ANTIMICROBIAL SENSITIVITY PATTERN OF SYMPTOMATIC URINARY TRACT INFECTION IN PREGNANCY IN AMINU KANO TEACHING HOSPITAL

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ABSTRACT

Objective: To determine sensitivity pattern of antimicrobial organism in women presenting with features of urinary tract infections in pregnancy in Aminu Kano teaching hospital Kano.

Methods: Retrospective study carried out between January to December 2010, amongst pregnant women attending our antenatal clinic. Those with urinary symptoms had their urine sent for bacteriological examination. Sociodemographic information, results of urine investigations obtained from patients' case records, and analyzed using EPI info statistical software version 6. Significant associations tested using chi-square test and $p<0.05$ was considered significant.

Results: Seventy-two women had positive results. 7565 women attended antenatal clinic , incidence of UTI 1.3%. Six bacterial isolates identified. Most common was *Proteus Mirabilis* 24(33.3%), *E. Coli 25(25%), staphylococcus Saprophyticus 12(16.6%) Kleibsella aerogenes 10(13.9%), Enterococcus Faecalis 6(8.3%) and Pseudomonas aeriginosa 2 (2.8%), differences were statistically significant (p = 0.015). Sensitivity patterns for Proteus Mirabilis 12(50%) gentamicin, 7(29.1%) nitrofurantoin, 4(16.7%) augmentin and 1(5.6%) ofloxacine , differences statistically significant (p = 0.0037).* Highest number of bacterial isolates obtained in women 20-25 years (40.28 %) statistically significant, p = 0.0005. UTI commoner among women parity 1-2 (54.2%), not statistically significant, p = 0.35.

Conclusion: Commonest organism causing UTI in pregnancy in this study was proteus mirabilis, and is most sensitive to gentamicin.

Summary: Urinary tract infections (UTI) in pregnancy have clinical presentation. A retrospective study of seventy-two pregnant women was carried out in AKTH to determine the antimicrobial sensitivity pattern, in pregnant women presenting with features of UTI. The commonest organism isolated from the urine of these women was proteus mirabilis (33.3%), which was sensitive to gentamicin (50%) compared to augmentin (16.7%)

Keywords: prevalence, aetiology, antimicrobial sensitivity, UTI pregnant women, AKTH

INTRODUCTION

The urinary tract is predisposed to infections during pregnancy because of ureteric compression at the pelvic brim by the gravid uterus, by the enlarged ovarian veins and probably by the effect of progesterone on the renal pelvis, calyces and ureters resulting in decreased tone and peristalsis All these contribute to the urinary stasis in the renal system and consequent disposition to infection. About 5-10% of pregnant women have asymptomatic bacteriuria with the vast majority antedating pregnancy; about 30% may go on to develop overt symptomatic infections.[2] In Zaria the incidence of asymptomatic bacteriuria is 4.8%, 8.0% in Sokoto and 17.9% in Benin among the pregnant women attending antenatal clinic in these institutions.[3,4,5]

Acute pyelonephritis is an ascending infection involving the ureters, renal pelvis, calyces and invariably involving the parenchyma. It occurs in approximately 1-2% of pregnancies.[2] It is commoner in Primipara and those of high parity, women of low socio-economic status, poor perineal hygiene, women with past history of urinary tract infection and women with sickle cell disease.[2]

The organisms from the anorectal region, especially Escherichia coli have been implicated in many reports as being responsible for this condition[2,3,5,6]. Other organisms that may be associated with this condition include klebsiella, staphylococcus, streptococcus and pseudomonas species.[2,5,6]

It has been observed that the distribution of pathogens that cause UTI is changing[7,8].

Our patients presented with varied clinical features such as dysuria, frequency, fever, vomiting, loin pains, dehydration and renal angle tenderness. This represents typical presentation [2,5,6] and made clinical diagnosis easy. However, there was still need to confirm the diagnosis and determine sensitivity pattern by urine m/c/s while commencing empirical broad-spectrum antibiotics after samples for laboratory investigations were taken. For acute pyelonephritis treatment is usually for 10-14days.[3,14]

In patients with recurrent or persistent infection and asymptomatic bacteriuria difficult to eradicate, there may be an underlying lesion. This may be confirmed by renal ultrasound or an intravenous urogram, to rule out calculi and structural abnormalities of the urinary tract, with minimal risk of radiation to the foetus.[6] Post partum, intravenous urogram may be done at least 12 weeks after delivery to allow all the pregnancy related anatomical and physiological changes to resolve.

