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Research Article

BACTERIOLOGICAL STUDY OF URINARY TRACT INFECTION IN ANTENATAL CARE PATIENTS

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ABSTRACT

Aims & Objective: To isolate and diagnose the Uropathogens and its antibiotic sensitivity pattern in anti-natal care patient suffering from Urinary tract Infections. **Material and Methods:** 150 samples were collected by consent pregnant women between the age group of 18 to 40 years. A midstream clean catch is adequate, provided by all pregnant women's through given careful instructions. For enumeration of bacteria we perform standard loop techniques method. The number of colonies counted or estimated, and this number used to calculate the number of viable bacteria per ml of urine. The bacterial strains were identified by colonies character stick, gram staining, morphological and biochemical character. The bacterial strains identification was done up to genus and species level. The antibiotics sensitivity test of bacterial strains was done as per CLSI guidelines by Kirby-Baure Disc Diffusion Methods. **Results:** The significant bactiurea was found in 50 patients among 150 patients used. The most commonly isolated bacteria was *Escherichia coli* 23(40%) *Klebsiellaaerogens* 11 (22%) *Staphylococcus aureus* 10 (20%) *Pseudomonas aerugenosa* 4(8%).The incidence of bacteriuria among in their first pregnancy was 22.2%.The higher incidence of UTI in 2nd and 3rd trimester was found to have 31.4% & 40%. These studies were showing high level of resistance to first line antibiotics such as Cotrimaxozole. **Conclusion:** To minimizing the complication of the pregnant women should be educated about the physiology of pregnancy clinical presentation includes asymptomatic bacteria, acute cystitis & pyelonephritis. Pregnant women should be screened for asymptomatic bacteriuria by urine culture and treated with appropriate antibiotics. After the post treatment pregnant women should be examine again to confirm post treatment urine sterility.

Keywords: Pregnancy, Antimicrobial, UTI, Antenatal, Uropathogens.

INTRODUCTION

Urinary Tract Infection is an infection caused by the presence and growth of microorganism in the urinary treat. Urinary Tract Infection is the second most common type of infection that affects millions of people numbers times during life time. It is perhaps the single most common bacterial infection of mankind.[1,2] Urinary tract including the organs that collect the store urine and release it from the body which include kidneys, uterus, urinary bladders &urethra both in community & hospital settings and have been reported in all age groups in both sexes.[3]UTI is the second most common cause of bacteremia in hospitalized patients.[4,5]

Women tend to have UTI more often than man due to the short and wider female urethra and its proximity to anus. Bacteria may easily travel up to the urethra and cause infection from the rectum[2, 5] moreover, the main factors predisposing married women to bacteria are pregnancy and sexual intercourse.[6]The chances of bacterial contamination of the female urethra

increasing due to sexual activity. UTIs may cause in women because bacteria can be pushed into the urethra after intercourse. Once the bacteria may enter the urethra they travel upward, causing infection in the urinary bladder and other parts of the urinary tract.

The Pregnant women have increased risk for UTIs at the beginning in week $6^{th}$of gestations. Approximately 90% pregnant women develop urethral dilatation, increased bladder volume and decrease bladder tone, along with decreased ureteral tone contribution to increased urinary stasis and ureter vesicle reflux.[7] More than 70% of pregnant women develop glycosuria, which promote the bacterial growth in the urine. The increased level of progesterone and estrogens in urine may lead to a decreased the ability of invading the bacteria. This decreased ability may also cause by contract ureteral tone.[8,9] These factors may all present to the development of UTIs during pregnancy.

Significant bacteriuria may exist in asymptomatic patients. In 1960s Kass noted the subsequent high risk of developing pyelonephritis in patients with asymptomatic bacteria. The significant bacteriuria has been historically defined by finding more than 10^5cfu/ml of urine. [10,11]In recent studies the pregnant women with acute dysuria have showed the presence of significant bacteriuria with lower colony counts.[12,13]

The sign and symptoms of UTI may be varying to age, sex and location of the infection. The urine may develop an unpleasant odour. Women feel lower abdominal discomfort and experience sensations like there bladder is full. Women may have an STD (sexual transmitted disease) and urethral infection may also complain of a vaginal discharge. Dysuria, frequency and urgency, other symptoms may include rectal, testicular, penile or abdominal pain may be complained by man.

MATERIAL AND METHODS

Study Area: This study was done in Department of Microbiology at Teerthankar Mahaveer Medical College, Moradabad (U.P., India) in 2011 to 2012 after the approval of Institutional Ethics committee. A total of 150 urine sample were collected from pregnant women between the age group of 18 to 40 years. The urine sample was obtained by informed consent of the pregnant women.The Demographic and clinical information of the subjects were obtained by chart abstraction and recorded on prepare data collection form.

