

## A Hospital-Based Assessment of the Spectrum of Renal and Perinephric Space Infection: An Observational Study

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### Abstract

**Aim:** The aim of the present study was assess the spectrum of renal and perinephric space infection among urology patients.

**Methods:** The present study was conducted in the Department of General Surgery for the period of 24 months. 200 patients were included in the study. Suspected patients were clinically evaluated and investigated using ultrasound scan of the abdomen.

**Results:** Out of 200 patients, 130 (65%) males and 70 (35%) females suffered from renal and perirenal space infections in the age group of 10-70 years. Majority were young in the age group of 21-30 years. At the time of presentation, the commonest symptom was fever (96%) followed by flank pain (43%) weakness and lethargy (73%). The average duration of symptoms was 23 days (range 7-60 days). On clinical examination, all patients were febrile (range 99- 103° F) with marked costovertebral tenderness in 90%. It was seen that 96 (48%) patients had renal abscess, 84 (42%) perinephric abscess and 20 (10%) emphysematous pyelonephritis. The predisposing factors were diabetes mellitus (36%), ureteric calculi (32%) and renal calculi (24%) in these patients. 120 patients were treated with antibiotics only and 40 patients were treated with antibiotics+ PCD. In 8 patients, there was drainage of pus and debris.

**Conclusion:** Renal and perinephric space infection continues to be a serious urological problem with high mortality rate. A high index of suspicion, prompt diagnosis, appropriate antibiotics and surgical intervention may be effective in reducing mortality.

**Keywords:** Renal abscess; Perinephric abscess

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### Introduction

Renal and perirenal abscesses are rare disease entities resulting from infections in or surrounding the kidneys. In the past, they were associated with significant morbidity and mortality, which was in part due to their obscure symptoms and lack of detection using low-quality imaging systems. [1-5]

Renal abscess (RA) is defined as encapsulated pus confined to the renal parenchyma and is further divided into renal cortical or corticomedullary abscess. [6] Perinephric abscess (PNA) is a collection of suppurative material located between Gerota's fascia and the renal capsule. [7] Complications of urinary tract infections (UTIs) and hematogenous seeding from primary infected sites are the common source of infection. [7,8] Additionally, rupture of renal cortical abscess or renal carbuncle can result in the formation of PNA. [7]

As a result of its anatomical location and potential to spread, RA is potentially lethal and the prognosis can be poor, especially in immunosuppressed and cachectic patients. [6,9] PNA originates from hematogenous dissemination, and often has an acute presentation with pain and high spiking temperatures [7], while in most cases, PNA is notoriously silent clinically, thereby the diagnosis can be challenging. [7] It is reported that only 35%-38% of patients with PNA are correctly diagnosed at the time of admission. [10,11]

Renal abscess, which is extremely rare in pediatrics, has a long treatment period and is highly destructive to the kidneys. It is an extremely serious type of kidney infectious disease. The clinical manifestations are non-specific, including fever, abdominal pain, nausea, vomiting, and hematuria. [12-14] There is often a history of cold or surgery before the onset of the disease. The most common

pathogens are *Escherichia coli* and *Staphylococcus aureus* [12,14,15], which may be retrograde or hematogenous. Potential susceptibility factors include diabetes, vesicoureteral reflux, pelvic ureteral duplication malformation, and nephrolithiasis. [14-17]

The aim of the present study was assess the spectrum of renal and perinephric space infection among urology patients.

### Materials and Methods

The present study was conducted in the Department of General Surgery, BMIMS, Pawapuri, Nalanda, India for the period of 24 months. 200 patients were included in the study. Suspected patients were clinically evaluated and investigated using ultrasound scan of the abdomen. When the findings were suggestive of renal and perinephric space infection, plain and contrast enhanced computed

tomogram (CECT) scan of the abdomen was done to confirm the diagnosis and grade the abscess.

After the diagnosis, all patients were put on combination antimicrobial regime in form of injection ceftriaxone 2 gm tid, injection amikacin 500 mg bid and injection metronidazole 500 mg tid as the first line therapy, good hydration and close monitoring for symptomatic relief, decrease in fever, flank pain and local tenderness. In cases of poor improvement in 48 hours, the regime was upgraded to injection ceftazidime 2 gm tid and ultrasound guided percutaneous drainage /surgical exploration was considered. After recovery, patients were re-evaluated at four to six weeks for abscess resolution and management of other predisposing factors (obstructing renal or ureteric calculi, diabetes mellitus).

