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ANTENATAL WOMEN'S MICROBIOLOGICAL PROFILE AND ANTIBIOTIC SENSITIVITY PATTERN IN ASYMPTOMATIC BACTERIURIA

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ABSTRACT

Asymptomatic bacteriuria (ASB) poses a considerable risk during pregnancy, potentially leading to adverse maternal and fetal outcomes. This study aims to investigate the microbiological profile and antibiotic sensitivity patterns of ASB in antenatal women, providing crucial insights for tailored management strategies.The study included 120 pregnant patients. A prospective study was conducted involving antenatal women who underwent screening for ASB. Urine samples were collected, and microbiological analysis was performed to identify bacterial isolates. Antibiotic sensitivity testing was carried out using standard procedures. Out of the antenatal women screened, a subset demonstrated asymptomatic bacteriuria. The microbiological profile revealed a spectrum of bacterial isolates, with Escherichia coli being the most prevalent. Other isolates included Klebsiella pneumoniae, Staphylococcus aureus, Enterococcus, coagulase-negative Staphylococcus (CONS), and Acineto bacter. The antibiotic sensitivity pattern varied among these isolates, emphasizing the importance of tailored treatment strategies. This study sheds light on the microbiological landscape of asymptomatic bacteriuria in antenatal women, highlighting the prevalence of specific bacterial strains and their varying susceptibility to antibiotics. These findings underscore the need for region-specific guidelines to optimize the management of ASB during pregnancy. Tailoring antibiotic interventions based on local microbial patterns can enhance the effectiveness of antenatal care, minimizing complications and improving maternal and neonatal health outcomes.

Key words: Antenatal, Asymptomatic Bacteriuria, Microbiological Profile, Antibiotic Sensitivity, Pregnancy, Urinary Tract Infections.

INTRODUCTION

Antenatal care plays a pivotal role in ensuring the health and well-being of both the expectant mother and the developing fetus. One critical aspect of this care involves monitoring and addressing potential infections, such as asymptomatic bacteriuria (ASB). Asymptomatic bacteriuria during pregnancy is a significant clinical concern, characterized by the presence of bacteria in the urinary tract without overt symptoms. Antenatal women are particularly susceptible to this condition due to hormonal and anatomical changes, making them prone to urinary tract infections [1-3]. ASB is associated with adverse maternal and fetal outcomes, including preterm birth, low birth weight, and pyelonephritis. The prevalence of ASB in pregnant women varies globally, highlighting the need for region-specific studies to understand the microbial profile and antibiotic sensitivity patterns.

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Accurate detection and management of ASB are crucial to mitigate potential complications and improve maternal and neonatal health [4-6]. Pregnant women are inherently vulnerable to urinary tract infections, and asymptomatic bacteriuria is a common manifestation in this population. Despite its silent nature, asymptomatic bacteriuria can lead to serious complications, making its identification and appropriate management imperative during antenatal care [7-9].

Our study aims to explore the microbiological profile and antibiotic sensitivity pattern of asymptomatic bacteriuria in antenatal women, providing insights into the prevalent bacterial isolates and their susceptibility to commonly used antibiotics. Understanding the local microbial landscape and antibiotic resistance patterns is essential for tailoring effective treatment strategies, ensuring optimal outcomes for both mothers and their unborn children [10-11].

By elucidating the microbial spectrum associated with asymptomatic bacteriuria in our antenatal population, we aim to contribute valuable data that can inform evidence-based guidelines for screening, diagnosis, and treatment. This research holds the potential to enhance the quality of antenatal care, minimize complications related to urinary tract infections, and ultimately improve the overall health and well-being of pregnant women and their infants.

MATERIAL AND METHODS

This prospective study was conducted at the microbiology and obstetrics departments of Bhaarath Medical College and Hospital,Chennai.

The study included 120 pregnant patients from all trimesters attending the antenatal clinic. Pregnant women with a history of urinary tract infections (UTIs), fever, pregnancy-induced hypertension or diabetes mellitus, recent antibiotic therapy within two weeks, or known urinary tract congenital abnormalities were excluded.

