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Urinary tract infection in patients with chronic kidney disease: a clinical and microbiological profile from a tertiary care

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ABSTRACT: Intention: Chronic illnesses are a serious obstacle for global health policy in the 21st century. An aging population and the advent of chronic illnesses due to modifiable risk factors associated with modern lifestyles. Chronic illnesses, particularly chronic kidney disease, pose a serious danger to world health in both developed and developing nations. Patients with Chronic Kidney Disease (CKD) in India face a significant public health challenge due to urinary tract infections (UTIs). The resistance profile of uropathogens acquired in the community is crucial for patients with CKD. When developing an empirical antibiotic treatment plan, it is crucial to have information on the microbiological profile and antimicrobial susceptibility of uropathogens.

Urine was collected under sterile conditions, cultured, and identified using established microbiological methods. The Kirby-Bauer disk diffusion technique was used to determine antibiotic susceptibility per CLSI standards.

Keywords: Multidrug-resistant bacterial urethritis and chronic kidney disease

I. INTRODUCTION

The majority of deaths caused by illness in the twenty-first century are now from chronic conditions. The prevalence of chronic illnesses like chronic kidney disease has serious consequences for health and economic production in developing nations like India. One's immune system weakens and their susceptibility to infections rises as kidney function progressively declines due to chronic inflammation caused by chronic kidney disease. Patients with 2CKD have a higher risk of contracting infections. Patients with 2CKD who also have diabetes and/or high blood pressure have an even higher risk of infection. UTIs may manifest clinically and microbiologically differently, depending on the stage of chronic kidney disease. The incidence of 4UTI is the second leading cause of infection in the general public.⁵ Despite a growing number of patients with chronic renal insufficiency, there is less experience in treating UTIs in this group. Treatment of a urinary tract infection (UTI) with an antimicrobial agent needs a therapeutically effective concentration of the

medicine against the causative organism in the patient's blood, kidneys, parenchyma, and urine (5,6). Therefore, knowing a microbiological profile allows us to avoid the spread of antibiotic resistance by guiding our empirical use of antibiotics (6, 7, 8).

II. MATERIALS AND METHODS

The current research was conducted by the Microbiology Department of a large hospital in western Odisha. During the research period (November 2019 through October 2020), 130 samples were processed and assessed as part of standard diagnostic work for patients with CKD at the Department of Nephrology. In VIMSAR, Burla, researchers examined 130 patients with CKD using a cross-sectional design. Both hospital inpatients and outpatients met the inclusion criteria.

Exclusion criteria:

1. Patients with prior antibiotic therapy
 2. Patients with immunosuppressive medication
 3. Patients on dialysis therapy
 Clean catch midstream urine was collected in a wide mouth sterile universal container. Urine samples were collected aseptically and cultured within 2 hours on to CLED medium by semiquantitative method and incubated overnight at 37°C. Antibiotic susceptibility test was performed using Kirby Bauer disc diffusion method \

III. RESULTS

We analyzed samples from 130 patients with a positive urine culture and CKD from our hospital. One hundred thirty positive urine cultures were collected, with 98 coming from men and 32

from females. There were 121 cases of gram-negative infection (93 percent), 5 cases of gram-positive infection (3 percent), and 4 cases of Candida infection (3 percent). Escherichia coli (62.3%) was the most prevalent uropathogen across all ages, with Klebsiella species (13.8%) coming in second. In our research, older guys were more likely to suffer from a UTI due to CKD. Thirty-five (26.1%) of the 130 CKD patients are seniors in the 60-70 age bracket. Ceftriaxone and cotimoxazole-resistant Gram-negative bacteria were susceptible to amikacin, phosphomycin, and nitrofurantoin. Amoxycylav-resistant gram-positive bacteria were shown to be susceptible to linezolid. Fluconazole was effective against all strains of Candida.

