelonephritis, as patient management depends upon it [3]. Clinical manifestations are generally non-specific such as fever and vague abdominal pain, vomiting, dysuria. Biochemical profile shows leukocytosis with neutrophil predominance, elevated levels of erythrocyte sedimentation rate (ESR) and C reactive protein (CRP), and less often positive blood and urine cultures. Therefore, a delayed definite diagnosis can be quite 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 USG, computed tomography (CT) and magnetic resonance imaging (MRI) [1]. Classic treatment of renal abscesses includes antibiotics, surgical exploration, incision/ 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]. Here we describe the medical management of a case of renal abscesses following pyelonephritis in our tertiary care institute.

## 2. Case Report

A 16-year-old male was referred to our hospital with abdominal pain and high grade fever from 3 days ago. The pain was periumbilical and radiated to the left flank and associated with left renal angle tenderness. Other symptoms were malaise, anorexia, vomiting, fever, and dysuria. No history reported of constipation and voiding dysfunction. The child did not have any previous history of urinary tract infection. On physical examination, he had left costovertebral angle tenderness, fever. The child had received cefixime for 3 days before hospital admission from nearby hospital. Laboratory findings included leukocytosis (18000) with neutrophilic predominance, ESR=97, CRP=31, and active urine analysis showing 10-12 pus cells with urine culture showing *E. coli* > 10<sup>5</sup> colonies and negative blood culture. *E. coli* was sensitive to injection ceftriaxone and Inj amikacin. First performed sonography was suggestive of acute pyelonephritis. Injection Ceftriaxone was started at first but as the fever continued beyond 3 days, amikacin was added. The fever continued for next 3 days and settled by day 9 total of starting antibiotics. Child was still having pain at left renal angle. Repeat renal sonography revealed perinephric soft tissue stranding with thin subcapsular fluid collection at mid pole 25\*8 cm. 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 (37\*17 mm) and lower pole (16\*14 mm), and also three para aortic lymphnodes in the left renal hilum (6\*6 mm) (figure 1). As a result, ceftriaxone/amikacin were continued, and total of 21 days of antibiotics was given. After 1 month and 3 month followup, BUN, Cr, and electrolytes were normal and repeat USG and CT abdomen were all normal.



Usg pics of left kidney with pyelonephritis with perinephric abscesses

### 3. Discussion

Renal abscesses can 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 still unknown [4]. 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 positive urine culture for *E.coli*. *E. coli* is the most common bacteria causing acute pyelonephritis due to its unique ability to adhere to and colonize the urinary tract and kidneys. *E.coli* has adhesive molecules called P-fimbriae which interact with receptors on the surface of uroepithelial cells. Kidneys infected with *E. coli* can lead to an acute inflammatory response which can cause scarring of the renal parenchyma. The clinical diagnosis of renal or perinephric abscess following pyelonephritis 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 usg suggestive of pyelonephritis. 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] but in our case child did not have any history of previous urinary tract infection. Classic treatment of renal abscesses is medical followed by 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 marked improvement. After 1 months follow-up, the child was normal with no complaints of fever or renal angle tenderness and normal blood pressure and renal function tests.

#### 4. 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. Despite pyelonephritis improving in most cases, there is still significant morbidity and mortality that can be associated with severe cases of this disease. Overall mortality has been reported around 10% to 20% in some studies with a recent study from Hong Kong finding a mortality rate closer to 7.4% [10]. Thus renal abscesses should be seriously considered when a patient presents with symptoms of pyelonephritis but who does not respond to standard treatments.

**Conflict of Interest** None declared

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