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Original Research Paper

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ASSOCIATION OF DEMOGRAFIC VARIABILITIES TO URINARY TRACT INFECTION IN PREGNANCY

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ABSTRACT

Infection of urinary tract is one of the most common problems in pregnancy due to anatomical and physiological changes that take place in the genitourinary tract in pregnancy. It may be symptomatic or asymptomatic. As the age advances prevalence of bacteriuria is increasing. Multiparous women are having more prevalence of asymptomatic bacteriuria. Less the socio economic class more the prevalence of infection. Correlation between demographic factors like socioeconomic class, gravida and age on infection was studied using chi square test. Keeping the complications of bacteriuria, it has to be treated with 7-day regimen of antibiotics, based on the sensitivity pattern. Urine culture is repeated after 2 weeks to see the effectiveness of the treatment.

KEYWORDS : Urinary tract infection, bacteriuria, urine culture

INTRODUCTION

The American College of Obstetrics and Gynecology recommends that a urine culture be obtained at the first prenatal visit for all pregnant women. [1] Pregnant women have increased risk for UTIs. Beginning in week 6 and peaking during weeks 22 to 24, approximately 90 percent of pregnant women develop ureteral dilatation, which will remain until delivery (hydronephrosis of pregnancy). Increased bladder volume and decreased bladder tone, along with decreased ureteral tone, contribute to increased urinary stasis and ureterovesical reflux.[2]

Additionally, the physiologic increase in plasma volume during pregnancy decreases urine concentration. Up to 70 percent of pregnant women develop glycosuria, which encourages bacterial growth in the urine. Increases in urinary progestins and estrogens may lead to a decreased ability of the lower urinary tract to resist invading bacteria. This decreased ability may be caused by decreased ureteral tone or possibly by allowing some strains of bacteria to selectively grow.[2,3]

CLASSIFICATION OF URINARY TRACT INFECTION OF PREGNANCY:

According to Royal college of Obstetrics and Gynaecology 2008 urinary tract infection of pregnancy is classified as

1. Asymptomatic bacteriuria
2. Acute cystitis
3. Pyelonephritis

COMPLICATION OF ASYMPTOMATIC BACTERIURIA:

1. Cystitis
2. Pyelonephritis
3. IUGR
4. Preterm delivery
5. Premature rupture of membranes
6. Maternal anemia
7. Preeclampsia
8. Still birth
9. Perinatal mortality
10. Mental retardation and developmental delay of the child

Urine culture has traditionally been the gold standard screening assessment but, despite excellent sensitivity, laboratory time and costs are considerable and it takes 48 hours to obtain results. An ideal screening test should have good sensitivity, specificity and should be simple, inexpensive and produce quick results.

Escherichia coli accounts for 80–90% of infections.[4] *E. coli* is a rod shaped Gram-negative, facultative anaerobic and non sporulating bacterium. Strains that possess flagella are motile. The flagella have a peritrichous arrangement. E.coli have adhesions such as P and S fimbria, which increases the virulence of the organism.

Other Gram-negative bacilli, such as *Proteus mirabilis* and *Klebsiella pneumoniae*, can be cultured. *Proteus,Klebsiella* and most *Enterobacteriaceae* species show urease activity and form urinary calculi, which can act as reservoirs of infection. The coagulase negative cocci, *Staphylococcus saprophyticus*, is the second most frequently cultured uropathogen,[5] while other Gram-positive cocci, such as group B haemolytic streptococci, are less frequently isolated but remain clinically important.[6] Other less common uropathogens include *Staphylococcus aureus* and *Mycobacterium tuberculosis*, which can arise via haematological inoculation rather than ascending infection. Nonbacterial causes include *Chlamydia* species and fungal infections, such as *Candida albicans*.[7]

Pregnancy increases glomerular filtration rates, with a resultant increase in the elimination rate of renally-excreted medications. This, combined with increased maternal plasma volume, effectively reduces serum drug concentrations and can adversely affect the amount of therapeutic activity at the target tissue (bio-availability). This is especially a problem with ß-Lactam antibiotics, including penicillins and cephalosporins.[8] In addition, polyuria and frequency reduce urinary drug concentration and the therapeutic window within the urinary tract.[9] Consequently, it may be necessary to increase administration dosages or prescribe hydrophilic drugs to ensure efficacy.[10] It is essential to remember potential maternal side-effects, drug interactions and the possibility of teratogenicity when any medication is prescribed in the antenatal period, especially in early pregnancy.[11] Even when organogenesis is complete, the potential fetal effects of medications must be considered.[12]

