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Case study of clinical profiles of renal and perirenal infections

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Abstract

Purpose

1. To study incidence and prevalence of renal and perirenal infections.
2. To study etiological factors, clinical data for occurrence and complications of renal and perirenal infections.
3. To find out various systematic methods to decrease morbidity and mortality.

Materials and Methodology: This is a prospective observational study in our tertiary care hospital. Total 60 patients were investigated for routine laboratory investigation and radiological investigations. Patient if indicated was operated with suitable open surgical or laparoscopy surgery and followed up for immediate and late post-operative complication

Results

- Most common clinical presentation was 33.3% costovertebral tenderness.
- On final diagnosis, 46.7% had renal abscess, 36.7% had perirenal abscess, 6.7% had Emphysematous pyelonephritis, 6.7% had renal Tb, and 3.3% had Xanthomatous Pyelonephritis
- Majority of cases 26.7% were managed by percutaneous pigtail, 18.3% had Open surgical Drainage, 16.7% had DJ stenting, 15% had PCNL, 10% had Percutaneous Nephrostomy, 6.7% had Partial Nephrectomy, 5% had Cystourethroscopy and 1.7% had Cystourethroscopy with DJ stenting

Conclusion: Renal and perirenal infections are very common now a days. Perirenal abscess go undiagnosed in prior stage. Later it comes with irreversible changes and complications. Most common predisposing factor found was diabetes and calculi. Most common microorganism causing the disease was E coli. Thus, this finding will help clinicians to decide the management and decrease further complications.

Keywords: Cystourethroscopy, DJ stenting, Nephrectomy, PCNL, xanthomatous pyelonephritis

Introduction

Kidney infection, also known as renal infection or pyelonephritis, happens when bacteria from the urinary tract travel up the urethra and affect one or both kidneys [1]. Most of the time, the bacteria that cause kidney infections come from another part of the urinary tract, such as the bladder, ureters, or urethra. Kidney infections most commonly affect people who already have a bladder infection, females, and pregnant people [2]. According to this definition, upper urinary tract infections (UTI) can be classified as pyelonephritis (with evidence of parenchymal involvement) or pyelitis (without evidence of parenchymal involvement at imaging). Only the pathological approach, based on imaging techniques, is apt to identify the presence of kidney scars [3]. Acute pyelonephritis is characterized by clinical symptoms of renal tenderness, flank pain, fever with rigors, and is usually accompanied by bacteriuria/ pyuria [4]. Usually it is due to seeding of the kidneys by bacteremia or ascending infection from fecal contamination. Gram negative infections due to Enterobacteriaceae are the common cause of which E.coli is the most often grown organism [5].

The therapy of upper urinary tract infections is likewise controversial, possibly because of the different prevalence of severe parenchymal lesions in the different series. General agreement is reached only on the potential danger of kidney abscesses, requiring hospitalization and long-term antibiotic treatment [6].

The severity of the disease depends on the extent of the infection and the comorbidities of the patient. [7] Significant predictors of poor prognosis and longer hospital stay include advanced age, diabetes mellitus, abscess size, lethargy, and renal insufficiency [8].

Surgery is indicated in the setting of anatomic abnormality and when the abscess is too large for effective percutaneous catheter drainage and antibiotics treatment.

Empiric treatment depends on causative organism and should cover gram-negative organisms and *S. aureus*. Initial antibiotic therapy should be given parenterally. Fever can persist for up to 4 to 5 days on appropriate antibiotic therapy. Parenteral therapy should be continued till final susceptibilities are available [9]. Therapy can be de-escalated to oral antibiotics 48 hours after resolution of symptoms such as fever. These patients should undergo prompt imaging studies and be referred to an infectious disease specialist and a nephrologist for further management. Any delay in diagnosis or treatment can lead to very high morbidity and mortality [10].

Thus, the present study was carried out to study incidence and prevalence of renal and perirenal infections and to find out various systematic methods (medical and surgical) to decrease morbidity and mortality.

Aims and objectives

1. To study incidence and prevalence of renal and perirenal infections
2. To study etiological factors, clinical data for occurrence of renal and perirenal infections
3. To study complications of renal and perirenal infections
4. To find out various systematic methods (medical and surgical) to decrease morbidity and mortality.

