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Original Research Article

Antimicrobial sensitivity in urinary tract obstruction due to calculus: a study of 50 cases

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ABSTRACT

Background: The urinary tract obstruction occurs due to several causes. one of the most important cause of obstruction is urinary calculus. urinary calculi are the third most common affliction of the urinary tract exceeded only by urinary tract infection and pathology of prostate. Improvement of the medical facility and increased health consciousness has resulted in more patients presenting with early urinary tract obstruction due stone.
Methods: This is prospective study. It was conducted from July 2017 to August 2018 at GMERS medical college Valsad. A Study of 50 cases was carried out, after thorough clinical examination and necessary investigations, patients were subjected to x ray KUB, ultrasonography, intravenous pyelography. The samples were cultured & Antimicrobial sensitivity determined.
Results: *Escherichia coli* is the commonest urinary pathogen causing 60 -90 % of infection, but in this study 72% of patient came infected with *Escherichia coli* 16% came infected with *Klebsiella*. Infection of anterior urinary tract (Urethritis) is mainly caused by N. Gonrrhoeae, staphylococci and chlamydia. Gentamicin is found to be most effective drug (78% sensitivity) in present series this is followed by Gatifloxacin (60% sensitivity), Septran (36% sensitivity) & Cefotaxime (34% sensitivity).
Conclusions: It is concluded that most of the urinary tract infections in human are caused by *Escherichia coli* with more sensitivity to Gentamicin.

Keywords: Adenocarcinoma, Colorectal, Carcinoma, Colonoscopy, Retrospective

INTRODUCTION

Urinary Tract Infection (UTI) is a general term that refers to infection/inflammation of any part of the urinary tract caused by bacteria. UTI is one of the most common bacterial infections encountered by clinicians worldwide, approximately 150 million people are diagnosed with urinary tract infections resulting in $6 billion health care expenditures.[1] Moreover, since reporting of antibiotic susceptibility results in suspected cases of UTI takes at least 48 hours following sampling, and therefore, in the majority of community-acquired UTI (CAUTI), treatment decision is empiric, based on the limited and predictable spectrum of etiological microorganisms and available data reflecting antibiotic resistance.[2]

UTI is said to exist when pathogenic organisms are detected in the urine, urethra, bladder, kidney or prostate. In most instances, growth of more than 105 organisms per milliliter from a proper collected midstream clean-catch urine sample indicates infection. However significant bacteriuria is lacking in some cases of true

UTI. Especially in symptomatic patients, a smaller number of bacteria (102 to 104/ml) may signify infection. In urine specimens obtained by suprapubic aspiration or in-and-out catheterization and in samples from a patient with an indwelling catheter, colony counts of 102 to 104/ml generally indicate infection. Conversely colony counts>105/ml of midstream urine are occasionally due to specimen contamination, which is especially likely when multiple species are found.[3]

Struvite stones are virtually always caused by a urinary tract infection (UTI) as a result of an enzyme secreted by certain types of bacteria. Because more women than men have UTIs, more women than men develop struvite stones. These stones can grow very large and can block the kidney, ureter, or bladder.[4]

The vast majority of uncomplicated UTIs are caused by Escherichia coli, with other pathogens including *enterococci*, *Staphylcoccus saprophyticus*, *Klebsiella spp*. And *Proteus mirabilis*.[5]

In patient with suspected UTI, antibiotic treatment is usually started empirically before urine culture result available. To ensure appropriate treatment, knowledge of the organisms that cause UTI and their antibiotic susceptibility is mandatory.[6]

METHODS

A Study of 50 cases was carried out in the Department of Surgery in GMERS hospital and Medical College, Valsad. In the present study patients with history suggestive of urinary tract obstruction due to renal 0r ureteric calculi were selected.

Main aim of this study is to assess the patients giving history suggestive of urinary tract obstruction due to renal or ureteric calculi and confirmed by plain x-ray KUB. The urine was collected pre-operatively as a mid-stream specimen as well as per operatively from urinary tract proximal to stone before the tract is opened. The samples were cultured and antimicrobial sensitivity determined.

Primary objective of study is:

- To find out the commonest infective organism present in the urinary tract obstruction due to calculus.
- To find out the most effective drugs over this infective organism.
- To facilitate the post-operative management of these patient by good antibiotic coverage.
- To evaluate precautionary measures collection.
- To assess cost effectiveness of antibiotics
- To assess for Antimicrobial resistance.
- To eradicate the infection by selecting the appropriate antibiotics that would targets specific bacterial susceptibility.

RESULTS

This is a present study of 50 cases of antimicrobial sensitivity in cases of urinary tract obstruction due to calculus - admitted in various surgical units of GMERS Hospital, Valsad Following observations are made. Although urinary calculus can occur at any age, in this part it is more commonly seen in 3rd, 4th and 5th decades of life. This study suggests that 70% of cases belongs to 3rd, 4th and 5th decades of life (Table 1).

