

Bilateral renal aspergillosis in an immunocompetent host

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ABSTRACT

Bilateral primary renal aspergillosis is rare in immunocompetent hosts. The clinical presentation of *Aspergillus* pyelonephritis is similar to that of bacterial pyelonephritis. Here, we present an immunocompetent patient with primary bilateral renal abscesses due to *Aspergillus fumigatus*.

Keywords: Bilateral renal abscess, fungal renal abscess, primary renal aspergillosis

Introduction

Aspergillus is a ubiquitous saprophytic fungus cleared by the immune system of a healthy host. Invasive infections in immunocompetent hosts are uncommon (2%).^[1,2] *Aspergillus* infections involve respiratory system in 80%–92% of cases, followed by sinus and brain involvement.^[1]

Genitourinary infections occur as part of disseminated infections in immunocompromised hosts. Isolated bilateral renal aspergillosis is rare.

There are three other case reports of primary bilateral renal aspergillosis in immunocompetent hosts. Lisson *et al.* reported a 50-year-old patient with renal aspergillosis managed with nephrectomy.^[3] Another case report is of a 35-year-old man with bilateral renal aspergillosis managed with amphotericin.^[4] Ahmad reported a patient with emphysematous pyelonephritis treated with amphotericin and flucytosine.^[5]

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Case Report

A 66-year-old man presented with complaints of intermittent high-grade fever and generalized dull-aching abdominal pain for 3 months. He had a history of passing turbid urine, decrease in urine output and swelling of both feet for 10 days. For the current complaints, he was treated with intravenous medications for a week before coming to our hospital. He had type II diabetes mellitus for 3 years and was on regular medication for the same.

During his current admission, physical examination showed that he was conscious, afebrile, and tachycardic with heart rate of 136/min. Blood pressure was 110/70 mmHg. Rest of the vital signs were normal. He had renal angle tenderness bilaterally. Rest of the systemic examination was unremarkable.

Investigations revealed high total leukocyte counts with left shift, elevated urea and creatinine levels and pyuria with leukocyte esterase positivity [Tables 1 and 2]. In the above clinical setting, possibility of pyelonephritis/renal abscess with acute kidney injury was considered. Activated partial thromboplastin time was prolonged, which was thought to be due to sepsis-induced coagulopathy.

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Table 1: Relevant blood investigations with reference range		
	Reference range	Patient's values
Hematological investigations		
Hemoglobin (g/dl)	13.3-16.2	8.1
Total leukocyte count (mm ³)	4000-12,000	35,300
Differential count (%)		
Metamyelocytes	0	2
Band forms	0-5	3
Neutrophil	40-70	90
Lymphocyte	20-50	1
Monocyte	4-8	4
Platelet count (lakhs/mm ³)	150,000-400,000	380,000
Prothrombin time (s)/international normalized ratio	10-12.5	11.2/1.04
Activated partial thromboplastin time (s)	23.5-35.5	54.9
Biochemical investigations		
Urea (mg%)	15-40	124
Creatinine (mg%)	0.5-1.4	5.53
Sodium (mmol/L)	135-145	118
Potassium (mmol/L)	3.5-5	4.3
Bicarbonate (mEq/L)	22-29	7
Glycated hemoglobin (HbA1C)	<5.7	7.2
Total protein (g/dl)	6.0-8.5	6.6
Albumin (g/dl)	3.5-5.0	2.2
Alkaline phosphatase (U/L)	40-125	214
Virology		
HIV 1 and 2 antibodies		Nonreactive
Hepatitis B surface antigen		Negative
Hepatitis C antibody		Negative

HIV: Human immunodeficiency virus; HbA1C: Glycosylated hemoglobin

Table 2: Urine analysis with reference range		
	Reference range	Patient's values
Urine leukocytes	0-2 per high power field	2481
Urine leukocyte esterase		Positive
Urine nitrite		Negative

Ultrasound of the kidneys revealed enlarged kidneys with bilateral renal abscesses [Figure 1a and b]. Further imaging was done with a noncontrast computed tomography scan which showed similar findings. He underwent emergency ultrasound-guided drainage of renal abscesses on both sides after transfusion of blood products in view of coagulopathy. Pus drained was sent for bacterial, fungal, and mycobacterial smear and culture. Sample for GenExpert polymerase chain reaction test for *Mycobacterium tuberculosis* was also sent, which was negative. X-ray chest and electrocardiogram were normal. Relevant blood investigations and results of urine analysis are mentioned in Tables 1 and 2, respectively.