Material and methods

Study design: Prospective Study

Results

Study area: Tertiary care hospital

Sample size: 60 cases

Study duration: August 2020 to August 2022

Data collection: This was a prospective study carried out at a tertiary care hospital from August 2020 to August 2022. Total 60 patients were included in this study. Patient data was collected with detailed history and thorough clinical examination was done. Patients were investigated for routine laboratory (CBC, BSL LFT, RFT, urine culture sensitivity, pus culture sensitivity) investigation and radiological (Chest x-ray, USG abdomen + pelvis, local USG, CT, CECT) investigations

- Patient if indicated were operated with suitable open surgical or laparoscopy surgery.
- Patient were followed up for immediate and late post-operative complication.
- Laparoscopic surgery was done whenever indicated as per infrastructure facility availability.
- Data was entered in proforma in tabulated format and analyzed with respect to aims and objectives.

Inclusion criteria

- All patients having signs and symptoms of UTI associated with renal and perirenal infection of upper GU tract.

Exclusion criteria

- Terminally ill patients (other than urosepsis)
- Patients with malignancy and polytrauma
- Patients with medical renal disease were excluded.

Table 1: Age distribution

Age in years	Frequency	Percentage
<40	3	7
40 to 60	45	75
>60	12	20
Total	60	100

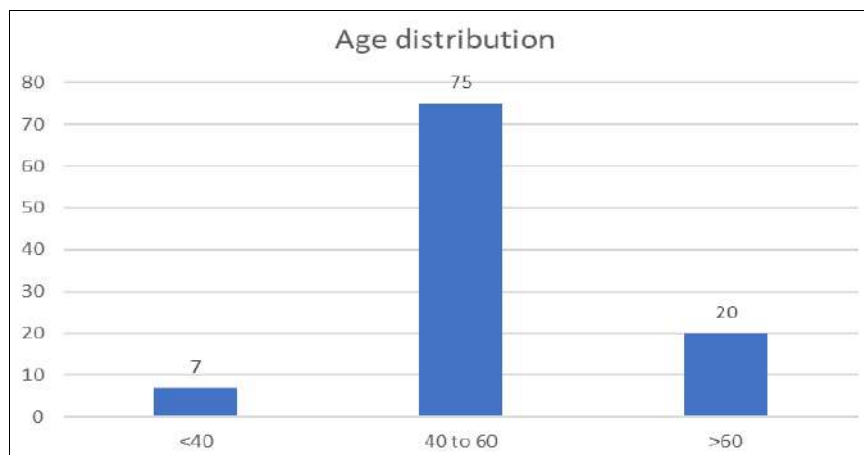


Fig 2: Majority 75% were in age group of 40 to 60 years. Mean age was 55.2±10.07 years, ranging between 22 to 82 years.

Table 2: Gender distribution

Gender	Frequency	Percentage
Male	26	43.3
Female	34	56.7
Total	60	100

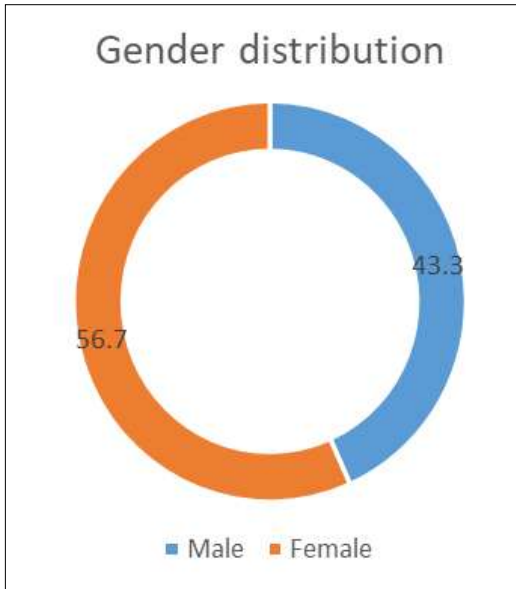


Fig 3: Female outnumbered males. 56.7% females and 43.3% males.

