

An Assessment of the Spectrum of Renal and Perinephric Space Infection among Urology PatientsBishwanath Prasad¹, Rajesh Jain², Sujeet Kumar Bharti³¹Assistant Professor, Department of Surgery, ICARE Institute of Medical Science and Research & Dr BC Roy Hospital, Haldia, West Bengal, India²Assistant Professor, Department of Surgery, ICARE Institute of Medical Science and Research & Dr BC Roy Hospital, Haldia, West Bengal, India³Assistant Professor, Department of Surgery, Shri Ramkrishna Institute of Medical Sciences and Sanaka Hospital, Durgapur, West Bengal, India

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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. 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.**Results:** Out of 200 patients aged 10-70, 130 (65%) men and 70 (35%) females had renal and perirenal space infections. Young people aged 21-30 dominated. Fever (96%) was the most prevalent symptom at presentation, followed by flank discomfort (43%), weakness, and fatigue (73%). The average symptom duration was 23 days (7-60 days). Clinical examination revealed all patients were febrile (range 99-103° F) with 90% costovertebral pain. It was shown that 96 (48%) patients had renal abscess, 84 (42%) perinephric, and 20 (10%) emphysematous pyelonephritis. Patients with diabetes (36%), ureteric (32%), and renal (24%), were predisposed. Antibiotics alone were given to 120 patients and antibiotics+PCD to 40. Eight individuals had pus and debris leakage.**Conclusion:** Renal and perinephric space infection is a deadly urological issue. High suspicion, timely diagnosis, antibiotics, and surgery may reduce mortality.**Keywords:** Renal abscess; Perinephric abscess.

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Introduction

Renal and perirenal abscesses are infrequent pathological conditions that arise from infections occurring inside or in the vicinity of the kidneys. Previously, they were linked to substantial illness and death, partly because of their unclear symptoms and inability to be detected with low-quality imaging technologies. [1-5]

A renal abscess (RA) is characterized by the presence of encapsulated pus that is localized inside the renal parenchyma. This condition may be further classified into two types: renal cortical abscess and corticomedullary abscess. [6] The perinephric abscess (PNA) refers to a lump of purulent material that is situated between Gerota's fascia and the renal capsule. [7,8] The major sources of infection include complications arising

from urinary tract infections (UTIs) and hematogenous seeding originating from primary infected sites. Furthermore, the occurrence of PNA might be attributed to the rupture of renal cortical abscess or renal carbuncle. [7]

Due to its anatomical positioning and propensity for metastasis, rheumatoid arthritis (RA) has the potential to be fatal, with a particularly unfavorable prognosis seen in individuals with compromised immune systems and cachexia. Hematogenous dissemination is the source of PNA, which often manifests as an acute condition characterized by discomfort and elevated spiking temperatures. [6,9] In the majority of instances, PNA exhibits a notable lack of clinical manifestation, making the diagnosis a complex task. [7] According to reports, the

accurate diagnosis rate for patients with PNA at the time of admission is just 35%-38%. [10,11]

Renal abscess, a condition that is very uncommon in the juvenile population, requires an extended duration of therapy and poses significant harm to the kidneys. This is a really severe form of renal infectious illness. The clinical presentations exhibit a lack of specificity, including symptoms such as fever, stomach discomfort, nausea, vomiting, and diaphoresis. [12-14] The occurrence of the illness often precedes a medical history including a cold or surgical procedure. *Escherichia coli* and *Staphylococcus aureus* are the most prevalent pathogens, which may be either retrograde or hematogenous. Diabetes, vesicoureteral reflux, pelvic ureteral duplication malformation, and nephrolithiasis are among the potential risk factors. [14-17]

The objective of this research was to evaluate the range of renal and perinephric space infection in individuals with urological conditions.

Materials and Methods

The present study was conducted in the Department of General Surgery, ICARE Institute of Medical Science and Research & Dr BC Roy

Hospital, Haldia, West Bengal, 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)
Age in years	
10-20	8 (4)
21-30	74 (37)
31-40	64 (32)
41-50	38 (19)
51-60	12 (6)
>60	4 (2)
Side	
Right	110 (55)
Left	90 (45)
Predisposing factors	
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)
Presenting symptoms	
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)
Clinical findings	
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

