



Pregnancy and Urinary Tract Infection

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ABSTRACT

Urinary Tract Infection is the most common complication during pregnancy. Even though the incidence of UTI in pregnancy is same as that in non-pregnant women, the chance of complications like pyelonephritis, maternal and foetal morbidities are more. Most common type of UTI in pregnancy is asymptomatic bacteriuria (ASB), which is defined as more than one lakh organisms per ml of urine cultured from a midstream clean voided specimen without symptom and can lead to pyelonephritis in 20 to 40% cases. Hence, screening for ASB in pregnancy on first antenatal checkup as well as in third trimester is mandatory. ASB also should be aggressively treated. Acute pyelonephritis in pregnancy can be devastating and needs aggressive management. The organism responsible for most of the UTI is *E.coli*. Group B *Streptococcus* can cause neonatal sepsis, warranting prophylactic antibiotic during pregnancy. The maternal and foetal complications of UTI include premature labor, hypertensive disorders, anaemia, intrauterine growth retardation, etc.

Urinary tract infections as a group are the most common complication of pregnancy. Even though the incidence of urinary tract infection (UTI) does not increase in pregnancy, it assumes importance because of its progression to pyelonephritis and its association with both maternal and foetal morbidity.

The incidence of urinary tract infection varies between 1.9% to 14%.^{1,2} Asymptomatic bacteriuria is the most common form of urinary tract infection. But untreated it may lead to cystitis and acute pyelonephritis.

PATHOGENESIS

UTI is more common in women. And the major reason is anatomic (short female urethra with its proximity to areas like vagina, rectum and anus, which are areas colonised with enteric flora).³

Around 90% of pregnant women have ureteral dilatation due to progesterone starting at 6 weeks of pregnancy and peaking during 22 to 24 weeks. Increased bladder volume, decreased bladder tone along with decreased ureteral tone contributes to ureteral stasis. This in association with the mechanical factors (due to the pregnant uterus) helps in ascent of lower tract infection resulting in increased proneness to pyelonephritis in pregnancy.³ Other factors that contribute in pregnancy are, glycosuria and decreased ability to lower urinary tract to resist invading organisms because of urinary progesterins and oestrogens.

BACTERIOLOGY

Most common uropathogen in pregnant women is *E.coli* (80% to 90%). Other pathogens include *Klebsiella pneumoniae*, *Proteus mirabilis*, *Enterobacter* species, *Staphylococcus saprophyticus*, Group B *Streptococcus* etc.

ASYMPTOMATIC BACTERIURIA (ASB)

Asymptomatic bacteriuria suggests significant bacteriuria without symptoms of infection. Significant bacteriuria is defined as 10^5 or, more organisms per ml of urine of a single uropathogen cultured from a clean voided specimen. Counts of less than 10^5 organisms per ml with two or more organisms generally represent contamination and not infection.

Asymptomatic bacteriuria if untreated in pregnant women may lead to acute cystitis in 30% cases⁴ and pyelonephritis in 20% to 40% cases⁵. Besides a metaanalysis of 17 studies showed an association of asymptomatic bacteriuria and prematurity or, low birth weight.⁶ In an analysis of more than 25,000 mother-infant pairs Schieve and associates found an increased risk of low birth weight, hypertension and anaemia in pregnant women with asymptomatic bacteriuria.⁷

These complications demand routine screening and treatment of asymptomatic bacteriuria in pregnant women.

Tests for infection like agent strips to look for presence of blood, protein, nitrate and leucocyte esterase can be helpful, but the sensitivity and predictive value (33% sensitive and 69%

predictive)⁸ is not good enough to depend only on them. Hence urine culture (mid stream, clean catch) is not only the gold standard for diagnosis of ASB but also is strongly recommended. This too is cost effective. The American College of Obstetrics and Gynaecology recommends urine culture at the first antenatal visit and a repeat culture during the third trimester.⁹ The US Preventive Service Task Force recommends a culture test between 12 to 16 weeks of gestation.