Tables and Charts TABLE 1

| GRAM NEGATIVE | |
|----------------------|-----------|
| Escherichia coli | 81 |
| Klebsiella species | 18 |
| Pseudomonas species | 8 |
| Citrobacter species | 5 |
| Non fermentors | 3 |
| Serratia | 3 |
| Proteus | 2 |

TABLE 2

| GRAM POSITIVE | |
|-----------------------|----------|
| Enterococcus species | 4 |
| Staphylococcus aureus | 2 |

TABLE 3

| CANDIDA | |
|----------------|----------|
| C.albicans | 2 |
| C.non albicans | 2 |

TABLE 4 (AGE DISTRIBUTION OF PATIENTS)

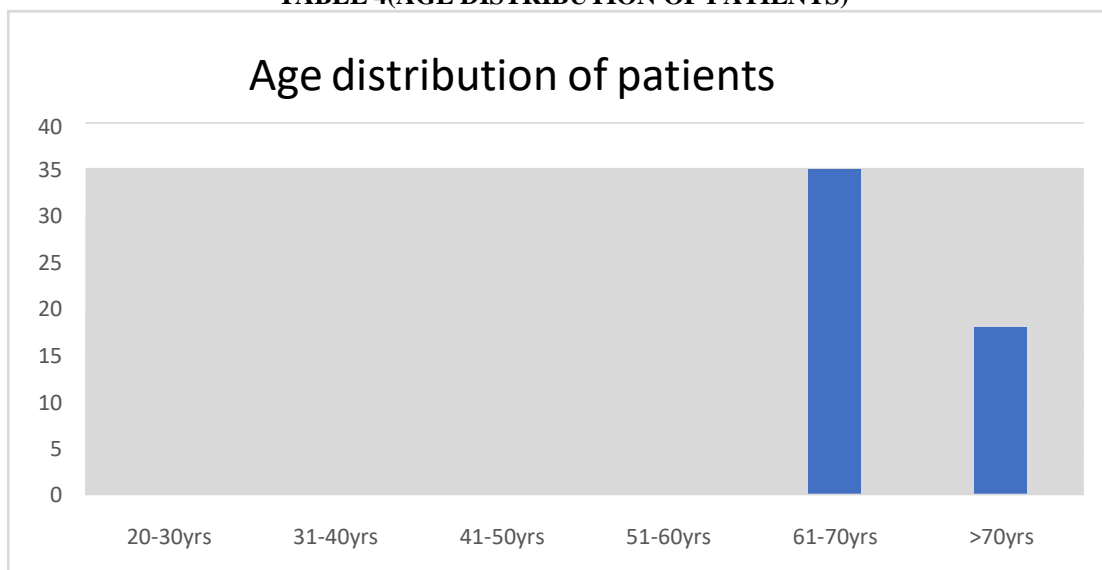


TABLE 5 (GENDER DISTRIBUTION OF PATIENTS)