Table 3: Side affected

Side	Frequency	Percentage
Right	25	41.7
Left	33	55
Both	2	3.3
Total	60	100

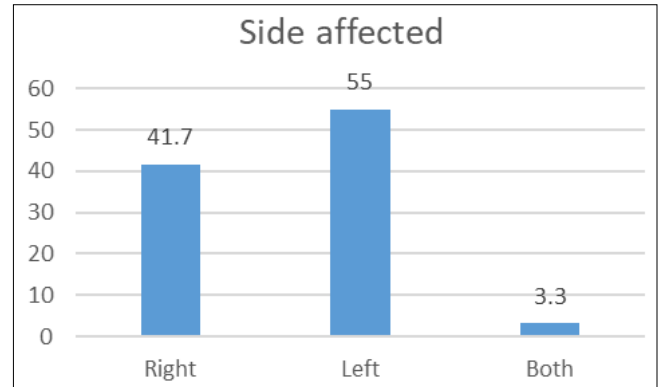


Fig 4: Most common side affected was left 55%, followed by 41.7% right and 3.3% had both side affected

Table 4: Predisposing factors

Predisposing Factor	Frequency	Percentage
Diabetes Mellitus	18	30
Immunocompromised	5	8.3
OTHER	2	3.3
Previous Operative Procedure	4	6.7
Renal Calculi	13	21.7
Ureteric Calculi	10	16.7
Urinary Tract Infection	8	13.3
Total	60	100

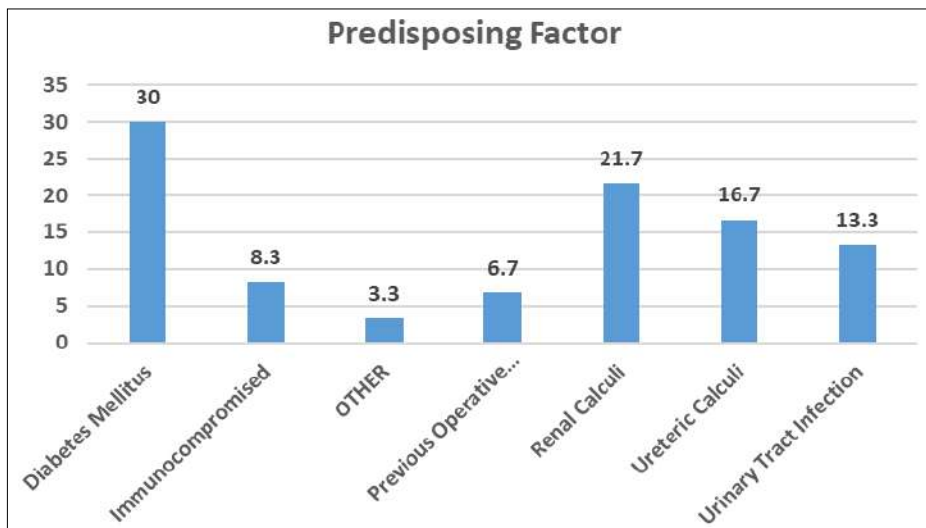


Fig 5: Majority 30% cases had DM, 21.7% had renal calculi, 16.7% had ureteric calculi, 13.3% had UTI so on.

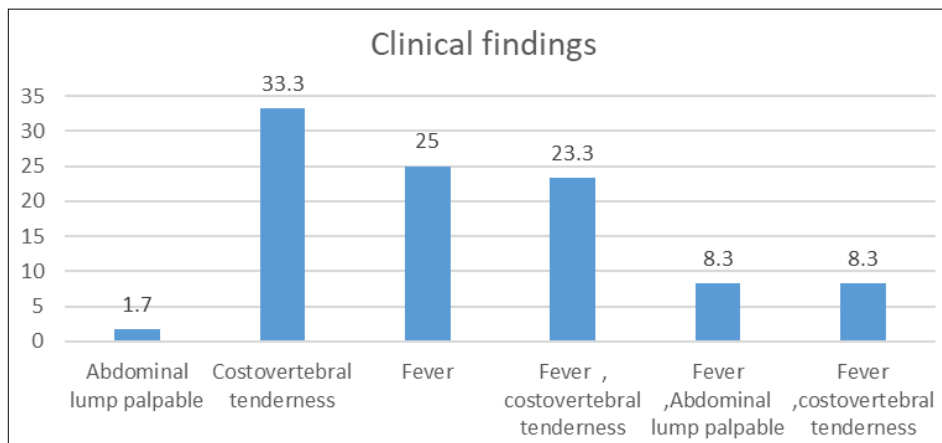


Fig 6: Most common clinical presentation was 33.3% costovertebral tenderness, 25% had fever, 23.3% had fever, costovertebral tenderness etc.

