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Original Article

Frequency, clinical and antimicrobial profile of suspected urinary tract infection cases in a teaching Hospital

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Abstract

Background: UTI is the most common nosocomial and community acquired infection in underdeveloped and developing countries around the world. The incidence is also increasing day by day which may lead to bacteremia and renal failure. Women are more susceptible to UTI. Though the findings of urinary pathogens do not change much in different settings but resistance to anti-microbial drugs are increasing due to indiscriminate and irrational use. So, in this present study the prevalence of UTI in patients of this hospital was investigated. As well as clinical profile of those patients and their drug resistance pattern has been studied. **Materials & Methods :** This was a prospective cross sectional trial conducted in TMC & RCH on 250 suspected cases of UTI from October 2016 to March 2017. Data was collected from inpatient and outpatient department of medicine using questionnaire form. Sample was collected at early morning for Urine R/M/E, Urine Culture and Sensitivity investigation. Urine was collected from each patient into a 20mL calibrated sterile screw-capped universal container supplied to the patients. The specimens were labeled, transported to the laboratory, and analyzed within 6 hours. All patients were well instructed on how to collect sample aseptically prior to sample collection to avoid contaminations from urethra. Verbal & written informed consent was obtained from all patients prior to specimen collection. **Results :** Among 250 patients 60.4% were females, 58.4% patients were illiterate and 68% were from low socio-economic condition. 63.6% patients had symptoms of UTI for <6 weeks and 26.4 % samples revealed positive from urinary culture. Among the uro pathogens E.coli is the most frequently found bacteria (57.58%) and most of the patients are susceptible to parenteral drugs like amikacin, gentamicin and meropenem. There is also moderate resistance against nitrofurantoin. **Conclusion :** In this study, 58.4% of the patients were illiterate and 68% patients were from low-socioeconomic condition. Moreover, most of the patients were resistant to frequently used oral antimicrobial drugs and susceptibility remains toward injectable anti-microbial drugs increasing the economic burden as well as the morbidity of the patients. So, adequate health education should be given to people of low socio economic condition about maintaining personal hygiene. Physicians should also prescribe antimicrobial drugs according to culture and sensitivity report as much as possible. And local antibiogram should be followed for empirical therapy.

Key words : Urinary tract infection, Frequency, Clinical profile, Antimicrobial profile

Introduction

Urinary Tract Infection (UTI) has become the most common hospital-acquired infection, accounting for as many as 35 % of nosocomial infections, and it is the second most common cause of bacteraemia in hospitalized patients.¹ On the other hand, women are more susceptible to UTI in the community. About 20% of women experience a single episode of UTI during their lifetime, and 3% of women have more than one episode of UTI per year². Pregnancy also makes them more susceptible to infection³. With

advancing age, the incidence of UTI increases in men due to prostate enlargement and neurogenic bladder.⁴ Also 5% patients in the hospital develop catheter associated UTI.⁵ This could lead to irreversible renal damage resulting in renal failure also.⁶ This also increases the economic burden of the patients. UTI caused by a range of pathogens, but most Predominantly *Escherichia coli*, *Staphylococcus aureus*, *enterococcus* spp., *pseudomonas* spp., *Proteus* spp., *providencia* spp., *acinetobacter* spp., *klebsiella*

spp., citrobacter spp., Neisseria gonorrhoeae and other pathogens.⁷ In almost all cases, there is a need to start treatment before the final microbiological results are available. This causes distribution and susceptibility of UTI-causing pathogens to change according to time and place.⁸ Studies from the Nepal, India and other areas of Bangladesh have reported an increased resistance of the urinary pathogens to commonly-used antibiotics^{9,10}. But there has not been any report about antimicrobial resistance pattern in Bogra. So, in his present setting, the frequency of UTI and anti-microbial resistance pattern in the treatment of UTI as well as what should now be the choice of antibiotics in the treatment of UTI were investigated.

Objectives

General Objective

1. To see the types of bacteriuria among UTI patients.
2. UTI of hospital attended patients.

Specific Objectives

1. To see the clinical presentation among UTI patients.
2. To see the anti-microbial sensitivity pattern among UTI patients
3. To find the antibiotic of choice in the treatment of UTI

Materials & Methods

Study Design: This was a prospective cross sectional study.

Study Period: October 2016 to March 2017

Study Place: TMSS Medical College & Rafatullah Community Hospital, Bogra (TMC & RCH).

Study Population: All suspected UTI patients above 18 years.

Sample Size: 250 suspected cases of UTI attending outpatient & in patient department of TMC & RCH.

Sampling Method: Purposive sampling method will be followed as per Inclusion and Exclusion criteria. Evaluation of patient will be based on history, physical examination and investigation.

Inclusion Criteria

- Patient who has not taken any antibiotics within two weeks of this study.
- Patient >18 years of age.

Exclusion criteria

1. Patient who take antibiotics within two weeks prior study.
2. Patient who will be not interested to take part in the study.