Table 1: Incidence of age.

Range of age (years)	No. of patients	incidence
1-10	2	4%
11-20	4	8%
21-30	15	30%
31-40	6	12%
41-50	14	28%
51-60	5	10%
61-70	2	4%
71-80	2	4%

Although the urinary tract obstruction due to calculus occurs in 4:3 ration in most of the part of the world but in present study males are more affected than female with 3:1 male to female ratio (Table 2).

Table 2: Incidence of sex.

Sex	No. of patients	incidence
Male	34	68%
Female	16	32%

Although the occurrence of urinary tract infection due to stone is not much related, whether the patient come from urban or rural area. But we show that in this present series 54 % of the patients come from the rural area compared to 46% from urban locality (Table 3).

Table 3: Incidence of area distribution.

Area	No. of patients	incidence
Urban	23	46%
Rural	37	54%

Urinary tract infection can result in a wide range of symptoms from asymptomatic to the classic renal colic. Most of the patient comes to hospital with renal colic and burning micturition.

The present study group patients presented clinically with features of the flank pain (renal colic) in 98% of cases, while burning micturition occurred in 58%, followed by Nausea and vomiting in 48%, hematuria occurred in 20% of cases. There was considerable overlap of presentation this features presents in various combination (Table 4).

Table 4: Incidence of symptom.

Symptoms	No. of patients	Incidence
Flank pain	49	98%
Hematuria	10	20%
Burnning micturation	29	58%
Fever	9	18%
Nausea/vomiting	24	48%

The Clinical sign of urinary tract obstruction due to stone are somewhat non- specific.

Table 5: Incidence of sign.

Sign	No. of patient	Incidence
Tenderness in loin	34	68%
Palpable mass in abdomen	4	8%
Other	16	32%

In most of Patients tenderness present in the loin towards the affected side, occasionally associated with an abdominal mass palpable during physical examination, on rare occasions, the mass can be visible. In present study, tenderness in loin found in 68% of patients and mass in the abdomen is found in 8% of patients (Table 5). The basic approach to the patient is depend on taking a complete history, executing a thorough physical examination, and performing a urinalysis.

This basic dictate and guide the subsequent diagnostic evaluation. In present study patients are investigated by above tabulated investigations. Most of the patients are selected after observing X-ray KUB and renal function, exact site of stone is decided after ultrasonography and intravenous pyelography, which is necessary operative management of a patient (Table 6).

Table 6: Investigation.

Investigation	No. of patients	Incidence
X-ray kub	50	100%
Ultrasonography	50	100%
Intravenous pylography	50	100%
Other	5	10%

Table7: Infective organism and their antibiotic sensitivity.

Organism	No. of cases	Drugs used					
		Gatifloxacin	Gentamycin	Norfloxacin	Nalidixic acid	Cefotaxime	Septran
Escherichia coli	36	+	+	+	+	+	+
Klebsiella	8	+	+	+	+	+	+
Proteus	5	+	+	+	-	-	-
Negative	1	-	-	-	-	-	-

The presence of bacteria in urine is called bacteriuria. It is regarded as significant when the urine contains 105 organisms or more per ml. Although *Escherichia coli* is the commonest urinary pathogen causing 60 -90 % of infection, but in this study 72% of patient came infected with *Escherichia coli* 16% came infected with Klebsiella. Infection of anterior urinary tract (Urethritis) is mainly caused by *N. Gonrrhoeae*, *staphylococci* and *chlamydiae* (Table 7).

Table 8: Drug efficiency.

Etiology	No. of patients	Incidence
Gatifloxacin	30	60%
Gentamycin	39	78%
Norfloxacin	13	26%
Nalidixic acid	10	20%
Cefotaxime	17	34%
Septran	18	36%

The general principles for selecting the appropriate antibiotics include consideration of the infecting pathogen, underlying diseases, age, previous antibiotic therapy, other medications currently taken, outpatient v/s. inpatient status, pregnancy. Aminoglycosides are commonly used in treatment of urinary tract infection. They are most effective against most gram-negative bacteria. Gentamicin is found to be most effective drug (78% sensitivity) in present series this is followed by Gatifloxacin (60% sensitivity), Septran (36% sensitivity) and Cefotaxime (34% sensitivity). Gentamicin is the drug of choice in eradicating urinary infection and may render the urine sterile (Table 8).

