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# STUDY OF THE CLINICAL PROFILE OF PATIENTS WITH CT PROVEN ACUTE PYELONEPHRITIS IN A TERTIARY CARE HOSPITAL.

**Dr. Venkateshwara Murali Dhamotharan, Dr. Srinivasan Ramadurai, Dr. Sowmya Gopalan*
Dr. Preetam Arthur**

*1. Consultant Physician, Venkateshwara Hospitals, Tirunelveli, Tamil Nadu.*
*2. Asst. Prof., Dept. of general medicine, Sri Ramachandra University, Chennai, Tamil Nadu*
*3. Asso. Prof., Dept. of general medicine, Sri Ramachandra University, Chennai, Tamil Nadu*
*4. Professor, Dept. of general medicine, Sri Ramachandra University, Chennai, Tamil Nadu*

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For Correspondence
Email ID:
sowmya_js@yahoo.com

**Abstract-**

**Background-** Acute pyelonephritis is a common renal infection that causes considerable morbidity.

**Materials and methodology-** This was a prospective study of a cohort of patients who presented to Sri Ramachandra University, Chennai, India between 2011 and 2013 with a CT proven diagnosis of acute pyelonephritis Data was collected and the patients were followed up till discharge or death. This was then analyzed.

**Results-** Out of the 100 patients, 52 were male. Most patients were in the 51-60 year age, diabetes was the most common risk factor present in 73% of the patients. Fever was the dominant symptom.18 had emphysematous pyelonephritis. 29 needed ICU care while 3 succumbed.

**Conclusions-** Acute pyelonephritis is a common infection, typical triad of symptoms are not very common, high index of suspicion is needed in diabetics. CT is very useful in diagnosis and early treatment results in good outcomes.

**Key words- Acute Pyelonephritis, CT abdomen, Clinical profile**

## Introduction

Acute pyelonephritis is characterized by clinical trial of renal tenderness, flank pain, fever with rigors, and is usually accompanied by bacteriuria/ pyuria. Usually it is due to seeding of the kidneys by bacteremia or ascending infection from fecal contamination. Gram negative infections due to Enterobacteriacae are the common cause of which E.coli.is the most often grown organism.

Predisposing factors include frequent sexual intercourse, old age, urological instrumentation, diabetes mellitus and pregnancy.

When associated with diabetes, immunosuppression, neoplasm and structural defects like calculi, strictures,

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reflex nephropathy, it is called complicated pyelonephritis.

Inclination towards early imaging has resulted in increasing numbers of cases being detected. CT abdomen is far superior to Ultrasound abdomen. CT abdomen will detect calculi, emphysema, hemorrhage, parenchymal calcification, obstruction and inflammatory masses.

**Methodology**

This is a prospective study of a cohort of patients admitted to Sri Ramachandra Medical college and Research Institute, a tertiary care hospital, located in Chennai, South India between 2011 to August 2013 with a CT proven diagnosis of acute pyelonephritis.

Approval was obtained from hospital ethics committee for this study and informed consent of the patients was taken. All patients were more than 18 years of age.

Detailed questionaire was filled up including the following data.

Age, Sex, comorbids, drug history, clinical symptoms and signs, lab investigations, urine and blood culture, ultrasound abdomen, CT abdomen, treatment and outcome till discharge.

Patient who were pregnant and those with prior urological intervention were excluded. Patients were followed up till their discharge from the hospital or death.Data was analyzed using standard SSPS Windows 16 software.

**Results**

**Table 1**- Symptoms and Co-morbidities

| | |
|---|---|
| **Sex distribution** | |
| Male | 52 |
| Female | 48 |
| **Symptomatology** | |
| Fever | 94 |
| Chills & rigors | 80 |
| Flank pain | 69 |
| Dysuria | 53 |
| Hematuria | 7 |
| **Comorbids** | |
| Diabetes | 73 |
| Calculi | 12 |
| BPH | 7 |

**Figure 1**: Age Distribution

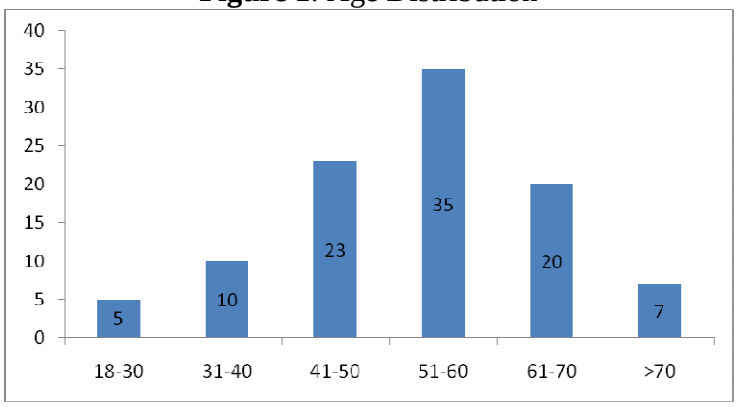

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**Table 2**- Microbiological pattern in urine culture

| **Urine Culture** | |
|---|---|
| **Organisms** | **Frequency** |
| E. Coli | 40% |
| Klebsiella | 4% |
| Enterococci | 4% |
| Proteus | 1% |
| Candida | 1% |
| Citrobacter | 1% |
| No growth | 49% |
| CT Imaging | Percentage of Patients |
| Unilateral Acute Pyelonephritis | 49% |
| Bilateral Acute Pyelonephritis | 33% |
| Unilateral EPN | 17% |
| Bilateral EPN | 1% |

**Figure 2**- CT Imaging

100 patients were included in the study: majority being in the 51-60 year age group (table 2).52 patients were male and 48 were female.