Renal and perinephric suppurative infections are infrequent occurrences. Nevertheless, they have the potential to result in substantial illness and death. [18,19] These infections have an equal impact on both men and females, with the exception of renal cortical abscess, which has a threefold higher prevalence in males. The prevalence also rises among the elderly population and those with comorbid obstructive uropathy. [20-22] Infections may be classified as either intrarenal (cortical) or perirenal in nature. [18] Roughly 10% of renal cortical abscesses burst through the capsule, resulting in the formation of a perinephric abscess. This kind of abscess is challenging to handle and has a negative prognosis. [20] Even with surgical intervention, the mortality rate remains elevated. [23,24] The clinical distinction of renal cortical or perinephric abscess poses challenges, and the use of computed tomography (CT) scans is considered the most effective approach for its identification. [25]

Within the cohort of 200 individuals, it was observed that 130 (65%) were males and 70 (35%) were females who experienced renal and perirenal space infections within the age range of 10 to 70 years. The majority of individuals were between the age range of 21 to 30 years. The most prevalent symptom seen at the presentation was fever,

accounting for 96% of cases, followed by flank discomfort at 43%, and weakness and lethargy at 73%. The mean length of symptoms was 23 days, with a range of 7 to 60 days. Each patient had fever (ranging from 99 to 103° F) and significant costovertebral soreness in 90% of cases during the clinical examination. A total of 96 patients (48%) exhibited renal abscess, 84 patients (42%) presented with perinephric abscess, and 20 patients (10%) presented with emphysematous pyelonephritis. The patients in question exhibited predisposing characteristics such as diabetes mellitus (36%), ureteric calculi (32%), and renal calculi (24%). A total of 120 patients received treatment alone with antibiotics, while 40 patients received a combination of antibiotics and PCD. Drainage of pus and debris was seen in 8 individuals. Effective management of renal abscess necessitates extended administration of intravenous and oral antibiotics, with surgical or percutaneous drainage being reserved for cases where the patient does not respond. [26,27]

Perinephric abscesses frequently arise due to rupture of a corticomedullary intranephric renal abscess, recurrent pyelonephritis, xanthogranulomatous pyelonephritis or an obstructing renal pelvic stone producing pyonephrosis. Gram-negative bacterial abscesses frequently arise as a result of the rupture of corticomedullary abscesses, whereas staphylococcal infections are typically caused by the rupture of renal cortical abscesses. Haematogenous spread from other sites of

infection, such as wound infection, furuncles, or pulmonary infection, is responsible for around 30% of cases. Abscess may also arise as a result of ascending urinary tract infection, characterized by nonspecific presenting symptoms. [28] Factors related with antimicrobial therapy failure include big abscesses, obstructive uropathy, severe vesico-ureteral reflux, diabetes, old age and urosepsis with gas producing organisms. A drainage treatment should be considered when there is a big abscess and no clinical improvement occurs after 48 to 72 hours of proper antibiotic therapy. [21] In the presence of obstructive uropathy, it is recommended to promptly perform drainage through percutaneous nephrostomy and subsequently correct the lesion once the patient has achieved stability and afebrile status. If open drainage is necessary, an incision and drainage is favored whereas nephrectomy is reserved for patients whose renal parenchyma is diffusely injured and for elderly patients whose life relies upon early surgical intervention. [29]

Conclusion

There is still a significant mortality rate associated with renal and perinephric space infections, which are considered to be a major urological condition. There is a possibility that a high index of suspicion, timely diagnosis, appropriately administered antibiotics, and surgical intervention might be useful in lowering death rates.