Treatment of ASB

A variety of antimicrobial agents can be used as treatment of ASB. Normally they are used for a period of 3 to 7 days.¹⁰ Several authors have found a single dose of antibacterial to be less effective.¹¹ Normally drugs like Ampicillin (500mg 6 hrly), Amoxicillin (250 mg 8 hrly), Nitrofurantoin (100mg bd), Cephalexin (250mg 6 hrly) are tried. Nitrofurantoin has less chance of encountering resistance than Ampicillin considering that the most common organism is *E. coli*. Sulfonamides can be used in first trimester but to be avoided in second and third trimester for fear of kernicterus in infants. Drugs like Fluroquinolones and Tetracyclines are avoided because of possible foetal toxicity.

ACUTE CYSTITIS

Acute cystitis manifests with symptoms & signs of urgency, frequency, dysuria, haematuria and pyuria without fever and evidence of systemic illness. The organisms involved are same that of ASB. Acute cystitis generally improves with a course of antibiotics for a period of 7 to 10 days.

ACUTE PYELONEPHRITIS

Acute Pyelonephritis is a serious complication of pregnancy and can be devastating. The incidence is 1 to 2% during pregnancy and in cases of untreated ASB, it can occur in 20 to 40 % of patients.

Majority of cases occur after first trimester (73% in second trimester and 27% in third trimester).³ As described earlier factors like dilatation of ureters (due to effect of progesterone) and mechanical pressures of pregnant uterus are major contributory factors in ascent of lower tract infection.

The patient usually presents with fever, chill, rigor, nausea, vomiting and flank tenderness. They show pyuria and a positive urine culture (mostly *E.coli*). 1 to 2 % patients may experience septic shock. Around 20 % may have a raised serum creatinine level (more than 1 mg%). Around 2% will develop dyspnoea, tachypnoea, and hypoxia with pulmonary infiltrates in chest X-ray consistent with ARDS.¹² Besides the maternal morbidity, the acute pyelonephritis can have adverse effects on foetus.

Most of the patients will need hospitalisation, parenteral antibiotics and hydration. Majority will respond to treatment within 48 to 72 hrs. If the response to treatment is not as per expectation, other conditions like infection due to resistant organisms, nephrolithiasis, perinephric abscess, obstructions need to be considered. Further investigations like ultrasound, CT scan or, even a limited intravenous pyelography may be helpful if clinical situation demands so.

Because of high risk of recurrence, it is mandatory that patients of acute pyelonephritis to be followed up either with frequent

urine cultures or, with antimicrobial suppression therapy (i.e. Nitrofurantoin 100mg once daily at bed time) till delivery.

GROUP B STREPTOCOCCUS (GBS) INFECTION

GBS needs special mention, as it is known to cause neonatal sepsis and is associated with pre term rupture of membranes, pre term labor and delivery. It is found to be the cause of UTI in pregnancy in 1 % of patients. Pregnant women with GBS bacteriuria need to receive prophylactic antibiotics during labor to prevent neonatal sepsis.

MATERNAL AND FOETAL MORBIDITIES

In a study involving 25,746 pregnant women UTI was found to be responsible for premature labor, hypertensive disorders, anaemia, and amnionitis. It also has been associated with intra uterine growth retardation and low birth weight. Trials have shown to reduce the incidence of pre term birth and low birth weight. Ascent of microorganisms from vaginal area and replication in placenta, deciduas and membranes could be a mechanism of pre term labor. In pregnant rhesus monkeys inoculation of GBS lead to appearance of cytokines such as IL1, IL6, PGE2 and PGF2a.¹³ These prostaglandins are known to stimulate uterine contraction.

CONCLUSION :

UTI in pregnancy is a common and established cause of maternal and foetal morbidity. Appropriate treatment reduces the incidence of complications. Hence it is mandatory to do routine culture of urine at initial antenatal check up and in the third trimester. It is also essential to treat the urinary tract infection aggressively.

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