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Microbiology

ASYMPTOMATIC BACTERIURIA IN A PREGNANT WOMAN: CASE REPORT AND REVIEW OF LITERATURE

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ABSTRACT Asymptomatic bacteriuria is a condition in which 105 bacteria/ ml or more are found in urine culture without the appearance of any symptoms of urinary tract infection. It is an important cause of significant morbidity in the neonate and the mother if it occurs in a pregnant woman. We present a case of asymptomatic bacteriuria caused by enterococci in a pregnant woman in her 1st trimester with a review of literature.

KEYWORDS : Asymptomatic bacteriuria, pregnancy, Enterococci

Introduction

Asymptomatic bacteriuria refers to the presence of bacteria in urine. It is a condition in which urine culture reveals a significant growth of pathogens that is greater than 10^5 bacteria/ml, but without the patient showing symptoms of urinary tract infection (UTI). This is common during pregnancy. The apparent reduction in immunity of pregnant women appears to encourage the growth of both commensal and non-commensal microorganisms. The physiological increase in plasma volume during pregnancy decrease urine concentration and up to 70% pregnant women develop glucosurea, which encourages bacterial growth in the urine

Symptomatic UTI is seen in 1-2% of pregnancies while aymptomatic bacteriuria is seen in 2-13%. There are several anatomical and hormonal changes in pregnancy, which lead to ureteral dilatation and urinary stasis, which increase the risk of developing urinary tract infections. Untreated UTIs can lead to complications like pyelonephritis, low-birth-weight infants, premature delivery, and, occasionally, stillbirth.

We report the case of a pregnant woman with asymptomatic bacteriuria at 11 weeks of pregnancy caused by *Enterococcus faecalis.*

Case Report

A 32 year old primigravida at 11 weeks of gestation presented with history of spotting per vaginally to our tertiary care hospital in the Department of Obstetrics and Gynaecology. She was normal on examination and was admitted for observation. She had no history of frequency, urgency, burning micturition and/ or suprapubic pain. However, to screen for asymptomatic bacteriuria, a clean-catch, mid-stream urine specimen was sent in a sterile universal container to the Department of Microbiology for culture and antibiotic sensitivity testing.

Samples were cultured on dried plates of blood agar and MacConkey agar without crystal violet as per standard guidelines, using a calibrated drop delivering 0.002ml of urine. Plates were incubated aerobically of 37°C overnight. Colony counts yielded bacterial growth of 10^5/ml or more of pure isolate and were regarded as significant. A drop of urine was examined microscopically at high magnification for pus cells, red blood cells, epithelial cells, casts, crystals, yeast-like cells and *Trichomonas vaginalis*. A few pus cells per high power field were found but there were no epithelial cells, RBCs, casts or crystals.

Smooth, grayish, opaque, non-haemolytic colonies with entire edges were found on blood agar after 24 hours of incubation (**Plate 1**). There were smooth, compact, tiny, opaque, pink colonies on MacConkey agar after 24 hours of incubation (**Plate 2**). Gram stain of the isolate revealed oval-to-spherical gram positive cocci in pairs and short chains. Catalase and motility tests were negative. The isolate hydrolyzed esculin in the presence of bile and grew in 6.5% sodium chloride. It hydrolyzed pyrrolidonyl arylamidase. It fermented lactose, maltose, mannitol and D-mannose. It did not ferment arabinose.

Thus, *Enterococcus faecalis* was isolated after 24 hours of incubation. Antibiotic sensitivity testing was performed on Mueller Hinton agar by Kirby Bauer disc diffusion method according to CLSI guidelines. It was sensitive to amoxicillin, ampicillin, erythromycin, nitrofurantoin and vancomycin (**Plate 3**).

Discussion

Symptomatic urinary tract infections (UTI) are seen in 1% to 2% of pregnancies. Asymptomatic bacteriuria (ASB) is seen in 2-15% of pregnant women. In about 80% of pregnant women, at around the 6th week of pregnancy, due to the physiological changes of pregnancy the ureters begin to dilate, caused partly by a reduction in smooth muscle tone with slowing of ureteral peristalsis[1]. This is also known as "*hydronephrosis of pregnancy*", which peaks at 22-26 weeks and continues to persist until delivery. Both progesterone and estrogens levels increase during pregnancy and these will lead to decreased ureteral and bladder tone. Increased plasma volume during pregnancy leads to decreased urine concentration and increased bladder volume[2]. A combination of all these factors leads to urinary stasis and uretero-vesical reflux. Glycosuria in pregnancy is also another well-known factor which predisposes mothers to UTI.

Neonatal complications which are associated with asymptomatic bacteriuria include intrauterine growth restriction, low birth weight and pre-term premature rupture of membranes. Maternal complications which are associated with asymptomatic bacteriuria are hypertension, pre-eclampsia and maternal anemia[3]. An important and serious maternal consequence of untreated ASB in a pregnant woman is the significant risk of acute pyelonephritis in later pregnancy, which can range from 30-40%. In treated patients it is only up to 3-4% [4]. Primigravida have the highest rate of culture positivity, at 66.6%, according to an Indian study[5].