References

1. Fowler Jr JE, Perkins T. Presentation, diagnosis and treatment of renal abscesses: 1972–1988. *The Journal of urology*. 1994 Apr 1;151(4):847-51.
2. Manjón CC, Sánchez ÁT, Lara JD, Martínez Silva V, Betriu GC, Sánchez AR, Peñalver CG, Galvis ÓL. Retroperitoneal abscesses. *Scandinavian journal of urology and nephrology*. 2003 Jan 1;37(2):139-44.
3. THORLEY JD, JONES SR, SANFORD JP. Perinephric abscess. *Medicine*. 1974 Nov 1;53(6):441-51.
4. Salvatierra O, Bucklew WB, Morrow JW. Perinephric abscess: a report of 71 cases. *The Journal of Urology*. 1967 Sep;98(3):296-302.
5. Adachi RT, Carter R. Perinephric abscess: current concepts in diagnosis and management. *The American surgeon*. 1969 Jan;35(1):72-5.
6. Jaik NP, Sajuiitha K, Mathew M, Sekar U, Kuruvilla S, Abraham G, Shroff S. Renal abscess. *J Assoc Physicians India*. 2006 Mar; 54:241-3.
7. Gardiner RA, Gwynne RA, Roberts SA. Perinephric abscess. *BJU international*. 2011 Apr; 107:20-3.
8. Coelho RF, Schneider-Monteiro ED, Mesquita JL, Mazzucchi E, Marmo Lucon A, Srougi M. Renal and perinephric abscesses: analysis of 65 consecutive cases. *World journal of surgery*. 2007 Feb;31:431-6.
9. Iwamoto Y, Kato M. A case with fistula formation between a perinephric retroperitoneal abscess, a ureter and a descending colon: Successful outcome after conservative management. *Canadian Urological Association Journal*. 2014 Sep;8(9-10):E644.
10. Shu T, Green JM, Orihuela E. Renal and perirenal abscesses in patients with otherwise anatomically normal urinary tracts. *The Journal of urology*. 2004 Jul 1;172(1):148-50.
11. Meng MV, Mario LA, McAninch JW. Current treatment and outcomes of perinephric abscesses. *The Journal of urology*. 2002 Oct; 168(4 Part 1):1337-40.
12. Linder BJ, Granberg CF. Pediatric renal abscesses: A contemporary series. *Journal of Pediatric Urology*. 2016 Apr 1;12(2):99-e1.
13. Chen CY, Kuo HT, Chang YJ, Wu KH, Yang WC, Wu HP. Clinical assessment of children with renal abscesses presenting to the pediatric emergency department. *BMC pediatrics*. 2016 Dec;16(1):1-5.
14. Seguias L, Srinivasan K, Mehta A. Pediatric renal abscess: a 10-year single-center retrospective analysis. *Hospital Pediatrics*. 2012 Jul 1;2(3):161-6.
15. Al-Taheini K, Leonard M, Pike J. MP-16.21: Management of renal abscess in children. *Urology*. 2006 Nov 1; 68:161.
16. Ko MC, Liu CC, Liu CK, Woung LC, Chen HF, Su HF, Li CY. Incidence of renal and perinephric abscess in diabetic patients: a population-based national study. *Epidemiology & Infection*. 2011 Feb;139(2):229-35.
17. Angel C, Shu T, Green J, Orihuela E, Rodriguez G, Hendrick E. Renal and peri-renal abscesses in children: proposed physiopathologic mechanisms and treatment algorithm. *Pediatric surgery international*. 2003 Apr; 19:35-9.
18. Dembry LM. Renal and perinephric abscesses: Current treatment options. *Infectious diseases*. 2002; 4:21-30.
19. Meng MV, Mario LA, McAninch JW. Current treatment and outcomes of perinephric abscesses. *The Journal of urology*. 2002 Oct;168(4 Part 1):1337-40.
20. Dembry LM, Andriole VT. Renal and perirenal abscesses. *Infectious disease clinics of North America*. 1997 Sep 1;11(3):663-80.
21. Yen DH, Hu SC, Tsai J, Kao WF, Chern CH, Wang LM, Lee CH. Renal abscess: early diagnosis and treatment. *The American journal of emergency medicine*. 1999 Mar 1;17(2):192-7.
22. Patterson JE, Andriole VT. Renal and perirenal abscesses. *Infectious disease clinics of North America*. 1987 Dec 1;1(4):907-26.

23. Salvatierra O, Bucklew WB, Morrow JW. Perinephric abscess: a report of 71 cases. *The Journal of Urology*. 1967 Sep;98(3):296-302.
24. Adachi RT, Carter R. Perinephric abscess: current concepts in diagnosis and management. *The American surgeon*. 1969 Jan;35(1):72-5.
25. Dalla Palma L, Pozzi-Mucelli F, Enet V. Medical treatment of renal and perirenal abscesses: CT evaluation. *Clinical radiology*. 1999 Dec 1; 54(12):792-7.
26. Patel NP, Lavengood RW, Fernandes M, Ward JN, Walzak MP. Gas-forming infections in genitourinary tract. *Urology*. 1992 Apr 1;39(4):341-5.
27. Gerzof SG. Percutaneous drainage of renal and perinephric abscess. *Urologic radiology*. 1981 Dec; 2:171-9.
28. Rinder MR. Renal abscess: an illustrative case and review of the literature. *Maryland Medical Journal (Baltimore, Md.)*. 1996 Oct 1;45(10):839-43.
29. Schaeffer A J. Infection of the urinary tract. In: Campbell M F, Retik A B, editors. *Campbell's Urology*. 7th ed. Philadelphia: W B Saunders & Co, 1998: 533-614.