Some of the complications associated with pyelonephritis include miscarriage, premature delivery, intrauterine growth restriction and foetal death. Others include acute renal failure, septic shock, haemolytic anaemia, perinephric abscess and pulmonary injury.[2,5,6]

Many studies addressed the causative agents of UTI while others looked in to the antibacterial sensitivity pattern. This present study was aimed at elucidating the causative agents of UTI in pregnancy, and antimicrobial sensitivity pattern in AKTH.

MATERIALS AND METHODS

This was a retrospective study carried out between January to December 2010, of urine microbiological sensitivity pattern reports of pregnant women attending antenatal clinic at Aminu Kano Teaching Hospital (AKTH). They presented with urinary symptoms and had their urine sent for microscopy, culture and sensitivity (mcs). Sociodemographic information and results of urine m/c/s were obtained from patients' case records. Mid-stream urine (MSU) samples were collected inside sterile disposable universal bottles from pregnant women. They were instructed on how to collect samples and the need for prompt delivery to the laboratory. The laboratory procedure adopted was using the media of Nutrient Agar (NA) from Biotec Limited, Nutrient Broth (NB), MacConkey agar (MCA), Blood Agar (BA) and Cystein Lactose Eletrolyte Deficient (CLED) Agar were supplied by Oxoid Limited. All glass wares were washed with detergent and rinsed with water, and allowed to dry. The glass wares were later wrapped in aluminum foil and sterilized in a hot air oven at 160 ^{O}C for 3 h. Media were prepared according to the manufacturer's specifications and sterilized by autoclaving. The urine samples were mixed and aliquots centrifuged at 5000 rpm for 5 min. The deposits were examined using both x10 and x40 objectives. A volume of the urine samples were applied to a glass microscope slide, allowed to air dry, stained with gram stain, and examined microscopically. Culture and sensitivity testing was carried out as described by Cheesbrough.[9,10] **The data was analyzed using EPI info statistical software version 6.** Absolute numbers and simple percentages were used to describe categorical variables. Significant association of UTI with socio-demographic, bacteriological agent and antimicrobial sensitivity were tested using chi-square test and $p<0.05$ was considered significant.

RESULTS

Seventy-two women had clinical and laboratory evidence of UTI. The average number of women attending antenatal care per annum in AKTH was 7565. This gives an incidence of symptomatic UTI of 1.32% among our antenatal women.

Table 1: shows the frequency distribution of UTI by age and Parity. The highest number of bacterial isolates was obtained from pregnant women within the age bracket of 20-25 years (40.2 %) followed by 26-30 years (34.7%) but this was not statistically significant, p= 0.94 while age groups 31-35 years had the least percentage (9.7%) and this was statistically significant, p = 0.0005. Urinary tract infection was commoner among those of parity 1-2 (54.2%) than those of parities 3-4 (44.4%), but this was not statistically significant, p=0.35. Those of parity 5 had the lowest incidence of UTI (1.4%).

Table 2: shows the frequency distribution of bacterial pathogens in UTI's among pregnant women. The most predominant organism was *Proteus Moribilis,* 24(33.3%). This was followed by *Escherichia Coli 18(25%), Staphylococcus Saprophyticus 12 (16.7%), Kleibsella Species 10(13.9%), Enterococcus Faecalis 6(8.3%) and Pseudomonas 2 (2.8%). This difference was statistically significant, p= 0.015.*

Table 3: shows common antimicrobial sensitivity of UTI pathogens. Of the UTI due to Proteus Mirabilis,

12(50%) were sensitive to gentamycin, 7(29.1%) were sensitive to nitrofurantoin, 4(16.7%) were sensitive to augmentin and 1(5.6%) were sensitive to ofloxacine. The difference is statistically significant, p = 0.0037

DISCUSSION

The prevalence rate of UTIs in this study population was 1.32%. This was similar to the 1-2% reported by Otubu in Nigeria[2], 2-9% reported by Nicolle[11] and 2% reported by Okafor et al in Enugu[12] but differs from reported rates in studies by Okonko et al[1] and Onifade et al among pregnant women in Oyo and Ondo States respectively[13].