Table 5: Clinical presentation

Clinical findings	Frequency	Percentage
Abdominal lump palpable	1	1.7
Costovertebral tenderness	20	33.3
Fever	15	25
Fever, costovertebral tenderness	14	23.3
Fever, Abdominal lump palpable	5	8.3
Fever, costovertebral tenderness	5	8.3
Total	60	100

Table 6: Final diagnosis

Diagnosis	Frequency	Percentage
Emphysematous pyelonephritis	4	6.7
Perirenal abscess	22	36.7
Renal Abscess	28	46.7
RENAL TB	4	6.7
Xanthomatous Pyelonephritis	2	3.3
Total	60	100

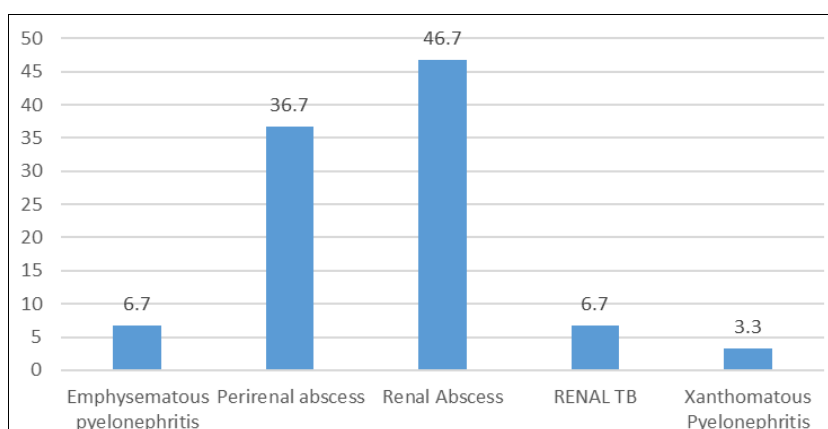


Fig 7: Final Dignosis

On final diagnosis, 46.7% had renal abscess, 36.7% had perirenal abscess, 6.7% had Emphysematous pyelonephritis, 6.7% had renal Tb, and 3.3% had Xanthomatous Pyelonephritis

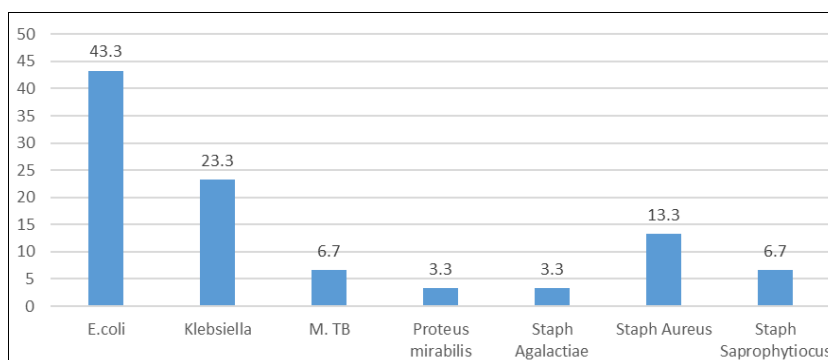


Fig 7: Microorganism identified

Table 7: Microorganism identified

Organism	Frequency	Percentage
E.coli	26	43.3
Klebsiella	14	23.3
M. TB	4	6.7
Proteus mirabilis	2	3.3
Staph Agalactiae	2	3.3
Staph Aureus	8	13.3
Staph Saprophytiocus	4	6.7
Total	60	100

Most common microorganism identified was 43.3% E coli, 23.3% Klebsiella, 13.3% Staph aureus, 6.7% each had M Tb and

Staph saprophyticus, and 3.3% each had Proteus mirabilis and Staph Agalactiae respectively.