Sample collection: Midstream clean catchurine is requisite; the samples were collect by all patients by given instructions. The instructions are as follows:

- First the labia spread with one hand and then.
- With the other hand, wipe the urethral meatus downward toward the rectum with the help of towelette, and then discard the towelette.
- Then release initial portion of urine and collect the second part of urine in void mouth sterile containers approx 10-15 ml and then release the excess urine in to the toilet.

The clean catch specimen should not be reduces or eliminate the possibility of cross- contamination from the urethra and vagina. More than two organisms in a culture usually indicate a contaminated specimen.

Culture, Enumeration, Isolation & identification of Uropathogens: The culture was done on MacConkey Agar, Sheep Blood Agar and Mueller Hinton Agar was used for Antibiotics sensitivity. For enumeration of bacteria we perform standard loop techniques method. An inoculating loop of standard dimension is used to take up a small, approximately fixed and known volume of mixed un-centrifuged urine and spread it over a plate of agar culture medium. The plate is incubated, the number of colonies counted or estimated, and this number used to calculate the number of viable bacteria per ml of urine. Thus, if a 0.004 ml loop full of urine yields 400 colonies, the count per ml will be 10^5, (250×1,00,000) or just indicative of significant bacteriuria.

The bacterial strains were identified by Colonies character stick, Gram Staining, Morphological and Biochemical character. The bacterial strains identification was done up to genus and species level. The antibiotics sensitivity test of bacterial strains was done as per CLSI[14]guidelines by Kirby-Baure Disc Diffusion Methods[14].

RESULTS

Table 1: Showed Incidence of UTI in relation of age Distribution of Pregnant women

Age Group	No. of Tested	No. of Positive
21-25	40	7 (17.5%)
26-30	45	15 (33.3%)
31-35	35	4 (11.4%)
36-40	30	24 (80.0%)
Total	150	50 (33.3%)

Table 2: Incidence of UTI by No. of Pregnancy.

Parity	No.of tested	No.of Positive
1st Pregnancy	45	10 (22.2%)
2nd Pregnancy	55	15 (27.3%)
3rd & Above	50	25(50.0%)

Table 3: Frequency of UTI in different gestational periods

Age of Pregnancy (In Months)	No. of Tested	No. of Positive
3	10	0(0.0%)
4	25	2 (8.0%)
5	15	5(33.3%)
6	30	15 (50.0%)
7	30	13(43.3%)
8	25	10(40%)
9	15	5(33.3%)

Table 4: Various bacteria isolated from Urine samples

Isolates	No.of positive Samples
Eschericheia coli	23 (46%)
Klebsiella spp.	11 (22%)
Pseudomonas aeruginosa	4 (8%)
Staphylococcus aureus	10 (20%)
mixed Culture	2 (4%)
Total	**50**

Table 5: Antibiotics Pattern of *E coli* (n=23)

Name of Antibiotic	Sensitivity
Polymyxin B (300unit)	19(82.6%)
Nitrofurantoin (300µg)	17 (73.9%)
Levofloxacin (5µg)	15 (65.2%)
Chloroamphenicol (30µg)	13 (56.5%)
Amikacin (30µg)	12 (52.2%)
Cefoperazone (75µg)	11 (47.8%)
Ampicillin (10µg)	10 (43.5%)
Gentamicin (10µg)	8 (34.8%)
Norfloxacin (10µg)	7 (30.4%)
Co-Trimoxazole (25µg	6 (26.1%)

Table 6: Antibiotics Pattern of *Klebsiellaaerogens* n=11

Name of Antibiotic	Sensitivity
Ciprofloxacin(5µg)	10 (90.9%)
Ceftazidime(30µg)	9 (81.8%)
eCefotaxime(30µg)	9 (81.8%)
Chloroamphecol(30µg)	8 (72.7%)
Gentamicin(10µg)	7 (63.6%)
Levofloxacin(5µg)	5 (45.5%)
Ampicillin(10µg)	3 (27.3%)
Norfloxacin(10µg)	2 (18.2%)
Meropenum(10µg)	2 (18.2%)
Co-Trimoxazole(25µg)	1 (9.1%)

Table 7: Showed Antibiotics Pattern of *staphylococcus aureus* n=10

Name of Antibiotic	Sensitivity
Nitrofurantoin (300µg)	9 (90.0%)
Levofloxacin (5µg)	9 (90.0%)
Ciprofloxacin (5µg)	8 (80.0%)
Gentamicin (10µg)	8 (80.0%)
Ceftazidime (30µg)	7 (70.0%)
Imipenam (10µg)	7 (70.0%)
Cefoperazone (75/10 µg)	6 (60.0%)
Tobramycin (10µg)	5 (50.0%)
Amikacin (10µg)	5 (50.0%)
Norfloxacin (10µg)	3 (30.0%)

Table 1: Showed the higher percentage of UTIs was obtained in the age groups of 36-40 (80.0%) years followed by the age groups 26-30 (33.3%). The highest number of bacterial isolates was found in subject of 36-40 years followed by 26-30 years. Comparatively, lower number of bacterial isolates was obtained from age groups 21-25 and 31-35 years.