DISCUSSION

In present study, the prevalence of UTI was higher in 3rd, 4th and 5th decades of life More cases of UTIs were recorded among young and middle age patients (20–49 years, 51.04%) by Akram et al.[7] In another study by Ullah F et al, middle-aged patients accounted for 54.3% of UTI.[8]

It is stated that UTI is predominantly a disease of the females due to a short urethra and proximity to vestibule and the anal opening. but in present study males are more affected than female with 3:1 male to female ratio. Were

reported by Khan et al, in Aligarh with a preponderance in young females (30 times > young males).[9] 46% patients from urban respondents and 54% patients from rural respondents were identified with UTI in present study. This may be attributed to the higher levels of awareness and treatment seeking behavior in the urban respondents compared to the rural respondents. The present study group patients presented clinically most common urinary symptom with features of the flank pain (renal colic) followed by Burning micturition, Nausea and vomiting, hematuria. Similar trends have been reported by Medina-Bambardo et al.[10]

E. coli and Klebsiella were the most common organisms isolated in present study. These findings agree with other recent reports by Iram Shaifali, Uma Gupta which have indicated that gram-negative bacteria, mostly *E. coli* (33.1%) and *Klebsiella* (7.9%) *protease* (0.7%) step aureus (2.2%).[11] The most effective antibiotic for E. coli in this study observed was Gatifloxacin followed by Gentamycin, Norfloxacin, Nalidixic acid, Cefotaxin and Seeptan. Similar pattern observed against Klebsiella in this study. Similar trends were reported by Kothari et al and Savas et al.[12,13]

Gentamicin is found to be most effective drug (78% sensitivity) in present series this is followed by Gatifloxacin, Septran and Cefotaxime. There was significant increase in sensitivity pattern in year 2017 was detected for Nalidexic acid, Mecillinum and Colistin because these antibiotics are not commonly used in our community in last few years. According to guideline by Infectious Diseases Society of America (IDSA) in the year 2011, an antibiotic is no longer recommended for empirical treatment of acute UTI if there is >20% resistance prevalence to that particular antibiotic.[14]

CONCLUSION

Most of the patients having UTI belongs to 3rd, 4th and 5th decades. Males are predominantly affected. Flank pain and burning micturition are main symptoms. All though signs vary but flank tenderness is the commonest sign. Haematuria is present only in 20% of cases. *Escherichia coli* is the most common organism found, followed by *Klebsiella*. Gentamicin is the most effective Antimicrobial agent followed by Gatifloxacin. Aminoglycosides are highly effective against most gram-negative bacteria, but when it combines with penicillins they are also effective against *enterococci*.

Cephalosporine has good activity against most uropathogens. Yet it is not unanimously expected whether to treat the urinary tract infection by a shorter period or a longer period. But, it is accepted that choice of the drugs and length of the treatment is decided on patient's history and various urine tests that identifies the offending organism or mixed organism.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Biadglegn F, Abera B. Antimicrobial resistance patterns of bacterial isolates from urinary tract infections at Felege Hiwot Referral Hospital, Ethiopia. Ethiop J Health Dev. 2009;23:236-8.
2. Akoachere JF, Yvonne S, Akum NH, Seraphine EN. Etiologic profile and antimicrobial susceptibility of community-acquired urinary tract infection in two Cameroonian towns. BMC Res Notes. 2012;5:219.
3. Stamm WE. Scientific and clinical challenges in the management of urinary tract infections. The Am J Med. 2002;113(1):1-4.
4. Sepsis and kidney stones, Sepsis Alliance. Available at https://www.sepsis.org/sepsis-and/kidney-stones/.
5. Blondeau JM. Current issues in the management of urinary tract infections. Drugs. 2004;64(6):611-28.
6. Ashkenazi S, Even-Tov SM, Samra Z, Dinari G. Uropathogens of various childhood populations and their antibiotic susceptibility. Pediatr Inf Dis J. 1991;10(10):742-6.
7. Akram M, Shahid M, Khan AU. Etiology and antibiotic resistance patterns of community-acquired urinary tract infections in JNMC Hospital Aligarh, India. Ann Clin Microbiol Antimicrob. 2007;6:4.
8. Ullah F, Malik S, Ahmed J. Antibiotic susceptibility pattern and ESBL prevalence in nosocomial *Escherichia coli* from urinary tract infections in Pakistan. Afr J Biotechnol. 2009;8:3921-6.
9. Khan AU, Zaman MS. Multiple drug resistance pattern in urinary tract infection patients in Aligarh. Biomed Res. 2006;17:179-81.
10. Medina-Bambardo D, Segui-Diaz M, Roca-Fusalba C, Llobera J. The Dysuria Team. What is the predictive value of urinary symptoms for diagnosing urinary tract infection in women? Fam Pract. 2003;20:103-7.
11. Shaifali I, Gupta U, Mahmood SE, Ahmed J. Antibiotic susceptibility patterns of urinary pathogens in female outpatients. North Am J Med Sci. 2012;4(4):163.
12. Kothari A, Sagar V. Antibiotic resistance in pathogens causing community-acquired urinary tract infections in India: a multicenter study. J Infect Dev Ctries. 2008;2:354-8.
13. Savas L, Guvel S, Onlen Y, Savas N, Duran N. Nosocomial urinary tract infections: Micro-organisms, antibiotic sensitivities and risk factors. West Indian Med J. 2006;55:188.
14. Colgan R, Willams M. Diagnosis and treatment of acute uncomplicated cystitis Am Fam Physician. 2011;84:771-6.

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