The report of this study showed that UTI occurred commonly among pregnant women in the 20-25 age bracket and this is similar to reports by Okonko *et al*[1] and Obiogbolu *et al*[16]. The findings of this study also showed that 54.17% of the women who had UTIs were in their first or second pregnancy and this compares reasonably with the reports of Okonko et al[1]. Urinary tract infection is commoner in Primipara and those of high parity[2].

The most major causative organism of UTI among the pregnant women in this study was Proteus Mirabilis *(33.3%). The report of this study showed that contrary to previous studies on the aetiology of UTI in pregnancy which implicated Escherichia Coli as the major offending organism, Proteus Morabilis is the commonest cause of UTI among pregnant women in AKTH and that most of the organisms were sensitive to gentamycin despite the fact that` augmentin was the commonly used empirical treatment for UTI in AKTH.*

This report represent a changing pattern and differs from Okonko et al[1] , Onifade et al[13] and Okonofua and Okonofua [15] and others[2,3,6,8] where Escherichia coli was the major cause of UTI in pregnancy. It however support previous observation by Ojeigbe and Nworie[8] and Kolawale et-al [9] that the organism causing UTI in pregnancy are changing. In our series, Escherichia Coli ranked second (25%) and this difference was statistically significant when compared with Proteus Mirabilis.

The report of this study showed that the main causative agents of UTI in pregnancy were very sensitive to gentamycin in 50% of cases. This is comparable to the reports of *Abdullah and Al-Moslih[16] ,* Hajarnis[17] *and* Ezechi et al[20] although in the later series, nitrofurantoin was first, while gentamycin was the second most active antimicrobial in use during UTI in pregnancy. Assefa *et-al [21]* also agrees with our series on effectiveness of gentamycin and nitrofurantoin, *but their high level of sensitivity (100%) for augmentin was not reproduced by our study. However reports from systematic reviews from the Cochrane data base were different. Vazquez etal concluded that, although antibiotic treatment is effective for the cure of UTI in pregnancy, there are insufficient data to recommend regimen for the treatment of ITI during pregnancy[3]. There has been very few report of resistance to gentamycin and nitrofurantoin in UTI[22]. Levofloxacine, like other quinolones are not totally safe in pregnancy and cannot be recommended [16].*

The report of this study showed that contrary to previous studies on aetiology of UTI in pregnancy which implicated Escherichia Coli as the major offending organism [2.14.21], Proteus Mirabilis was the commonest cause of UTI amongst pregnant women in AKTH and that most of the organisms were sensitive to gentamicin even though augmentin until now was the commonly used empirical treatment of UTI in pregnancy in AKTH.

Conclusion: The incidence of UTI in this study was1.32%. Proteus Mirabilis was the commonest organism isolated and it was sensitive to gentamicin ; therefore an empirical treatment of suspected UTI in pregnancy should include a regimen containing gentamicin in the absence of renal impairment until urine m/c/s result is available.

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Table 1: Frequency distribution of UTI by age and Parity

Parameter	Number	Percentage
Age		
20-25	29	40.3%
26-30	25	34.7%
31-35	7	9.7%
36-40	11	15.3%

Table 2: Frequency distribution of bacterial pathogens in UTIs among pregnant Women

Pathogen	Number	Percentage
Proteus mirabilis	24	33.3%
Escherichia coli	18	25%
Staphylococcus saprophyticus	12	16.7%
Kleibsella aerogenes	10	13.9%
Enterococcus faecalis	6	8.3%
Pseudomonas aeriginosa	2	2.8%

Table 3: shows common antimicrobial sensitivity of the Pathogen (proteus mirabilis)

Antibiotics	Number	Percentage
Gentamycin,	12	50%
Nitrofurantoin	7	29.1%
Augmentin	4	16.7%
Ofloxacine	1	5.6%

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