Urinary tract is second only to the respiratory tract in acquiring microbial infection, especially in females. It is more common in pregnant than in non-pregnant women. Urinary tract infections result from ascending colonization of the urinary tract. The primary source of organisms is existing vaginal, perineal, and fecal flora[6]. The pathogens responsible for infections during pregnancy are similar to those in the general population. Most infections are caused by *Enterobacteriaceae*, commonly found in the gastrointestinal tract, with *Escherichia coli* responsible for 63–85% of cases, and among the remaining: *Klebsiella pneumoniae* (~8%), coagulase-negative *Staphylococcus* (up to 15%), *S. aureus* (up to 8%), and group B streptococci (GBS) (2-7%) [7,8,9]. Less

common organisms that cause UTI in pregnancy are enterococci, *Gardnerella vaginalis* and *Ureaplasma ureolyticum* [10,11,12].

Screening tests like leukocyte esterase and nitrite tests have low sensitivity for identifying bacteriuria in women who are pregnant, hence, these patients should be screened with urine cultures; however, the optimal frequency of urine culture screening has not been established. A single urine culture at the end of the first trimester generally is recommended based on clinical outcomes and cost-effectiveness. Women with asymptomatic bacteriuria or symptomatic UTI during pregnancy should be treated and should undergo periodic screening for the duration of their pregnancy. The Infectious Diseases Society of America (IDSA) makes no recommendations for subsequent screening of pregnant women found to have no asymptomatic bacteriuria at the initial screen [13].

Pregnant women should be treated when bacteriuria is identified [14, 15]. The choice of antibiotic should address the most common infecting organisms (i.e., gram-negative gastrointestinal organisms). The antibiotic should also be safe for the mother and fetus. Historically, ampicillin has been the drug of choice, but in recent years *E. coli* has become increasingly resistant to ampicillin [16]. Ampicillin resistance is found in 20 to 30 percent of *E. coli* cultured from urine in the out-patient setting [17]. Nitrofurantoin is a good choice because of its high urinary concentration. Alternatively, cephalosporins are well tolerated and adequately treat the important organisms. Fosfomycin is a new antibiotic that is taken as a single dose. Sulfonamides can be taken during the first and second trimesters but, during the third trimester, the use of sulfonamides carries a risk that the infant will develop kernicterus, especially preterm infants. Other common antibiotics (e.g., fluoroquinolones and tetracyclines) should not be prescribed during pregnancy because of possible toxic effects on the fetus. The present isolate of *Enterococcus faecalis* was sensitive to the tested antibiotics, so ampicillin was administered to the pregnant woman. A follow-up culture showed no growth of organisms.

Conclusions

Asymptomatic bacteriuria is found in many pregnant women and can be associated with significant maternal and neonatal morbidity. Routine screening for ASB in all pregnant women and treatment is a must to prevent such complications.

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Plate 1: Growth of *Enterococcus faecalis* on blood agar

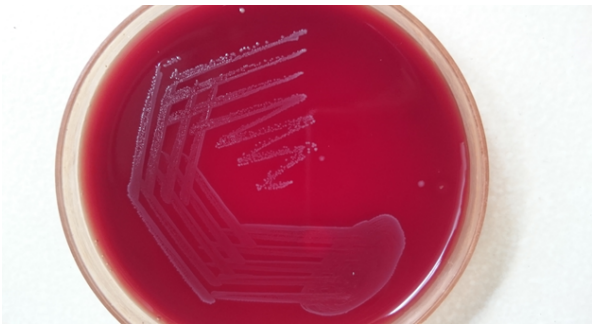


Plate 2: Growth of *Enterococcus faecalis* on MacConkey agar

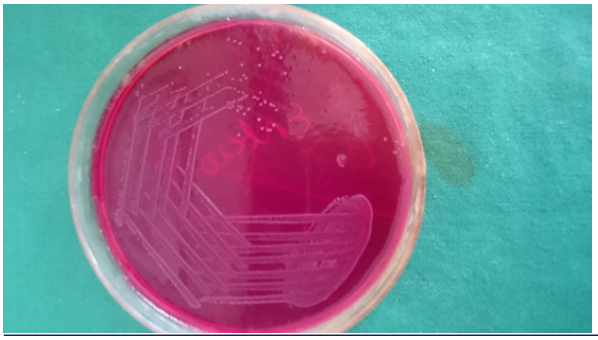
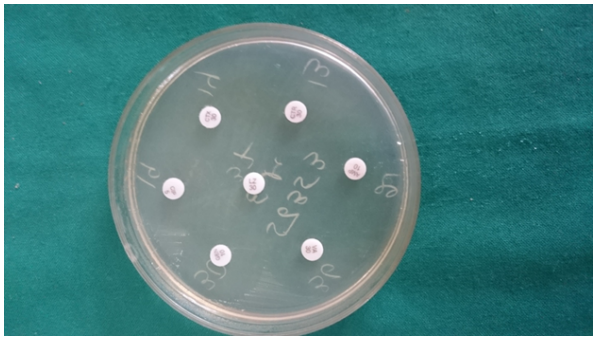


Plate 3: Antibiotic sensitivity testing on Mueller Hinton agar



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