Procedure

This was a cross sectional study carried out in department of Medicine, of TMSS Medical College & Roffatullah Community hospital, Bogra Bangladesh. Permission was taken from the Ethical committee of TMC & RCH before commencing this study. And the patients were selected randomly. Data regarding age, sex, type & duration of UTI, sign and symptoms of UTI was recorded in specific questionnaire forms. The urine samples were collected from the OPD and IPD patients who had features of urinary tract infection, determined by treating physicians, were included in this study admitted during six months from October 2016 to March 2017.

Sample collection for investigations

Urine was collected for Urine R/M/E and Urine C/S from each patient into a 20mL calibrated sterile screw-capped universal container which was supplied to the patients. The specimens were labeled, transported to the laboratory, and analyzed within 6 hours. All patients were well instructed on how to collect sample aseptically prior to sample collection to avoid contaminations from urethra.

Bacteriological investigation

Culture using calibrated wire loop (0.001 ml) samples were inoculated in to Cystine Lactose Electrolyte Deficient medium (CLED). After overnight incubation at 37°C for 24–48 hours colonies were counted to check significant growth. Colony counts yielding bacterial growth of 10⁵/ml of urine were regarded as significant for bacteriuria. Colonies from CLED were sub cultured into MacConkey agar and blood agar plates (BAP) (Oxoid, LTD) and incubated at 37°C for 24–48 hours. Identification of bacteria was done using colony characteristics, gram reaction of the organisms and biochemical test following standard procedure.¹¹ All procedures were conducted in TMC & RCH Microbiology Laboratory by the senior laboratory technologist in all the time to avoid professional biases.

Antimicrobial susceptibility testing

Susceptibility testing was performed on all isolates according to the criteria of National Committee for Clinical Laboratory Standards (NCCLS)¹² The drugs that were tested include amoxicillin, cephadrin, cefuroxime, ceftriaxone, ceftazidime, nitrofurantoin, ciprofloxacin, gatifloxacin, moxifloxacin, azithromycin, amikacin, gentamicin, vancomycin, colistin, meropenem, cotrimoxazol, amoxycylav.

Statistical analysis

The interested variables were processed, edited and analyzed by SPSS windows version 17.0. The socio-demographic data of the study population was expressed in frequency distribution and their observed

difference was tested by one sample 't' test and 'chisquare' test. P value <0.05 was considered as statistically significant with the 95% confidence interval. The results were presented in tables.

Results

250 patients were included in this study showing female preponderance (60.4%). Mean (of the age of the patients were 43.57(18.20) with the range of 18-95 years. Here, Table 1 shows socio-demographic data about the study population. Among the individuals, about 89.2% of the patients were muslims, 79.6% patients were married, 58.4% patients were illiterate, 82.0% patients were from rural area, 54.8% were housewives, 68.0% patients had income of <5000 taka.

Table - I: Socio-demographic Characteristics of the Study Population (n=250)

Variable		Frequency	Percentage
Age (Mean $\pm$ SD)		43.57 years (SD $\pm$ 18.20) 18 – 95yrs.	
Sex	Female	151	60.4%
	Male	99	39.6%
Religion	Muslim	223	89.2%
	Hindu	27	10.8%
Marital Status	Single	36	14.4%
	Married	199	79.6%
	Widow	09	3.6%
	Widower	06	2.4%
Level Of Education	Illiterate	146	58.4%
	Primary	54	21.6%
	Secondary	33	13.2%
	Higher Secondary	10	4.0%
	Graduate & above	07	2.8%
Occupation	Service	19	7.6%
	Business	18	7.2%
	Agriculture	35	14.0%
	Retired	18	7.2%
	Unemployed	23	9.2%
	Housewife	137	54.8%
Monthly Income	<5000 taka*	170	68.0%
	5001 – 10000 taka	54	21.6%
	10001 -15000taka	12	4.8%
	>15000taka	14	5.6%
Residence	Rural	205	82.0%
	Urban	45	18.0%

Table II shows frequency of clinical sign – symptoms of UTI. Among 250 study populations, 84% patients had fever, 74% patients had increased frequency of micturition, 77.6% patients had urgency and 61.6% patients had dysuria, 55.8% patients had loin pain, 55.6% had vomiting and 74.8% study population had burning sensation during micturition.

Table - II: Incidence of UTI by Clinical Sign- Symptoms.

Sign-Symptoms	Present (%)	Absent (%)
Fever	84.0	16.0
Frequency	74.0	26.0
Urgency	77.6	22.4
Dysuria	61.6	38.4
Intense Desire to Pass more Urine after Micturation	46.4	53.6
Visible Hematuria	7.2	92.8
Loin Pain	58.8	41.2
Vomiting	55.6	44.4
Burning Sensation during Micturation	74.8	25.2
Duration of Symptoms	<6 weeks	63.6 (%)
	6-12 weeks	30.4 (%)
	>12 weeks	4.0 (%)

Table III shows gender distribution for the rate of isolation of urinary pathogens in urine culture. Among 250 samples 66 samples revealed presence of uropathogens in culture of urine among which female and male were 43 and 23 respectively.