Table 2: Showed the highest percentage of UTIs occurrence is 50% in there 3rd and above pregnancy followed by 27.3% in 2nd pregnancy and the lowest incidence of UTIs 22.2% in the 1st pregnancy.

Table 3: Showed the prevalence of UTIs by gestational age (age of pregnancy) revealed that women in the 6th and 7th months of their pregnancy had the highest prevalence of 50.0% and 43.0% respectively while women in the early month of their pregnancy had no specific bacterial growth and shows no sign of UTIs.

Table 4: Out of 50 isolates, Gram negative bacteria were more frequently then gram positive bacteria. These include *Escherichia coli* (46%), *Klebsiellaaerogens* (22%), *Pseudomonasaeruginosa* (8%). Gram positive bacteria account with *Staphylococcus aureus* (20%). The rate of isolation of *Klebsiellaaerogens* and *Staphylococcus aureus* was higher in spcimen collected from pregnant women.

DISCUSSION

During the period from January 2011 to December 2012a total of 150 urine specimens were collected from pregnant women and processed. Significant bacteria colony forming units (cfu) 10^5 was found in 50 patient among 150 patients used. The most commonly isolated bacteria was *Escherichia coli* 23 (40%) *Klebsiellaaerogenes* 11 (22%) *Staphylococcus*

aureus 10 (20%) *Pseudomonas aerogenes* 4 (8%) and mix culture *Klebesiella& Staphylococcus* 2 (4%). In pregnant study out of 50 positive urine samples, gram negative bacteria were more prevalent 78% then gram positive bacteria 22%. Which was similar from previous study gram negative bacteria (61.9%) then gram positive bacteria (38.1%), (Sabrina J. 2009).[15]Thesimilar finding have been also reported by Bloomberg et. Al 2005as well as elsewhere Gebre Selassie, 1998, Delzell&Lefevre, 2000; Nicolle, 2001; Schnarr&Smaill, 2008.[16-20]

The incidence of bacteria among women in their first pregnancy is 22.2%. This figure is higher than the prevalent role of 2-9% reported by Nicolle (2003)[21] and lower than in a similar study on pregnant women the number of pregnancy is one of the possible factors affecting the incidence & prevalence rate of UTIs among women.[22] Present study also showed that women in their pregnancy had the higher incidence of UTI while women on their early month of the pregnancy had no specific bacteria growth & shows no signs of UTIs.

In the present study, women in their 2nd and 3rd trimester were found to have the higher incidence of UTI 31.4% & 40% respectively, but it was lower than the previous study in 2nd trimester 41.4% and in 3rd trimester 55% (Okonko et.al 2009)[22]

This study showed high levels of resistance to first line antibiotic such ascotrimaxozole. These finding correlated with finding from previous studies (Gupta et. Al, Arrendondo – Garcia, et al.[23-25]

CONCLUSION

It is obvious from this limited study that significant bacteria in pregnancy are common and a serious causes of maternal and perinatal morbidity and mortality. To minimize the complication of pregnancies regular antenatal care showed be taken. The pregnant women should be educated about the physiology of pregnancy clinical presentation includes asymptomatic bacteria.

Acute cystitis and pyelonephritis pregnant women should be checked for asymptomatic bacteria by urine culture and treated with appropriate antibiotics. All women should be confirming post treatment urine sterility by reviewing the urine culture. When intake an antibiotics the pharmacokinetics and bioavailability of the individual drug in pregnancy must be considered alone with the resistance profiles of microorganism in the local antenatal population. It is established a vital use of treatment with safety profile, without teratogenic risks.

