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PREVALENCE OF ASYMPTOMATIC BACTERIURIA IN PREGNANT WOMEN

Microbiology

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ABSTRACT

Asymptomatic bacteriuria (ASB) is Urinary Tract Infection without symptoms, which is associated with significant maternal and foetal risks. The study aimed to find, incidence of ASB in pregnant women at Nair Hospital, Mumbai. Study included 3000 pregnant and 300 non-pregnant women. Collection, transportation, and microscopic examination of urine and identification of isolates were carried out by standard methods. In pregnant women, majority ASB cases (10.0%) were in age group of 36 to 40 years, while least (7.67%) were in age group of 30-35% years with mixed infection of two pathogens. In non-pregnant women mixed infection was absent. Prevalence of ASB was twice more common in pregnant women than non-pregnant women.*(p value< 0.0001)*. In both groups, *E.coli* was the predominant isolate. The results showed an association of ASB with age and appeared multifactorial. Hence, routine screening for ASB in pregnant women would allow early treatment to avoid complications.

KEYWORDS

Pregnant Women, Urinary Tract Infections, E. Coli, Asymptomatic Bacteriuria

1. INTRODUCTION :

Urinary Tract Infections (UTIs) are caused by presence and growth of microorganisms anywhere in UT, is an important cause of morbidity and mortality. Women are more susceptible than men, due to short urethra, absence of prostatic secretion, pregnancy and easy contamination of UT with faecal flora . It is twice more common in pregnant women than age matched non-pregnants. *(Nath G et al, 1996)*.

UTI have three principle presentation- asymptomatic bacteriuria (ASB), acute cystitis and pyelonephritis. UTI may occur with or without symptoms and latter is known as ASB.ASB is often a dynamic process and is defined as 10^5 bacteria per ml of one or more on two clean-catch cultures taken on separate days. During pregnancy,ASB can be associated with medical conditions like premature delivery and infants of low birth weight. *(Faro S et al, 1998)*.

Prevalence of ASB in non pregnant women increases with age, sexual activity and parity. And also includes low socioeconomic status, sickle cell trait, diabetes mellitus, grand multiparity .Epidemiology of bacteriuria, risk factors and etiologic agents in pregnancy are similar to non-pregnant women. Bacteriuria in pregnancy usually reflects prior colonization rather than acquisition during the pregnancy itself *(Patterson TF et al, 1997)* . Organisms that cause UTIs during pregnancy are same as those found in non-pregnant patients. Most cases of UTIs are caused by *Enterobacteriacea* especially *Escherichia coli (E.coli), Klebsiella species and Enterobacter species* which account for 90% of all UTIs encountered in pregnancy. Other commonly isolated uropathogens include *Proteus* species, *Pseudomonas* species, *Citrobacter* species and *Staphylococcus* species and group B *Streptococcus*. (Gilstrap LC et al, 2001)

Studies in India suggest prevalence of ASB as 2 to 12% among pregnant women, which is slightly higher than that from west (*Nath G et al, 1996*) . However, ASB in pregnancy have not been adequately studied in developing countries, hence study was aimed at finding out incidence of ASB in pregnancy in Mumbai.

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 Department of Microbiology in association with Department of Obstetrics and Gynecology.

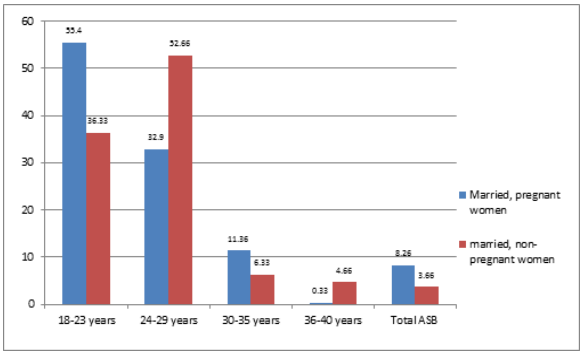
2.2 Participants :

Patients from Gynecology department, recruited for bacteriologic evidence of ASB, 3000 married pregnant (study group) and 300 married non-pregnant women (control group) were included in study. Subjects showing symptoms of UTI, suffering from diabetes, under antibiotic or steroids treatment were excluded from study. Counseling of subjects for enrollment and their detailed data were recorded in a specially formulated structured proforma.

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).