### Results

**Table 1: Patient's profile and clinical data**

Gender	N (%)
Male	130 (65)
Female	70 (35)
<b>Age in years</b>	
10-20	8 (4)
21-30	74 (37)
31-40	64 (32)
41-50	38 (19)
51-60	12 (6)
>60	4 (2)
<b>Side</b>	
Right	110 (55)
Left	90 (45)
<b>Predisposing factors</b>	
UTI	20 (10)
Renal calculi	48 (24)
Ureteric calculi	64 (32)
Renal and ureteric calculi	4 (2)
Diabetes mellitus	72 (36)
Chronic renal failure	10 (5)
End stage renal disease	6 (3)
<b>Presenting symptoms</b>	
Pain in flanks	86 (43)
Fever with chill and rigor	188 (94)
Loss of weight	44 (22)
Weakness/lethargy	146 (73)
Pyuria	4 (2)
Decreased urine out	4 (2)
<b>Clinical findings</b>	
Fever	192 (96)
Costovertebral tenderness	180 (90)
Palpable lump	60 (30)

Diagnosis	
Renal abscess	96 (48)
Perinephric abscess	84 (42)
Emphysematous pyelonephritis	20 (10)

Out of 200 patients, 130 (65%) males and 70 (35%) females suffered from renal and perirenal space infections in the age group of 10-70 years. Majority were young in the age group of 21-30 years. At the time of presentation, the commonest symptom was fever (96%) followed by flank pain (43%) weakness and lethargy (73%). The average duration of symptoms was 23 days (range 7-60 days). On

clinical examination, all patients were febrile (range 99- 103° F) with marked costovertebral tenderness in 90%. It was seen that 96 (48%) patients had renal abscess, 84 (42%) perinephric abscess and 20 (10%) emphysematous pyelonephritis. The predisposing factors were diabetes mellitus (36%), ureteric calculi (32%) and renal calculi (24%) in these patients.

**Table 2: Treatment and outcome**

Treatment	No. of patients	Nephrectomy	Death
Antibiotics alone	120	-	-
Antibiotics + PCD	40	16	4
Antibiotics + urinary drainage	20	-	-
Antibiotics + exploration			
Drainage of pus & debris	8	-	-
Nephrectomy	16	16	8
Ureterolithotomy	40	-	4

120 patients were treated with antibiotics only and 40 patients were treated with antibiotics+ PCD. In 8 patients, there was drainage of pus and debris.

**Discussion**

Suppurative infections of the kidney and perinephric space are uncommon. However, they can cause significant morbidity and mortality. [18,19] These infections affect both sexes equally except renal cortical abscess, which is three times more common in males. The incidence also increases in elderly and those with associated obstructive uropathy. [20-22] These infections are either intrarenal (cortical) or perirenal.<sup>18</sup> Ten percent of renal cortical abscesses rupture through the capsule forming a perinephric abscess, which is difficult to manage and carries a poor prognosis.<sup>20</sup> The mortality is high even after surgical intervention. [23,24] The clinical differentiation is difficult and computerized tomography (CT) scan is the best method to identify a renal cortical or perinephric abscess. [25]

Out of 200 patients, 130 (65%) males and 70 (35%) females suffered from renal and perirenal space infections in the age group of 10-70 years. Majority were young in the age group of 21-30 years. At the time of presentation, the commonest symptom was fever (96%) followed by flank pain (43%) weakness and lethargy (73%). The average duration of symptoms was 23 days (range 7-60 days). On clinical examination, all patients were febrile (range 99- 103° F) with marked costovertebral tenderness in 90%. It was seen that 96 (48%) patients had renal abscess, 84 (42%) perinephric abscess and 20 (10%) emphysematous pyelonephritis. The predisposing

factors were diabetes mellitus (36%), ureteric calculi (32%) and renal calculi (24%) in these patients. 120 patients were treated with antibiotics only and 40 patients were treated with antibiotics+ PCD. In 8 patients, there was drainage of pus and debris. Successful treatment of renal abscess requires prolonged intravenous and oral antibiotics while surgical or percutaneous drainage is reserved for non-responders. [26,27]

Perinephric abscesses usually occur because of disruption of a corticomedullary intranephric renal abscess, recurrent pyelonephritis, xanthogranulomatous pyelonephritis or an obstructing renal pelvic stone causing pyonephrosis. Gram negative bacterial abscess commonly develops due to rupture of corticomedullary abscess while the staphylococcal infection develops due to rupture of a renal cortical abscess. Approximately 30% of cases are attributed to haematogenous dissemination from other sites of infection such as wound infection, furuncles or pulmonary infection. Abscess can also occur from ascending urinary tract infection, the presenting symptoms of which are nonspecific. [28] Factors associated with antimicrobial treatment failure are large abscesses, obstructive uropathy, severe vesico- ureteral reflux, diabetes, old age and urosepsis with gas forming organisms. A drainage procedure should be considered when there is a large abscess and no clinical improvement occurs after 48 to 72 hours of appropriate antibiotic therapy. [21] If obstructive uropathy is present, prompt drainage by percutaneous nephrostomy should be performed and the lesion corrected once the patient is stable and

afebrile. If open drainage is required, an incision and drainage is preferred while nephrectomy is reserved for patients whose renal parenchyma is diffusely damaged and for elderly patients whose survival depends upon urgent surgical intervention. [29]

### Conclusion

Renal and perinephric space infection continues to be a serious urological problem with high mortality rate. A high index of suspicion, prompt diagnosis, appropriate antibiotics and surgical intervention may be effective in reducing mortality.

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