Table 8: Management

Management	Frequency	Percentage
Cystourethroscopy	3	5
Cystourethroscopy with DJ stenting	1	1.7
DJ stenting	10	16.7
Open surgical Drainage	11	18.3
Partial Nephrectomy	4	6.7
PCNL	9	15
Percutaneous Nephrostomy	6	10
Percutaneous pigtail	16	26.7
Total	60	100

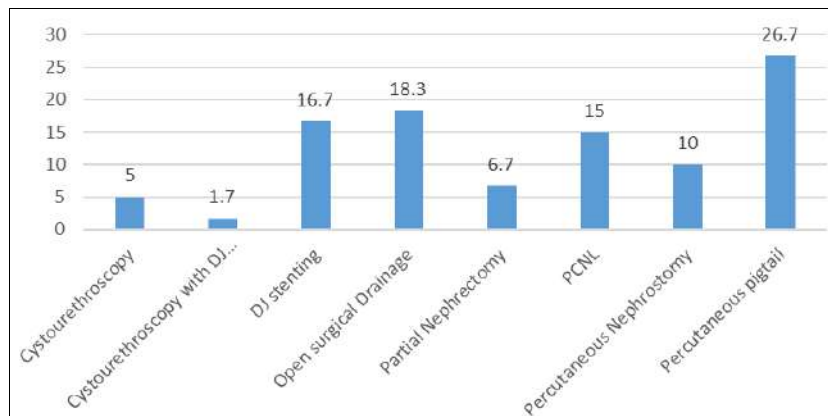


Fig 8: Management

Majority of cases 26.7% were managed by Percutaneous pigtail, 18.3% had Open surgical Drainage, 16.7% had DJ stenting, 15% had PCNL, 10% had Percutaneous Nephrostomy, 6.7% had

Partial Nephrectomy, 5% had Cystourethroscopy and 1.7% had Cystourethroscopy with DJ stenting

Table 9: Association between predisposing factors and final diagnosis

Predisposing Factor	Emphysematous pyelonephritis	Perirenal abscess	Renal Abscess	RENAL TB	Xanthomatous Pyelonephritis	Total
Diabetes Mellitus	3	8	7	0	0	18
Immunocompromised	0	1	0	4	0	5
OTHER	0	1	1	0	0	2
Previous Operative Procedure	0	2	2	0	0	4
Renal Calculi	1	5	5	0	2	13
Ureteric Calculi	0	4	6	0	0	10
Urinary Tract Infection	0	1	7	0	0	8
Total	4	22	28	4	2	100

In present study on association between predisposing factors and final diagnosis, it was seen that majority of cases had renal abscess and among them majority had DM and ureteric and renal calculi as predisposing factor. Applying chi square test, p value <0.001, as p value is <0.05, shows statistical significance.

Discussion

Age distribution

In present study majority 75% were in age group of 40 to 60 years. Mean age was 55.2±10.07 years, ranging between 22 to 82 years. Study by Liu XQ *et al.* [11] showed that mean age was 46.4 years. Study by Piccoli, G.B *et al.* [12] showed that mean age was 32 years. Study by Venkateshwara Murali Dhamocharan *et al.* [13] showed that majority were in age group of 51 to 60 years.

Gender distribution

In our present study female outnumbered males. 56.7% females and 43.3% males. Study by Liu XQ *et al.* [11] showed that 57% were females and 43% were males. Study by Deshpande NS *et al.* [14] showed that majority were males, M:F was 112:58. Study by Piccoli, G.B *et al.* [12] showed that all were females. Study by Venkateshwara Murali Dhamocharan *et al.* [13] showed that 52 were males.

Side affected

As per our study most common side affected was left 55%, followed by 41.7% right and 3.3% had both side affected. Study by Piccoli, G.B *et al.* [12] showed that 12.6% had bilateral affected side.