At admission, he was empirically initiated on intravenous meropenem at doses adjusted for renal impairment. Pus smear from renal abscesses from both sides showed septate fungal hyphae. The patient was advised to take intravenous voriconazole. However, after discussion, he opted for intravenous amphotericin

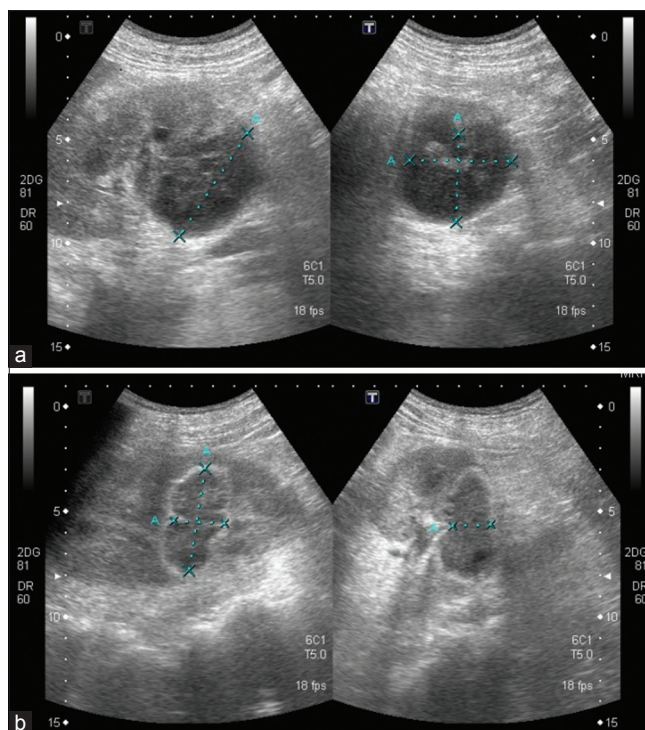


Figure 1: Ultrasound of the right (a) and the left (b) kidney with renal abscesses

B which was started at a dose of 1 mg/kg/day. Cultures from both renal abscesses revealed growth of *Aspergillus fumigatus*. The patient's hospital stay was complicated by worsening renal function, acute pulmonary edema, hyperkalemia, and metabolic acidosis. He was initiated on hemodialysis and noninvasive ventilation. The patient had a sudden cardiac arrest, probably secondary to aspiration on day 9 of hospital stay and he succumbed to his illness.

Discussion

Fungal pyelonephritis due to *Aspergillus* can present with fever and flank pain, similar to bacterial pyelonephritis.^[6] Renal aspergillosis can also lead to obstruction of the urinary tract, hydronephrosis, oliguria, and anuria.^[7]

A case series that studied patients with antemortem and postmortem diagnosis of renal aspergillosis found the mortality rate to be 81%. Fifty-five percent of patients with renal aspergillosis had renal failure.^[8] Diabetes mellitus, high leukocyte count (>20,000 cells/mm³), and acute renal impairment are associated with severe pyelonephritis with multifocal lesions (odds ratio 2.9, 7.1, and 7.9, respectively). These are also likely to be seen in patients with renal abscesses.^[9] All of the above poor prognostic factors were present in our patient.

In patients with invasive aspergillosis, older age, higher sequential organ failure assessment score, mechanical ventilation, and need for renal replacement therapy are associated with mortality.^[10]

Fever, pyuria, and duration of symptoms before hospitalization are not helpful in differentiating patients with and without renal abscesses.^[11] Computed tomography scan of the kidneys should be done when renal abscesses are suspected.

Ahmad reported an immunocompetent patient with unilateral emphysematous pyelonephritis. This patient had refused nephrectomy and hence was managed conservatively with liposomal amphotericin and flucytosine for 2 months. He showed clinical improvement along with resolution of renal failure with the above management.^[5]

Another case report describes a patient with bilateral primary renal aspergillosis and granulomatous interstitial nephritis. He was managed with intravenous amphotericin B and did not require surgical intervention.^[4] However, in contrast to our patient, the above patients had less severe renal dysfunction and did not require hemodialysis or Intensive Care Unit care.

Lisson *et al.* have reported a case of bilateral renal aspergillosis, initially managed with parenteral antifungals, subsequently requiring left nephrectomy followed by partial right nephrectomy. Necrotic mass and renal infarcts were found in the affected kidney.^[3]

Fungal infections should be suspected in patients who have symptoms and signs of pyelonephritis, especially those with persistent fever and lack of response or worsening despite antibiotics.

This case highlights the importance of obtaining a microbiological diagnosis in patients with pyelonephritis. Maintaining a high index of suspicion is crucial as early administration of antifungals is required in fungal pyelonephritis.

Though rare, fungal renal abscesses can mimic bacterial pyelonephritis and should be considered as a differential diagnosis in patients with acute pyelonephritis.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and

due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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