Urinary Tract Infections in Pregnancy

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Urinary tract infections (UTI) are remarkably common in women. Some 20% Women in the age range 20-65 years suffer at least one attack per year, 50% develop a UTI within their life time1. Not surprisingly infections of the urinary tract are the most common bacterial infections encountered during pregnancy. These can be both asymptomatic and symptomatic affecting both upper and lower urinary tracts.

Aetiology

The major reason why urinary tract infections are more common in women than men is anatomic. The female urethra is relatively short, averaging 3- 4 cm in length, and thus act as barrier to invading pathogens. Moreover, it is in relatively close proximity to both the vagina and the rectum and therefore may be more readily colonized by enteric organisms. However, the mechanisms responsible for the increased susceptibility to symptomatic UTI in pregnancy continue to be debated. The Enterobacteriaceae account for approximately 85-95% of infections.

Prevalence of asymptomatic bacteriuria in non pregnant women rises with age, at the rate of about 1% for each decade of life from at least age 5 onward. The prevalence of bacteriuria not only increases with age but also with sexual activity, parity, and sickle cell trait.

The higher prevalence rates (11%) have been seen in socially indigent multiparas, as compared with about 2% in pregnant patients in private practice2. Multiparity is also associated with increased bacteriuria in pregnancy3. Sickle cell trait has been cited as another association with bacteriuria, reflecting renal parenchymal damage1,5.

More recent studies have shown that by culturing for urea plasmas and other fastidious organisms, the prevalence of bacteriuria may be as high as 25%. However, it is unclear whether Ureaplasma urealyticum and Gardnerella vaginalis found in the bladder urine of some pregnant women, play a significant pathogenic role7.

Changes of Genitourinary system during pregnancy

The changes that take place in the urinary tract during pregnancy may simply permit urinary colonization established prior to pregnancy to lead to symptomatic infection. Pregnancy does not seem to enhance virulence factors, but urinary stasis and diminished ureteral tone and peristalsis caused by ureteral compression of the enlarging uterus and to a lesser extent by the smooth muscle relaxant effects of progesterone predispose to symptomatic urinary infections8. Because relatively few women become bacteriuric during the course of pregnancy and because there is no evidence to suggest that bacteriuria present early in pregnancy has been acquired at the time of or since conception, it seems likely that the frequency of symptomatic UTI during pregnancy reflects asymptomatic bacteriuria.

**Commonly isolated pathogens in women with urinary tract infections:**

- Escherichia coli
- Klebsiella Enterobacter
- Escherichia coli
- Enterobacter
- Proteus
- Pseudomonas
- Staphylococcus
- Streptococcus

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acquired periodically by certain woman very early in life or later.\(^9\)

Though some authors (Patterson TF et al.) believe that profound physiologic changes affecting the entire urinary tract occur during pregnancy may have a significant impact on the natural history of UTI during gestation.\(^{10}\)

Dilatation of the upper collecting system occurs in most normal pregnancies and extends down to the level of the pelvic brim. These changes are more pronounced on the right than the left, largely owing to the sharp angle of the right ureter follows on its drop into the pelvic cavity. Ureteral peristalsis is reduced after the second month of gestation, with long periods of complete agony seen in the seventh and eighth months of pregnancy, likely a result of hormonal change.\(^{11}\) Dilated ureters can hold up to 200 ml of urine.\(^{12}\)

The bladder, like the ureters, undergoes a progressive decrease in tone and a subsequent increase in capacity. Later in pregnancy, the bladder may contain double its normal volume without discomfort.

Some other studies have suggested that hormonal rather than mechanical changes seen during pregnancy may be the primary factors involved in the aetiology of hydroureter.\(^{13}\)

These changes vary from patient to patient and are more likely to occur during first pregnancies or in women who have had their pregnancies in rapid succession. The urinary tract tends to revert to normal by the second month of the puerperium.

**Asymptomatic infections (asymptomatic bacteriuria)**

The reported prevalence of asymptomatic bacteriuria during pregnancy varies from 2% to 12% depending on parity, race, and socioeconomic status. The highest incidence has been reported in black multiparas with sickle cell trait and the lowest incidence in affluent white women of low parity. Asymptomatic bacteruria is twice as common in pregnant women with sickle cell trait and 3 times as common in pregnant woman with diabetes as in normal women.