Predisposing factor

In present study majority 30% cases had DM, 21.7% had renal

calculi, 16.7% had ureteric calculi, 13.3% had UTI so on. Study by Kolla PK *et al.* [15] showed that bilateral EPN with urinary obstruction and hydronephrosis was in 50% of patients. Study by Deshpande NS *et al.* [14] showed that common aetiologies were acute gastroenteritis (20%), snake and unknown bite (18.8%), Infective causes (15.8%) and Poisoning and drug induced (15.2%). Study by Piccoli, G.B *et al.* [12] showed that 15.1% had renal scars. Study by Venkateshwara Murali Dhamotharan *et al.* [13] showed that 73% had risk factors.

Clinical presentation

In present study most common clinical presentation was 33.3% costovertebral tenderness, 25% had fever, 23.3% had fever, costovertebral tenderness etc. Study by Liu XQ *et al.* [11] showed that 76.5% had lumbar pain, 53.1% had fever, 11.2% had abdominal pain. Study by Deshpande NS *et al.* [14] showed that decreased urine output, swelling over face and lower limb and vomiting was most common presenting symptoms comprising of 44%, 45% and 34% respectively. Study by Piccoli, G.B *et al.* [12] showed that fever was absent in 6.7%, pain in 17.8%, lower urinary tract symptoms in 52.9%. Study by Venkateshwara Murali Dhamotharan *et al.* [13] showed that fever as most common presentation.

Final diagnosis

In our study on final diagnosis, 46.7% had renal abscess, 36.7% had perirenal abscess, 6.7% had Emphysematous pyelonephritis, 6.7% had renal Tb, and 3.3% had Xanthomatous Pyelonephritis. Study by Piccoli, G.B *et al.* [86] showed that 79.8% multiple abscesses were present. Study by Venkateshwara Murali Dhamotharan *et al.* [13] showed that 18 had Emphysematous pyelonephritis.

Microorganism identified

In our present study most common microorganism identified was 43.3% E coli, 23.3% Klebsiella, 13.3% Staph aureus, 6.7% each had M Tb and Staph saprophyticus, and 3.3% each had Proteus mirabilis and Staph Agalactiae respectively. Study by Kolla PK *et al.* [15] showed that E coli was causative agent among all patients. Study by Liu XQ *et al.* [11] showed that 51.4% had E coli, 10% Staph aureus, 8.6% had Klebsiella Pneumoniae etc. Study by Mathew, D. M. K *et al.* [16] showed that 22% had leptospira infection.

Management

In our study majority of cases 26.7% were managed by Percutaneous pigtail, 18.3% had Open surgical Drainage, 16.7% had DJ stenting, 15% had PCNL, 10% had Percutaneous Nephrostomy, 6.7% had Partial Nephrectomy, 5% had Cystourethroscopy and 1.7% had Cystourethroscopy with DJ stenting. Study by Kolla PK *et al.* [15] showed that resuscitation, normalization of serum electrolytes and blood sugars, administration of parenteral antibiotics, and relieving ureteric obstruction if present. Study by Liu XQ *et al.* [11] showed that Intravenous antibiotic therapy was necessary while intervention including surgical and nonsurgical approaches were reserved for larger abscesses, multiple abscesses, PNAs and non-responders.

Association between predisposing factors and final diagnosis

On Association between predisposing factors and final diagnosis, it was seen in present study that majority of cases had renal abscess and among them majority had DM and ureteric and renal calculi as predisposing factor. Applying chi square test, p value <0.001, as p value is <0.05, shows statistical

significance.

Study by Masina J *et al.* [12] showed that patients presenting to the ED with various risk factors and comorbidities, including HIV, sepsis, hypertension, and diabetes mellitus, may have underlying renal dysfunction. ED clinicians should therefore adopt a low threshold to screen for renal dysfunction in these patients.

Conclusion

Renal and perirenal infections are very common now a days. Perirenal abscess go undiagnosed in prior stage. Later it comes with irreversible changes and complications. Present study concluded that elderly age, females are more prone to the disease. Most common predisposing factor found was diabetes, calculi and infections. Most common microorganism causing the disease was E coli. Thus, this findings will help the clinicians to decide the management for such cases and decrease the further complications.

Conflict of Interest

Not available

Financial Support

Not available

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