The institutional ethics committee provided clearance for the study, and participants provided informed consent. Pregnant women received guidance on collecting a clean mid-stream urine sample in a sterile container. Microscopic examination of centrifuged urine was conducted to detect pus cells, erythrocytes, microorganisms, and casts.

Laboratory Procedures:

Urine samples were processed within 1-2 hours of collection using standard microbiological techniques. Cultures were performed on 5% sheep blood agar and MacConkey agar, followed by incubation at 37°C for 24 hours. Extended incubation occurred if no growth was observed. Organism identification involved Gram staining, motility tests, catalase tests, oxidase tests, coagulase tests, and routine biochemical tests following Cowan and Steel's Manual.

Growth Interpretation:

Sterility was determined if no growth was observed. Significant growth was reported when the colony count corresponded to 10^5 colony-forming units (CFU) per ml. Insignificant growth was noted for colony counts below 10^5 CFU per ml.

Antibiotic Sensitivity Testing:

The standardized Kirby-Bauer disc diffusion method on Muller Hinton agar plates, following NCCLS (CLSI) recommendations, assessed antibiotic sensitivity. Tested antibiotics included Amikacin (30mcg), Gentamicin (10mcg), Nitrofurantoin (300mcg), Ceftazidime (30mcg), Amoxicillin-clavulanic acid (30mcg), Cefepime (30mcg), Cotrimoxazole(25mcg), and Ceftazidime-clavulonic acid (30/10mcg). Antenatal women with significant bacteriuria were advised to take antibiotics based on sensitivity results [12-16].

RESULTS

Out of 120 pregnant women examined for asymptomatic bacteriuria, of these 30 cases were culture positive. Of 30cases the highest number of culture positive cases were in the age group of 26-35years(63.3%) followed by 18-25years(20%)and >36years (6%).

65 samples were sterile with no growth, insignificant bacteriuria in 5 cases and Mixed growth were seen in 20 cases, which is not included in significant bacteriuria.

In present study maximum number of culture positive cases were noted in second trimester (52.9%) followed by others.

The commonest isolated organism was E.coli(33%) followed by others.

In our study E.coliare sensitive to CAC, CAZ. AK, NIT. Out of E.coli 10 (33%) isolates were resistant to COT &GEN.Klebseilla pneumonia sensitive to Amikacin and Staph.aureuswas sensitive to Amoxicillin Clavulanic acid. ESBL isolates was not found in our study.The youngest among the cases studied was 18years old and oldest was 40years old.

Table: 1 Age wise distribution of culture positive cases.

Age (yrs)	No of culture positive cases	%
18-25	6	20
26-35	19	63.3
36-40	5	17

Table: 2 Culture growth.

Results of culture	No of cases	%
Significant bacteriuria	30	25
Insignificant bacteriuria	5	4.1
Mixed growth	20	17
Sterile	65	54

Table 3: Trimester wise Distribution of Culture Positive Cases

Trimester	No. of culture positivecases	%
First	**6**	**20**
Second	**20**	**67**
Third	**4**	**13.3**

Table 4: Bacteriological Isolates in Urine Samples.

Number of isolated	No. of cases n=30	%
E.coli	**10**	**33**
Klebesilla.pneumoniae	**6**	**20**
Staph.aureus	**4**	**13**
Enterococcus	**3**	**10**
CONS	**4**	**13**
Acinetobacter	**3**	**10**

DISCUSSION

The investigation into asymptomatic bacteriuria among 120 pregnant women yielded valuable insights into the prevalence, demographics, microbial etiology, and antibiotic sensitivity. The study revealed a culture positivity rate of 25%, with 30 cases identified as culture positive. The subsequent analysis provides a comprehensive understanding of the various facets influencing asymptomatic bacteriuria during pregnancy.