A woman is considered to be suffering from asymptomatic bacteriuria when there is presence of significant bacteria (by definition, \(\geq 10^5\) of a single uropathogen per mL of urine collected via clean-voided midstream sampling) without associated symptoms such as dysuria, frequency or suprapubic discomfort. Counts of less than \(10^5\) mL or specimens yielding two or more organisms probably represent contamination and not infection.\(^{14}\) To avoid confusion of contamination it is better to carry out the test in two consecutive specimens.

Though it is not causing any apparent problem to the mother but up to 25-30% of women will develop acute pyelonephritis and according to some stuws this may be as high as 50% if remain untreated and even treated the affected population will be near 10%.

Keeping the delayed complications in mind, it is wise to treat these cases with antibiotics whenever they are detected. Different antibiotics with different durations have been tried so far. The duration of therapy for bacteriuria of pregnancy has received much attention. Early studies used continuous therapy until term because of the concern about treatment failures following short course therapy.

More recent studies have evaluated single-dose therapy for bacteria in pregnant women. It has been suggested that pregnant women, like non pregnant women with renal infection, were more difficult to treat and had higher failure rates with single-dose therapy. Since then more trials have shown that single-dose therapy effectively eradicates bacteriuria in pregnancy. But the important issue is not the length of therapy chosen but that appropriate follow-up is obtained to document the elimination of bacteriuria.

The main problem of treating these cases is that while selecting the drug we have to take both the mother and the fetus in consideration. The effect of Ampicillin, Amoxicillin,
Review Article

Cephalosporin, have so far been widely studied and all of them gave good results. Ronald et al. used nitrofurantoin, also got as good result as others. But the use of this drug should be restricted to early pregnancy as it may induce haemolytic anemia. Peddler et al. in 1985 showed use of augmenting gave significantly good results. In 1983 Campbell et al. found that single does therapy has lower initial cure rate.

An affective drug for UTI is trimethoprim-sulfamethxazole. It is necessary to avoid sulfa drugs during pregnancy due to increased occurrence of neonatal hyperbilirubinaemia.

Symptomatic UTI:
Symptomatic infection of the lower urinary tract (acute cystitis) is usually manifested by dysuria, frequency, urgency along with positive urine culture. In the absence of upper tract involvement patients do not have systemic symptoms like fever, nausea, vomiting. Acute pyelonephritis is usually associated with loin pain. Presence of only increased frequency of micturition or nocturia is usually not the symptom of UTI during pregnancy as it can be a normal physiological adaptation of pregnancy.

Urine analysis of these patients reveal pus cells, white cell casts, bacteriuria. Presence of haematuria indicates urinary calculi. The diagnosis needs to be confirmed by urine culture.

Beside the usual complications of pyelonephritis like septicaemia, endotoxic shock, acute renal failure, pulmonary dysfunction-the other important concern for obstetricians is the effect of UTI on the foetus which includes IUGR and pre-maturity.

Any pregnant mother who are suspected acute pyelonephritis should be handled intensively and hospital admission is indicated. Antibiotic therapy needs to be started from very begin even before getting the urine culture and sensitivity report. This cases should be treated with intravenous antibiotics initially and after the systemic manifestation (fever; vomiting) improves, oral regimen can be started. Penicillin and cephalosporin is the drug of choice but incase of penicillin resistant cases (no improvement within 48-72 hours) aminoglycoside like gentamicin can be helpful.

28% of women with pyelonephritis can develop recurrent bacteriuria and 10% recurrent acute pyelonephritis during the same pregnancy. In these cases long term prophylactic treatment with Nitrofurantoin, 100 mg every night is advocated by some authors although the efficacy of such therapy is questionable.

Conclusion
In all patients with bacteriuria of pregnancy should be treated and followed up cultures are taken to document response. Therapy should be as brief and non-toxic as possible to both mothers and fetuses. All cases of persistent asymptomatic bacteriuria throughout pregnancy or even a single attack of acute pyelonephritis need through post partum investigations.

References
7. Gilbert GL, Garland SM, Fairley KF, et at:
Bacteriuria due to ureaplasmas and other fastidious organisms during pregnancy: Prevalence and significance. Pediatric Infect Dis 1986, 5:S139