When instituting empirical treatments, it is vital to consider the profile of putative causative organisms and antimicrobial resistance trends within the local antenatal population.[13]

Urinary infection recurs in 4–5% of pregnancies. The risks of developing pyelonephritis and its potential consequences are the same as for the primary infection. The exact aetiology is uncertain but re-infection by coliform bacteria from the vaginal reservoir can occur as a result of sexual activity. Urinary tract anomalies must be excluded and postpartum evaluation is advisable after several episodes of antenatal infection.[14]

CASE STUDY

In the present study, we studied the influence of demographic

variables on urinary tract infection complicating pregnancy among hundred antenatal women attending the antenatal out patient department at Sree Balaji Medical college and hospital from 2017 july to December, over a period of 6 months. Statistical significance was calculated using chi square test

- As age increases the percentage of occurrence of infection also increases. Lesser the age lesser the infection. In this study in age group 20-25 years 13% of them had bacteriuria. Among 26-30 years of age 18.5% and highest among the higher age group 31-35 years, being 50%.
- **Relationship between age and urinary tract infection is statistically significant. (p=0.03).**
- Higher the gravida more the percentage of bacteriuria. In this study only 14.3% primi gravida is having bacteriuria. Second gravida- 16.2%, Third gravida- 21.1%. Highest among the fourth gravida- 100%. Only 2 patients were in fourth gravida in our study group. Both of them had bacteriuria.

Relationship between gravida and urinary tract infection is statistically significant, (p=0.002).

- Lower the socio economic class more is the prevalence of bacteriuria. In the present study only 14.3% of them in class I (upper class) socio economic status had bacteriuria. Class II, III, IV had bacteriuria in 12.5%, 11.1%, 17.2% of them respectively. Highest being in the lower class 30.4%.

Table 1: ASSOCIATION BETWEEN INFECTION AND DEMOGRAPHIC VARIABLES

DEMOGRAPHIC VARIABLES		Urine culture				Total	Chi square test
		No growth		Positive			
		N	%	n	%		
Age	20 -25 years	47	87.0%	7	13.0%	54	
	26 -30 years	31	81.5%	7	18.5%	38	**2=6.49**
	31 -35 years	4	50.0%	4	50.0%	8	**p=0.03***
Gravida	I	36	85.7%	6	14.3%	42	
	II	31	83.8%	6	16.2%	37	**2=10.12**
	III	15	78.9%	4	21.1%	17	**p=0.02***
	IV	0	0.0%	2	100.0%	2	
Socio Economic Status	Class I	12	85.7%	2	14.3%	14	
	Class II	14	87.5%	2	12.5%	16	
	Class III	16	88.9%	2	11.1%	18	2=3.45
	Class IV	24	82.8%	5	17.2%	29	p=0.48
	Class V	16	69.6%	7	30.4%	23	

Though the relationship between socio economic class and bacteriuria is not statistically significant (p=0.48), there is an increasing trend in the prevalence of urinary tract infection in lower class.

High prevalence with advancing maternal age may be due to increasing co morbid conditions, which is associated with neurogenic bladder and increased residual urine volume or urinary reflux. This increased prevalence of ASB in those belonging to low socio economic status is due to poor sanitation, lack of general hygiene and failure to attend antenatal clinic regularly.

CONCLUSIONS

- Correlation between demographic factors like socioeconomic class, gravida and age on infection was studied using chi square test. Urinary tract infection was more common in multiparous (p=0.02), elderly age groups (p=0.03) and lower socio economic class (p=0.48). Though relation between socio economic class and infection is not statistically significant, there is an increasing trend of infection in lower socio economic class.

Urine culture is the gold standard for diagnosing Urinary tract infection. Unfortunately urine culture availability is limited in most of the low resource settings. According to ACOG all pregnant women should be screened with urine culture in their first antenatal visit.

Screening the substantial segments of the population in search for the disease at its earliest stage is a very good logical extension of the role of preventive medicine.

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