The most common presenting symptoms were fever (94%), rigors (80%) and flank pain (69%) (Table 1). 7% of patients also had hematuria.

The most common co-morbid condition was diabetes (73%).

Microbiological investigations revealed a positive urine culture in 51 patients. The most common pathogen was E. coli in 40 patients, followed by Klebsiella and Enterococci in 4 patients each (table 3). Blood culture was positive in 18 cases of which 16 grew E. Coli.

Imaging studies revealed the presence of unilateral involvement in 49 and bilateral in 33(table 4).

18 patients had evidence of emphysematous pyelonephritis.

53 patients were treated conservatively with appropriate antibiotics and supportive therapy alone while 47 also required urological intervention. D J stenting was the most often performed urological procedure.

29 patients required admission into intensive care units and 3 succumbed to sepsis.

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**Discussion:**

Urinary tract infection (UTI) is a common medical ailment that is responsible for considerable morbidity and is said to be the second most common cause for visits to a health care setup. [1]Published data reveals that it is a disease that is seen most often in women which has been attributed to various causes including a short straight urethra, use of diaphragms and spermicidal, sexual intercourse, pregnancy, proximity of the urinary and genital tracts etc.[2,3]

In this study, the gender prevalence was 52 male and 48 female. Most reports have a higher female preponderance in the ratio of 4-5:1.[4,5] Reasons for a higher male population in our study may be due to exclusion of pregnant women with UTI and also because only those who had a CT Scan showing evidence of acute pyelonephritis(APN) were included- hence those with uncomplicated pyelonephritis and lower urinary tract infections who were treated based on cultures and had undergone ultrasound imaging were not included.

This infection has a bimodal peak, first one in woman of age 20-29 years and for both the sexes older than 50 years. Prostate and obstructive urinary problems, diabetes mellitus and renal involvement secondary to diabetes contribute to the second peak.

In this study, the peak was in the 51-60 years group with 35 patients with an almost equal number in the 31-40 and 61-70 age group.

Classical triad of fever with rigors, flank pain and dysuria usually occurs in 35 % of patients with acute pyelonephritis. In our study 94 patients has fever, 80% had rigors, 69% flank pain, 53 dysuria. Only 53 patients had all the three clinical symptoms.

So high degree of suspicion is required for diagnosis of acute pyelonephritis.

It is well known that APN is usually associated with diabetes, immunocompromised state, malignancy and structural abnormalities of the urinary tract. In this study 76 patients were diabetic. The increasing prevalence of diabetes in India may lead to an increase in the number of patients with pyelonephritis and hence a high index of suspicion is needed in diabetics.

12 patients had benign prostatic hypertrophy and 7 had renal calculi.

Multiple studies have shown that E. Coli is the commonest pathogen in acute pyelonephritis with 40- 80% of the urine cultures showing growth of this bacteria.[5,6,7] Others include Pseudomonas, Klebsiella, Proteus, Enterobacter, and Enterococcus faecalis. Nosocomial UTIs tend to be caused often by Candida, other Enterobacteriaecae such as Pseudomonas and by Enterococcus.[8] Candida has been isolated in about 9.45 of patients with hospital acquired UTIs.[8]

In this study, culture isolation of microorganism was about 51% probably due to widespread use of over the counter antibiotics prior to presentation. E.Coli was the causative organism in 80% of patients while there was 1 patient who grew Candida.

Uncomplicated renal infections generally do not require any imaging. However early imaging is warranted in patients with severe or atypical symptoms and signs, urogenital structural lesions, immunosuppressed or those who do not respond to adequate therapy. CT imaging of the genitourinary tract has emerged as the imaging of choice in patients with pyelonephritis.[9]CT helps to define the extent of involvement, helps in detecting perinephric fluid collections, abscesses, haemorrhage, gas, calculi, renal enlargement and inflammatory masses.[9]It is also useful to identify patients who require interventions. In this study CT showed 18 patients had emphysematous pyelonephritis while 33 had bilateral pyelonephritis.47

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patients underwent urological intervention including all the patients with emphysematous pyelonephritis. DJ stenting was the procedure performed.

Data from West shows mortality rates ranging from 7.7 to 16.5/1000 patients with acute pyelonephritis.[4]3 patients succumbed to their illness in the study and all had evidence of sepsis with multiple organ involvement.29 patients needed stabilization in the intensive care units-more often in the subgroup that had bilateral involvement.

**Conclusion:**

APN is more common than it is thought of. Patients seldom present with classical triad of flank pain, fever with rigors, dysuria. Diabetics are very high risk population to develop APN and the commonest pathogen is E.coli. CT imaging helps us in the diagnosis and complication of APN. Early detection and treatment reduces mortality and morbidity.

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