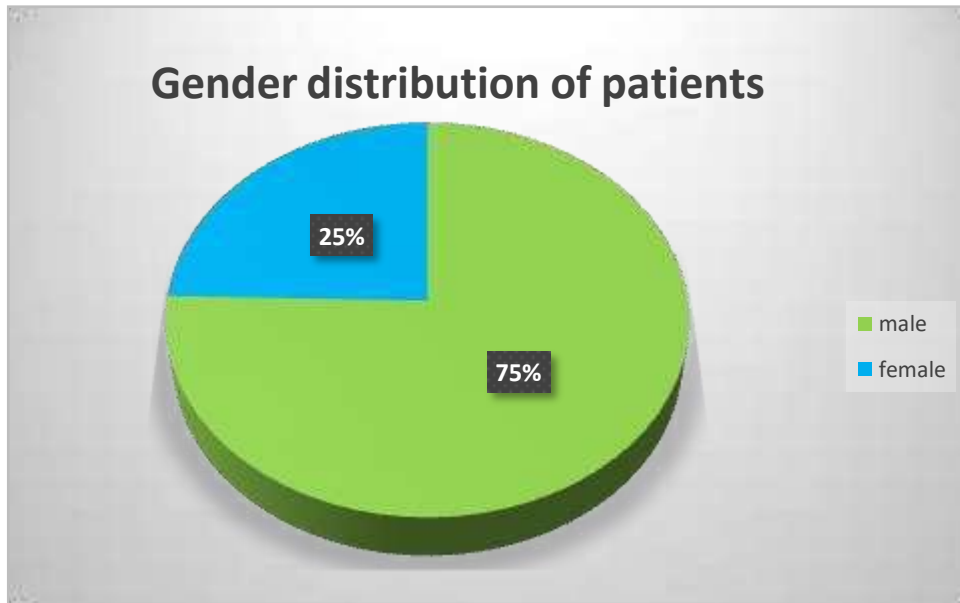
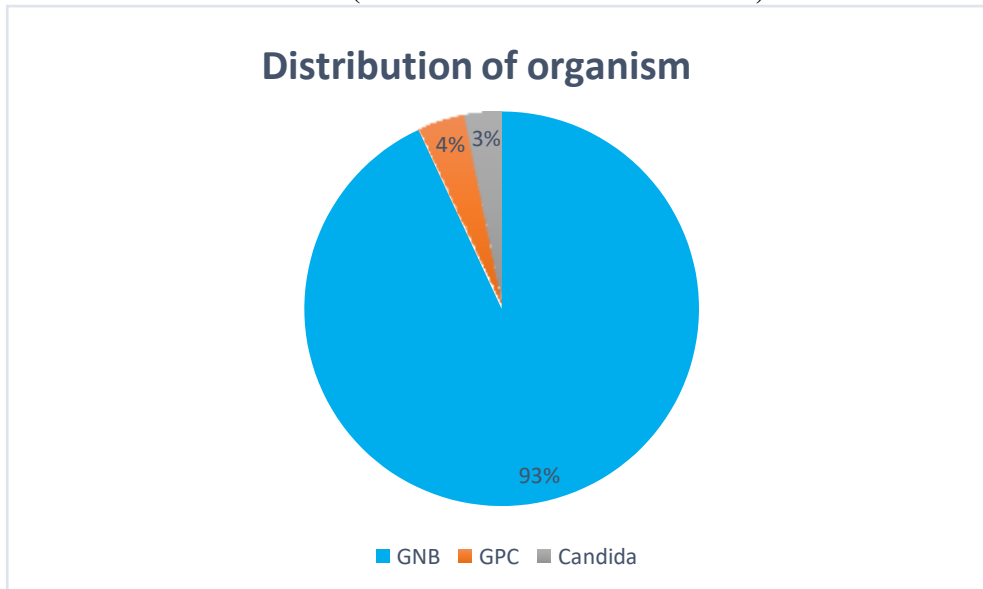


TABLE 6(DISTRIBUTION OF ORGANISM)



IV. DISCUSSION

According to our findings, older guys are at a greater risk of developing a urinary tract infection due to CKD. Urinary tract infections are more common in women than in men. However, the prevalence of CKD is higher in men than in women, therefore they suffer disproportionately in this case. Similar to the research by Mythri Shankar et al., we found that the prevalence of 2UTI in CKD was highest in older men, with 35(26.9%) of our CKD patients being in the 60–70 year age range.² Similar to the research of Mehrdad Payandeh et al., which included 130 CKD patients, 98 of them were male and 32 were female.^{6,7,8} Nearly 15% more Candida were found in this investigation than in the study by Chaudhary Richa et al., and 93% of the positive urine cultures were caused by gram-negative bacteria.^{6,7,8} The most prevalent uropathogen recovered was Escherichia coli (62.3%) across all ages, which represents an increase of 6% compared to a previous

research by Silvina Fiorante et al.^{6,7,8}. Ceftriaxone and Cotrimoxazole did not work against Gram-negative bacteria in our investigation, however Nitrofurantoin and Amikacin did. Linezolid was effective against Gram-positive bacteria, whereas Amoxyclav was ineffective, and fluconazole was effective against all strains of yeast.

V. CONCLUSION

UTIs seldom lead to permanent kidney damage because of how easily they may be treated. Kidney damage may occur as a result of urinary tract infections brought on by things like an enlarged prostate gland or a kidney stone. High fevers from a urinary tract infection (UTI) in young children might be harmful to their kidneys. UTI in CKD Depending on where the illness is at in its progression, people may do a lot of harm. As the clinical and microbiological characteristics of UTI in

the CKD population has not been well studied, Understanding uropathogens aids in antibiotic stewardship and reduces the risk of multidrug resistance.

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