REFERENCE

1. Morgan MG,McKenzie H. Controversies in the Laboratory, Diagnosis of Community Acquired Urinary tract Infection. Eur. J. Clin. Microbial.1993;12(7): 491-504
2. Ebie MY, Kandaki-Olukemi YT, Ayanbadejo J, Tanyigna KB. Urinary Tract Infections in Military Hospital. Niger. J. Microbiol. 2001; 15(1): 31-37
3. Hooton TM, Winter C, Tiu F, Stamm WE. Randomized Comparative Trial And Cost Analysis of 3 Days Antimicrobial Regmains for Treatment of Acute Cystitis in Women. JAMA.1995; 273: 41-51
4. Stamm WE. Scientific and Clinical challenges in the Management of urinary tract Infections. Ame. J.Med. 2002; 113: 1s-4s
5. Kolawole AS,Kolawole OM, Kandaki- Olukemi YT, Durowade KA, Kolawole CF. Prevalence of Urinary Tract Infection, Lafia, Nasarawa State. Int. J. medicinal Med. Sci. 2009; 1(5): 163-67
6. National Institute of Health (NIH). What I need to know about urinary tract infection. NIH Publication. 2004; 04:4807
7. Stamm WE, Hotton TM. Management of Urinary Tract Infection in adults. Engl J. Med. 1993;329:1328-34
8. Patterson TF, Andriole VT. Bacteriuria in Pregnancy. Infect Dis Clin North American.1987; 1:807-22
9. Lucas MJ, Cunningham FG. Urinary Infection in Pregnancy. ClinObstet Gynecol.1993; 36:855-68
10. Griebling TL, LitwinMS,Saigal CS. Chapter 18: Urinary Tract Infection in Women. Urologic disease in America.2007; NIH publication No. 07-5512
11. Malek RS, Elder JS. Xanthogranulomatus Pyelonephritis: A critical analysis of 26 cases and of the literature. Journal of Urology. 1978; 119 (5): 589-93
12. Korkes F, Favoretto RL, Broglio M, Silva CA, Castro MG, Perez MD. Xanthogranulomatus Pyelonephritis: Clinical Experience with 41 cases. Journal of Urology. 2008; 71 (2): 178-80

13. Ramakrishnan K, Et al. Diagnosis and Management of acute pyelonephritis in Adults. American Family Physician. 2005; 71 (5):933-42
14. Matthew A. Wikler, Franklin R. Cockerill, William A. Craig, Michael N. Dudley, George M. Eliopoulos, David W. Hecht, Et al,Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically; Approved Standard. Seventh Edition,www.microbiolab-bg.com/CLSI.pdf, M100-S17; 2007;27 (1):M100-S16
15. Sabrina J, Moyo, Said Aboud, MabulaKasubi, Samuel Y, Maselle. Bacterial isolates and drug susceptibility patterns of Urinary Tract Infection among pregnant women at muhimbili National Hospital. Journal of Health Research. 2009;12.
16. Blomberg B, Jureen R, Manji KP, Tamim BS, Urassa WK, Fataki M, et al. High Rate of Fatal cases of Pediatric septicemia caused by Gram negative Bacteria with extended spectrum beta-lactamase. Journal of Clinical Microbiology. 2005; 2: 745-49
17. Gebre- Selassie S. Asymptomatic bacteriuria in pregnancy: epidemiological, clinical and microbiological approach. Ethiopian Medical journal.1998; 36:185-92
18. Delzell JE, Lefever ML. Urinary Tract Infection during Pregnancy. American family physician. 2000; 61:713-21
19. Nicolle LE. Epidemiology of Urinary Tract Infection. Infections in Medicine. 2001; 18: 153-162.
20. Schnarr J, Smaill F. Asymptomatic bacteriuria and symptomatic urinary tract infection in pregnancy. European journal of Clinical investigation. 2008; 2: 50-57.
21. Nicole LE. Asymptomatic Bacteriuria: When to screen and when to treat Infection. Dis. Clin. North America. 2003; 17 (2):367-94.
22. Okonko I,Ijandipe L, Ilusanya O, Donbraye Emmanuel O, Ejembi J, Udeze A, et al. Incidance of Urinary Tract Infection among Pregnant women. Journal of Biotechnology. 1 December 2009;8(23): 6649-57
23. Gupta K, Hooten TM, Stamm WE. Increasing antimicrobial resistance and the management of uncomplicated community acquired urinary tract infections. Annals of Internal medicine. 2001;135, 41-50
24. Arredondo Gracia JL, Soriano Becerril D, Solorzano Santos F, Arbo Sosa A,Coria Jimenez R, Arzate Barbosa P. Resistance of Uropathogenic bacteria to first line antibiotics: a multi-center analysis. Current Therapeutic Research. 2007; 5, 350-53
25. Arredondo Gracia JL, Aabile Cuevas CF. High Resistance prevalence towards Ampicillin, Co-trimoxazole and ciprofloxacin among uropathogenic Escherichia coli isolates. Journal of of infection in Developing Countries. 2008; 5, 350-53