3. RESULTS :

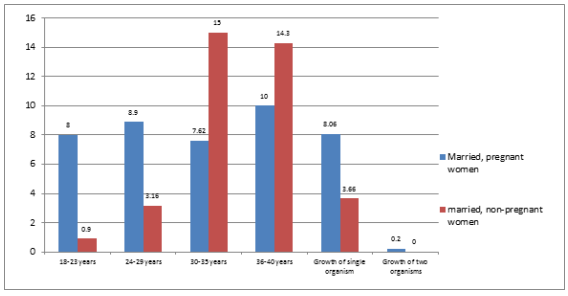


GRAPH 1: Distribution of age and ASB obtained cases in study and control group (%)

Study group=3000 subjects Control group= 300 subjects

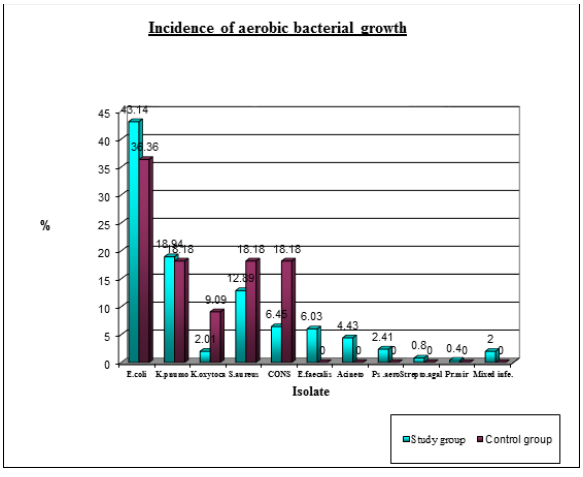
In study group, majority cases (55.4%) were in age group of 18 to 23years, while least (0.33%) in 36-40 years. In control group, majority cases (52.66%) were in age group of 24 to 29 years, while least (4.66%) in 36-40% years. (p value < 0.0001).

Prevalence of ASB in study and control group was 8.26% and 3.66%. respectively. ASB was twice more common in pregnant than in non-pregnant women. (p value < 0.0001).



GRAPH 2:Distribution of age and growth of isolates in study & control group with ASB (%)
Study group =248 subjects Control group = 11 subjects

In study group, majority ASB cases (10.0%) were in age group of 36 to 40 years, while least (7.67%) in 30-35% years. In control group, majority ASB cases (15.00%) were in age group of 30 to 35 years, while least (0.90%) in 18-23% years. (p value < 0.0001). In pregnant women, single pathogen was detected in 8.06% cases, while 0.2% cases showed mixed infection of two pathogens. In non-pregnant women single pathogen was observed in 3.66% cases and no mixed infection was observed.



GRAPH 3: - Isolates found in married pregnant and non pregnant women with ASB
Study group =248 subjects Control group = 11 subjects

In study group, *E.coli* was predominant isolate (43.14%) followed by *Klebsiella pneumoniae (K.pnumo)* (18.94%), *Staphylococcus aureus*(S.aureus) (12.89%) and least was *Proteus mirabilis (Pr. mir)* (0.4%). Mixed infection of two pathogens was detected (2%) here.

While in control group, *E.coli* was predominant isolate (36.36%) followed by *K.pnumo* (18.18%) & CONS (18.18%) & least was *Klebsiella oxytoca (K.oxytoca)* (0.4%). In this group *Enterococcus faecalis (E.faecalis)*, *Acinetobacter baumanii (Acineto)*, *Pseudomonas aeruginosa (Ps. aero)*, *Streptococcus agalactiae (Str. aga)*, *Pr. mir* and mixed infection was not detected. Etiology of bacterial agents was similar in both pregnant as well as non-pregnant women.

4. DISCUSSION :

During pregnancy UTIs are high potential risk for mother and child .Majorities of UTIs are asymptomatic and places mother at risk for low birth weight and preterm birth. Main objective of study was to determine incidence and etiology in patients suffering with ASB.