The age-wise distribution of culture-positive cases unveiled notable trends, with the highest prevalence observed in the age group of 26-35 years, accounting for 63.3% of positive cases [17-18].SimilaragepatternswerealsoobservedinstudiesbyImadeetal.(2010)andTurpinetal. (2007). In this study the prevalence of asymptomatic bacteriuriaamongpregnantfemalesis8.8%.The prevalence in various Indian studies was foundtobebetween5&12%,however,inWesternstudies,theincidencerangesfrom27%(GinecolObstetMex,2007;

Tadesseetal.,2007;Turpin etal.,2007; Kerure etal.,2013;Yashodharaetal.,1987;Obirikoranget al., 2012. This demographic skew towards the second and third decades of life emphasizes the susceptibility of women in their reproductive prime to asymptomatic bacteriuria during pregnancy.Physiological changes during pregnancy may render women in their late twenties to mid-thirties more susceptible to asymptomatic bacteriuria.Behavioral and lifestyle factors in this age range might contribute to increased bacterial colonization in the urinary tract [19-20].

The results of culture growth revealed diverse outcomes. Notably, 65 samples were sterile, and 20 cases exhibited mixed growth, highlighting the complexity of interpreting culture results in the context of asymptomatic bacteriuria.Sterile samples could be indicative of a diverse microbiome in pregnant women, and the presence of significant bacteriuria underscores the need for monitoring and intervention [21-22].

The distribution of culture-positive cases across trimesters indicated that the highest number of cases occurred in the second trimester (67%). Baleiras et al. had suggested that the prevalence ranging of asymptomatic bacteriuria in pregnant women was 5% to 10%.

This observation aligns with previous studies suggesting an increased susceptibility to asymptomatic bacteriuria during the middle stages of pregnancy.In a Turkish clinical unit, Kutlays had suggested that the prevalence of ASB was 10.6 % of pregnant women, admitted for an initial obstetric examination during the first trimester. Hormonal changes and anatomic alterations during the second trimester may contribute to an increased risk of asymptomatic bacteriuria.Increased blood flow to the kidneys during pregnancy might enhance bacterial growth [23-24].

Bacteriological analysis identified E. coli as the most common isolate (33%), followed by Klebsiellapneumoniae (20%), Staph. aureus (13%), Enterococcus (10%), CONS (13%), and Acinetobacter (10%). The prevalence of E. coli aligns with its recognized association with urinary tract infections during pregnancy.E.coli's predominance aligns with its common role in urinary tract infections, especially during pregnancy.Variability in bacterial isolates suggests a diverse range of contributors to asymptomatic bacteriuria in pregnant women [26-27].In contrast a study conducted

in Kanu showed Klebsiella and Staphylococcus saprophyticus to be most common uropathogen.

The antibiotic sensitivity profile revealed that E. coli was sensitive to CAC, CAZ, AK, and NIT. However, 33% of E. coli isolates were resistant to COT and GEN. Klebsiellapneumoniae demonstrated sensitivity to Amikacin, and Staph. aureus was sensitive to Amoxicillin-Clavulanic acid. Notably, no Extended-Spectrum Beta-Lactamase (ESBL) isolates were identified in the study.Antibiotic resistance patterns underscore the importance of judicious use of antibiotics during pregnancy. Monitoring local resistance trends is crucial for effective empirical treatment. This may indicate a localized epidemiological pattern with a lower prevalence of extended-spectrum beta-lactamase-producing bacteria in the studied population. Inclusion of a broad age range allows for a comprehensive understanding of asymptomatic bacteriuria during pregnancy. However, age-related trends may be influenced by factors not captured in the study, such as parity, socioeconomic status, and pre-existing health conditions.

CONCLUSION

This study provides a comprehensive overview of asymptomatic bacteriuria in pregnant women, encompassing age distribution, trimester-wise variations, microbial isolates, and antibiotic sensitivity. The findings underscore the complexity of interpreting culture results and emphasize the need for tailored approaches in managing asymptomatic bacteriuria during pregnancy. Further research could delve into the clinical implications of these findings and guide evidence-based interventions for improved maternal and fetal health outcomes.

Foot note:
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