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EFFECT OF ANTIMICROBIAL THERAPY FOR ASYMPTOMATIC BACTERIURIA IN PREGNANT WOMEN AND ITS EFFECT ON PREGNANCY OUTCOME.

Microbiology

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ABSTRACT

Selection of antimicrobials to treat Asymptomatic bacteriuria (ASB) must be made with special considerations given to maternal and fetal toxicity. The study was conducted to check the effect of antimicrobial therapy for ASB in pregnant women and its effect on pregnancy outcome in Nair Hospital, Mumbai. The study included 3000 pregnant and 300 non-pregnant women. Microscopic examination of urine, identification of isolates and antibiotic sensitivity testing of isolates were carried out by standard methods. Pregnant women screened were highest in second trimester (49.53%) and risk of ASB was highest in third trimester (8.7%). E. coli was leading bacteria isolated from 42.86.30% samples. Normal full term delivery was observed in 95.65% cases taking proper treatment for ASB. ASB in pregnancy leads to adverse effect on fetus and mother if not treated and which can be prevented by efficient screening and treatment.

KEYWORDS

Asymptomatic bacteriuria, pregnant women, antimicrobial therapy, pregnancy outcome

1. INTRODUCTION :

Urinary tract infection (UTI) is important cause of morbidity and mortality.UTI may occur with or without symptoms, latter is known as Asymptomatic bacteriuria(ASB). ASB is defined as 10^5 bacteria per ml of one or more on two clean-catch cultures taken on separate days *(*Faro et al, 1998*)*. Determination of number and type of bacteria in urine is important diagnostic procedure**.** The quantitative confirmation of bacteriuria following an initial positive non specific screen is useful in establishing etiologic agent and susceptibility *(*Patterson TF et al, 1997**)**. The gold standard for screening for ASB is growing bacterial cultures of urine samples. Unfortunately, nonculture methods are not generally reliable for identification of bacteriuria. The introduction of quantitative urine cultures in mid-1950s coincided with introduction and widespread use of antimicrobial drugs. First studies of quantitative urine bacteriology included a diverse group of asymptomatic patients (Nicolle LE, 2000).

Because of dangers that drugs may pose to fetus or newborn, few antibiotics and those well attested, are used in obstetric practice . Selection of an antimicrobial agent to treat bacteriuria must be made, with special considerations given to maternal and fetal toxicity (Schaeffer AJ, 2002). Only penicillins and cephalosporins, given orally or parenterally, are thought to be safe and effective during any phase of pregnancy. When a prophylactic or suppressive agent is selected, however, contraindications imposed by pregnancy should still be considered (Schaeffer AJ, 2002). It is generally accepted that all pregnant women should be screened with quantitative urine cultures to prevent complications associated with bacteriuria in pregnancy (Loughlin KR, 1994**).** Hence, aim of the study was to check effect of antimicrobial therapy for ASB in pregnant women and its effect on pregnancy outcome.

2. MATERIAL AND METHODS :

2.1 Place of work :

Study was carried out for two years, from January 2003 to December 2004 after taking permission from Institutional Ethics committee of T. N. Medical College and B. Y. L. Nair Charitable Hospital, Mumbai in the Department of Microbiology in association with Department of Obstetrics and Gynecology.

2.2 Participants :

Patients from Gynecology department, which were recruited for bacteriologic evidence of ASB were included in study. 3000 married pregnant women (study group) and 300 married non-pregnant women (control group). Subjects showing symptoms of UTI, suffering from diabetes, under antibiotic or steroids treatment in past, was excluded from study. Counseling of subjects for enrollment procedure was done. Detailed data from patients were recorded in a specially formulated structured proforma. Continuous follow-up of subjects was done up to delivery.

2.3 Collection and microbiological analysis :

Collection , transportation and culturing of urine samples was carried out by standard procedures (Koneman EW et al, 1997) Identification of obtained isolates from urine was done on basis of morphological, cultural characteristics and biochemical tests.(HiMedia Laboratories Manual, 1998)**.**

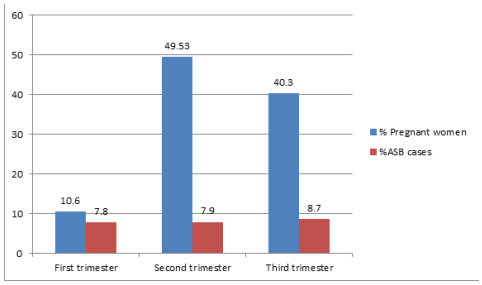
2.4 Antibiotic sensitivity testing :

It was carried out by Kirby - Bauer disk diffusion method of isolates obtained from urine samples (NCCLS guidelines, 2001).

3. RESULTS :

Graph 1 : Trimester of pregnancy in study group.

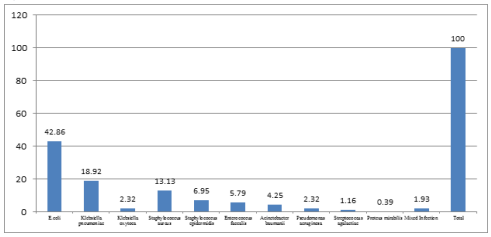
Number of pregnant women (n_p)= 3,000 Cases with ASB (n_{pa}) =248.



Pregnant women screened were highest in second trimester (49.53%) followed by in third trimester (40.3%). Risk of ASB was highest in

third trimester (8.7%) followed by in second trimester (7.9%) and in first trimester (7.8%).

Graph 3 : Pattern of bacteria (%) isolated from urine culture (n=259).



Out of 3300 urine culture, 259 (7.85%) yielded significant bacterial growths . *E. coli* was the leading bacteria isolated from 42.86.30% samples followed by *Klebsiella* spp *(18.92%) and Staph. aureus* (13.13%). While least growth observed was of *Proteus* spp(0.39%).