Table-III: Rate of Isolation of Uropathogens from Culture of Urine along with Gender Distribution

Sex	Growth of uropathogens, n	No growth of uropathogens, n
Female	43 (65.15%)	108 (58.69%)
Male	23 (34.85%)	76 (41.30%)
Total	66 (26.4%)	184 (73.6%)

Table IV shows pattern of bacteria isolated from urine culture. Among 250 samples 66 samples yielded bacterial growth. Of 66 samples most of the samples revealed E.coli (57.58%). Then S. aureus were found in 19.69% samples. Other samples revealed the presence of Klebsiella (10.61%), Enterococci (6.06%), Pseudomonas (3.03%), Enterobacter (1.51%) and Candida (1.51%) respectively.

Table - IV: Bacteria Isolated from Urine Culture

Bacteria	No.	Percentage(%)
E.coli	38	57.58
S. aureus	13	19.69
Klebsiella	07	10.61
Pseudomonas	02	3.03
Enterococci	04	6.06
Enterobacter	01	1.51
Candida	01	1.51
Total	66	100

Table V shows anti-microbial resistance pattern of uropathogens. Very high resistance is shown to amoxicillin, amoxycrav, cephradine, ceftriaxone, ceftazidime, co-trimoxazole ranging from 63.15% to 100%. Moderate resistance is shown against ciprofloxacin, moxifloxacin, azithromycin and vancomycin. Low resistance is shown against nitrofurantoin, amikacin, gentamicin and meropenem.

Antimicrobial Agent	E.coli (n=38) R%	S.aureus (n=13) R%	Klebsiella (n=7) R%	Enterococci (n=4) R%	Enterobacter (n=1) R%	Pseudomonas (n=2) R%
Amoxicillin	97.36	84.61	71.42	100	100	100
Amoxyclav	100	84.61	100	100	100	100
Cephadrin	78.94	61.54	71.42	100	100	100
Cefuroxime	86.84	61.54	100	100	100	100
Ceftriaxone	63.15	30.77	57.14	75	00	00
Ceftazidime	97.36	100	85.71	100	100	100
Nitrofurantoin	42.11	30.77	14.29	50	100	50
Ciprofloxacin	71.05	76.92	57.14	25	100	100
Moxifloxacin	65.78	53.84	71.23	25	100	100
Azithromycin	68.42	69.23	42.85	50	100	100
Amikacin	7.89	00	28.57	25	00	00
Gentamicin	21.05	7.69	14.29	50	00	00
Vancomycin	76.31	30.77	100	75	100	100
Co-trimoxazole	92.10	84.61	100	75	100	100
Meropenem	15.79	7.69	28.57	50	00	50

Discussion

Urinary tract infection (UTI) is one of the most important causes of morbidity in the general population. It is the most frequent community acquired and nosocomial infection.⁸ Moreover, emerging resistance to anti-microbial drugs is increasing day by day. It was documented in various other studies that, female are more commonly affected with UTI and the present setting also corroborates with this finding.⁹⁻¹² In this study it was also found out that people who are illiterate and with low socio – economic condition are more commonly affected by UTI which is probably due to lack of knowledge and personal hygiene. Like other documented studies, *E. coli* is the most frequently found pathogen on urinary culture. Frequencies of presence of other pathogens are not much different from the other studies. Drug resistance is the greatest concern for any bacterial infection including UTI. Though antimicrobial agents like amoxicillin, cotrimoxazole, cephradine, ciprofloxacin, azithromycin are used to treat UTI in many underdeveloped and developing countries including Bangladesh, it was shown in this study that resistance pattern is increasing in our country against those above mentioned drugs. Previously it was known that ciprofloxacin is the drug of choice for both complicated and uncomplicated UTI but in this study

it was shown that some bacteria are totally resistant to ciprofloxacin. This picture has also been shown for amoxicillin, amoxyclav, cephradine, ceftazidime, ceftriaxone also. Other studies have shown the susceptibility to nitrofurantoin is still intact.¹¹ But in the present study moderate resistance to nitrofurantoin was shown and the rate is increasing. Moderate resistance has also been shown against vancomycin and moxifloxacin. It was shown in this present setting that, susceptibility also remain for injectable drugs like amikacin, gentamicin and meropenem. As a result cost burden is increasing for patients which cannot be good news. Even for gram negative bacterial infection the only most susceptible drugs are now amikacin and meropenem which also corroborates with other studies.

Conclusion

Although pattern of uropathogens doesn't vary too much in different settings but increasing antimicrobial resistance to bacteria causing UTI is a great concern for all under developed and developing countries in particular. As susceptibility is decreasing towards most of the oral anti-microbial drugs, it is becoming a concern because of the increasing cost burden. So selection of antimicrobials for UTI should be guided by culture and sensitivity as much as possible.

Also health education should be given to people about personal hygiene to decrease the incidence of UTI and other bacterial infections.

Limitation

This study was conducted in a single center. Study population were also limited. Also distribution of patients based on the sources of infection like community acquired or nosocomial was also could not be mentioned.

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