Our study showed correlation of age and ASB cases in study and control group. Difference between them was statistically significant. *Nath G et al, 1996* reported incidence among 24-29 years as 10.37% followed by 18-23years (5.26%) and >30years age group (12.43%). In our study, incidence of ASB in pregnancy was observed to be 8.26% which was well within range of earlier reports (5-10%) from India. While in non-pregnant women, ASB were 3.66%. These findings were similar to observations made by *Lavanya SV et al, 2002* **.** *Nath G et al, 1996* reported higher incidence of UTI in pregnancy (9.04%). *Bandyopadhyay S et al, 2005* reported incidence of ASB in pregnancy 4.34%. Prevalence of ASB in Libya, in all women was 8.3% , in pregnant women was 11.7%, and in non pregnant women was 5% . This indicates, 16.7% of pregnant women were at risk of development of acute episode of UTI during pregnancy if they were not properly treated. (*Khaled AA et al, 2017).* Study in Libya found significantly high relation between age & bacteriuria and revealed, bacteriuria in women was commonest in age group of 25-30 years (62.5%) and these result agreed with study by Buzayan MM in Libya (*Buzayan MM et al, 1998*), but contrast with study in Yemen, that observed bacteriuria was more in age group of 15-24 years (53.7%) (*Al-Haddad AM et al, 2005*). This difference may be due to social factors like early age of marriage and sexual activity.

In our study, anaerobic studies were avoided, as incidence of anaerobes is very low in UTI. Pattern of aerobic bacterial isolates obtained here was same in both groups and were identified in majority (8.26%) of pregnant women. *Nath G et al, 1996* had reported 9.04% while *Lavanya SV et al, 2002* reported 8.4% in pregnant women**.** Only 2.41% was more than two pathogens concomitant mixed infections. In our study group, *E.coli* was predominant organism accounting for 43.14%, followed by *K. pnumo.* (18.94%), *S. aureus* (12.89%),*S. epidermidis* (6.45%) and *E. faecalis* (6.03%). *Acineto.* & *Ps. aero* was found to be 4.43% and 2.41% respectively and <1% were *Str. aga.* and *Pr. mir*. According to *Lavanya SV et al, 2002 E.coli* was found to be in 83% cases , *E.coli* with *Kleb. species* was in 4.7% cases , *S. aureus* with *Kleb. species* was in 2.3% cases,. *Nath G et al, 1996* reported 30.6% of *E.coli* followed by 24.4% *Coagulase negative Staphylococci (CONS)*, 20.4% of *E. faecalis* and 14.27% of *S. aureus*. *Kriplani A et al, 1993* reported *E.coli* as 64.7% followed by *K. pneumo* . and *Pr. mira* with 8.8%, It is quite evident that *E.coli* was most predominant causative agent of UTI followed by either *Klebsiella* and *Pseudomonas species. E.coli and Klebsiella. species* being natural flora of intestine would cause UTI in individuals with poor hygienic conditions, particularly individuals who do not keep up the proper hygienic condition of anus and perianal region. However, *Proteus species* being partial intestinal flora, is mainly expected to cause UTI, as it is predominantly present in faeces. *Pseudomonas species* appears to be the fourth predominant causative agent of UTI. A parallel study of control group , did not show any symptoms of UTI. Their urine samples were also cultured. Here, *E.coli* was predominant organisms (36.36%) , followed by *K. pneumo* (18.18%), *S. aureus* and *S. epidermidis* (18.18%). *E. faecalis* , *Acineto, Strep. agal.* and *Pr. mira* and *Ps. aero* were not isolated here. In Libyan study (Khaled AA et al, *2017)* most frequent isolates were *S. aureus* (31.2%), *E.coli* (25%), *S. saprophyticus*(18.9%) etc, where as another Libyan study found, bacteriuria in pregnant women caused by *E.coli* was 65.5% and *K. pneumo.* 20.7% (*Buzayan MM et al, 1998*) and Al Haddad AM et al found *E.coli* was most frequently isolated 41.5%, followed by *S. aureus* 19.5% (*Al-Haddad AM et al, 2005*).

5. CONCLUSION :

Most common pathogen involved in bacteriuria was *E. coli* accounting for 60 to 90% of infections in women, followed by *K. pneumo, Pr. mir, and Ps. aero and S. saprophyticus.* (*Cheesbrough M, 2006*). There are several ways to diagnose UTI, but urine culture still remains most reliable tool for its diagnosis (*Nath G et al, 1996*) Results of this work showed an association of ASB with age and it appeared to be multifactorial. A screening for ASB in pregnant women must be done to discover infected cases to avoid complications.

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