Pregnant women are predisposed to urinary infections due to profound changes in the urinary tract resulting in urinary stasis and an increased concentration of glucose and amino acids in urine. The majority of the urinary infections in pregnancy are caused by normal perineal flora. Three types of infection can occur: asymptomatic bacteriuria (ASB), cystitis, and pyelonephritis.

ASB is defined as > 100,000 colony forming units/ml of a single organism in the absence of symptoms. If left untreated, 25% of affected women will progress to acute pyelonephritis at some time during pregnancy. The incidence of ASB in pregnancy is 2-10% with higher incidences seen in women of lower socioeconomic class, those with sickle cell trait, and those who are more sexually active.

Most women with ASB will be detected by urine culture at their initial prenatal visit. Those with an initial negative urine culture will develop ASB at a rate of 1-2%. Since ASB is associated with acute pyelonephritis, preterm birth, and low birth weight infants, it is standard of care to treat pregnant women with ASB. The recurrence rate of ASB is as high as 30%; therefore these women need close follow up. Even with effective therapy and follow up, 2-5% of pregnant women with ASB will develop pyelonephritis.

Cystitis is characterized by dysuria, urgency and frequency, with few systemic manifestations. Infection is confirmed by pyuria, hematuria, and bacteriuria. The upper urinary tract may become involved by ascending infection. Approximately 40% of pregnant women with pyelonephritis have preceding symptoms of lower tract infection. (Cunningham et al., 2010)

Acute pyelonephritis complicates 1-2% of all pregnancies and is one of the most common reasons for hospital admission in the antepartum period. Pyelonephritis is more common in the second trimester and it is right-sided in about half of cases and bilateral in another fourth. Symptoms include abrupt onset with fever, chills, and pain in one or both lumbar regions. Urinary sediment usually contains numerous leukocytes, frequently in clumps, and many bacteria. E. coli strains are isolated in 75 to 80% of infections. (Cunningham, 2010) Sepsis syndrome is the most serious complication encountered with antepartum pyelonephritis and can be associated with pulmonary edema, respiratory failure, preterm labor and fetal death.

Recommendations

- Screen all pregnant women for ASB with a clean-catch, mid-stream urine for culture and sensitivity at their initial prenatal visit. If the culture comes back contaminated, repeat by mini-cath.(ACOG, 2012)
- If negative, repeat cultures are not needed except in patient with Sickle cell disease or trait, insulin dependent diabetes, or autoimmune disease. In these patients, repeat urine culture each trimester(clean catch, mid-stream urine; if the culture comes back contaiminated, repeat by mini-cath).
- Cystitis: Diagnose by history and examination of un-spun mini-cath urine for evidence of WBCs or bacteria. Confirm with culture and sensitivity. As an alternative to microscopy, urine dipstick with leukocyte esterase and nitrite can be utilized to diagnose infection in the setting of suggestive symptoms.
- If urine culture is positive, treat empirically with a 3 day course of Nitrofurantoin 100 mg two times per day or trimethoprim-sulfamethoxazole (Bactrim DS) 160/100 mg two times per day if not sulfa allergic and beyond the first trimester but prior to 34 weeks. Repeat urine culture and sensitivity in 7-10 days after treatment. An increasing number of organisms are developing antibiotic resistance therefore culture and sensitivity is more important than in the past in order to ensure the patient is receiving appropriate therapy.
- If repeat culture continues to be positive, check compliance and bacteria sensitivity and re-treat.
- Women with repeat positive urine cultures may be treated with chronic antibiotic suppression such as Nitrofurantoin 100 mg at bedtime.

Management of Acute Pyelonephritis (Cunningham et al., 2010)

1. Hospitalize patient.
2. Obtain urine culture. If patient appears significantly ill, obtain blood cultures as well as these may be positive prior to the urine culture.
3. Evaluate CBC, serum creatinine, and electrolytes.
4. Administer intravenous hydration to ensure adequate urinary output and replete any electrolyte disturbances.
5. Monitor vital signs, including pulse oximetry, and urinary output frequently and strictly.
6. Administer intravenous antimicrobial therapy with a 3rd generation cephalosporin (e.g. ceftriaxone), a beta-lactam with good gram negative coverage (e.g. piperacillin/tazobactam) or ampicillin and gentamicin.
7. Obtain chest radiograph if dyspnea or tachypnea is present. If evidence of pulmonary edema or oxygen saturation <95%, consider MFM or pulmonary consultation.
8. Repeat hematology and chemistry studies in 48 hours.
9. Change to oral antimicrobials when afebrile 24-48 hrs.
10. Discharge when afebrile 24-48 hours, provide oral antimicrobial therapy for an additional 14 days.

11. After completion of acute course of therapy, patient should receive suppressive therapy for the remainder of pregnancy such as Nitrofurantion 100 mg at bedtime.

Quality Indicators/Benchmarks

- Urine culture at initial visit

References

ACOG. (2012)Guidelines for perinatal care / American Academy of Pediatrics [and] the American College of Obstetrics and Gynecologists (7th ed.).

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Cunningham, F. G., Leveno, K. J., Bloom, S. L., Hauth, J. C., Rouse, D. J., & Spong, C. Y. (2010). *Williams Obstetrics* (23rd ed.). New York, USA: McGraw-Hill.