Table 1:- Effect of treatment on pregnancy outcome in infected women.

Treatment	Preterm labor	Premature baby	Maternal hypertension	Maternal anemia	Normal full term delivery
With treatment n = 23	0	0	1(4.34%)	0	22 (95.65%)
Without treatment n = 24	1(4.16%)	1 (4.16%)	3 (12.5%)	19 (79.1%)	0

DISCUSSION :

During pregnancy UTI are high potential risk for mother and child .The majorities of infections are asymptomatic, places mother at risk for low birth weight and preterm birth. When symptomatic or asymptomatic bacteriuria of pregnancy is diagnosed, it should be treated to avoid complications. **(**Ries k.and Kaye D.,1974*)* .Tetracyclines, Erythromycin, Chloramphenicol**,** Fluoroquinolones, Sulfa preparation**,** Trimethoprim, Nitrofurantoins and Aminoglycosides may cause ototoxicity and nephrotoxicity in both fetus and mother (Schaeffer AJ, 2002)**.** Although few data on human fetal toxicity of antimicrobial agents are available, several relatively safe during pregnancy have been identified. Ideally, these drugs should achieve high urinary and low serum concentrations and affect only bacteria. Because penicillin and cephalosporin inhibit growth of bacterial cell wall and human cells have a cytoplasmic membrane without a cell wall, these drugs act specifically on bacteria *(*Schaeffer AJ,2002)**.** They are thought to be safe and effective during any phase of pregnancy.Oral penicillin with its extremely high urinary concentrations, may be particularly effective and inexpensive agent. The short-acting Sulfonamides can safely used during first two trimesters of pregnancy, because fetus in utero handles excess unconjugated bilirubin through placenta. Similarly, nitrofurantoin has been commonly used in pregnancy during the first two trimesters but may be contraindicated at term because it can cause a hemolytic anemia in neonates with an immature enzyme system. Although single-dose β-lactam therapy in nonpregnant women is usually effective, it is probably prudent to prescribe a 3-day course of therapy in pregnant women. Longer- term treatment does not appear to reduce risk of recurrent bacteriuria (Schaeffer AJ, 2002).It is important to reculture urine 1 to 2 days after treatment is completed to ensure that urine shows no growth. If it does, the cause of bacteriuria must be determined to be lack of resolution, bacterial persistence or reinfection. If the infection is unresolved, proper selection and administration of another drug probably will solve the problem. If the problem is bacterial persistence or rapid reinfection, antimicrobial suppression of infection or prophylaxis throughout the remainder of pregnancy should be considered. Trimethoprim -SMX, Ciprofloxacin, Ofloxacin or Ceftriaxone is usually effective in most patients with domicillary infections. When prophylactic or suppressive agent is selected, however, contraindications imposed by pregnancy should still be considered (Schaeffer AJ, 2002). The most common causative organism was found here to be *Escherichia coli* with followed by *Klebsiella pneumonia* and in study group, in 8.06% of cases single pathogen and in 0.2% cases mixed infection of two pathogens was observed, while in control group single growth was observed in 3.66%. Similar observations were made by many studies. (Al-Haddad AM, 2005) (Kriplani A et al, 1993) Nitrofurantoin was found to be active against most of isolates obtained. While study in Libya (Khaled AA et al ,2017), most effective antibiotics tested on isolates were gentamycin (87.5%), azithromycin (75%) and ciprofloxacin (68.75%).

The choice of an initial antibiotic treatment often is empirical, being supported by the knowledge of epidemiological and clinical data. But empirical treatment of ASB without proper microbiological confirmation of diagnosis may be hazardous to the patient. Hence, the main objective of this study was to determine the incidence, etiology and antimicrobial testing in patients suffering with ASB in order to provide prophylactic treatment. In study group, 50%, 40% & 10% subjects were found to be in 2nd, 3rd & 1st trimester respectively. When the incidence of ASB was analyzed with duration of pregnancy, it was found to be 8.7% (106/209), 7.9% (118/1486) & 7.8% (24/305) in 3rd, 2nd trimester and 1st trimester respectively. Similar observations had also been made by earlier workers. Nath G. et al in 1996 observed that UTI cases in 3rd trimester was 11.9% (27/226) , significantly higher than 1st trimester 5.7% (6/104) when compared with 2nd trimester 7.5% (16/212). The incidence of ASB in pregnancy was observed to be 8.26% which was well within the range of earlier reports (5-10%) from India. (Lavanya SV et al , 2002)**.** Nath G. et al 1996 reported higher incidence of UTI in pregnancy (9.04%). Bandyopadhyay S. et al in 2005 reported incidence of ASB in pregnancy to be 4.34%. The association of ASB with other complications of pregnancy including stillbirth, intrauterine growth retardation and preterm labor in the absence of acute pyelonephritis has been more controversial (Nicolle LE, 2000). In the present study, Abnormal foetal outcome 8.32% (2/24) was observed in cases in culture positive mothers. Morever, premature babies were observed amongst mothers having ASB. However, ASB did not have significant effect on IUD and abortion . (Lenke RR et al 1983).Pregnant women with ASB and without treatment suffered from maternal hypertension 12.5% (3/24) and maternal anemia 79.1% (19/24).

5. CONCLUSION :

The presence of symptoms traditionally associated with UTI have low predictive value for identifying pregnant women with bacteriuria. Therefore, it is recommended that all pregnant women should be screened with semi-quantitative cultures. Also, ASB in pregnancy leads to adverse effect on fetus and mother if not treated. It can be prevented by efficient screening and treatment to avoid such outcomes and maternal complications.

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