



## REVIEW ARTICLE ON PROSPECTIVE ANALYSIS OF PRSCRIPTION PATTERN OF ANTIMICROBIAL THERAPY FOR URINARY TRACT INFECTION IN PREGNANT FEMALE PATIENT

Shikha Pal, Narendra Kumar Yadav, Aayush Yadav, Mandeep, Mahipal

Arya College of Pharmacy, Jaipur, Rajasthan

**Article Info:** Received 03 May 2020; Accepted 02 June 2020

**DOI:** <https://doi.org/10.32553/jbpr.v9i4.772>

**Corresponding author:** Dr. Shikha Pal

**Conflict of interest:** No conflict of interest.

### Abstract

Urinary tract infection (UTI) are common during pregnancy. These most common causative organism is E.coli.<sup>1</sup> A urinary tract infection (UTI) is an infection in any part of urinary system including kidney, ureters, bladder and urethra.<sup>2</sup> The urinary can be divided into the upper urinary tract and the lower urinary tract. The upper urinary tract consist of the kidney and ureters and lower urinary tract consist of the bladder and the urethra.<sup>2</sup> UTI can be classified by anatomic site of involvement into lower and upper urinary tract infection.<sup>3</sup>

Asymptomatic bacteriuria can lead to the development of cystitis and pyelonephritis. All pregnant women should be screened for bacteriuria and subsequently treated with antibiotics such as Nitrofurantoin, sulfisoxazole, or cephalexin. can be life threatening illness, with the increased risk of Perinatal and Neonatal morbidity.

Pregnant women with urinary group B Streptococcal infection should be treated and should receive intrapartum prophylactic therapy.

### Introduction

#### 1. DEFINATION

UTI is defined as significant bacteriuria in the setting of symptoms of cystitis or pyelonephritis.<sup>5</sup> UTI is an infection of urinary system including kidney, ureters, urethra and bladder.<sup>2</sup>

#### 1. TYPES OF URINARY TRACT INFECTION

Urinary tract infections can be classified on the basis of-

1. Anatomic site of involvement
2. Case complexity
3. Presence of symptoms

##### 1.1.1 ANATOMIC SITE OF INVOLVEMENT

Each type of UTI has more specific sign and symptoms, depending on which part of urinary tract is affected.<sup>1</sup> They are-

- Upper urinary tract infections
- Lower urinary tract infections

##### 1.1.1.1 UPPER URINARY TRACT INFECTIONS: KIDNEY AND URETER

An infection of upper urinary tract has include pyelonephritis. When Kidneys are affected called acute pyelonephritis.

##### 1.1.1.2 LOWER URINARY TRACT INFRCTIONS: BLADDER AND URETHRA

Infections of the lower urinary tract include cystitis, urethritis. When bladder are affected called cystitis and when urethra are affected called urethritis.

#### PYELONEPHRITIS

Acute pyelonephritis is a sudden and severe kidney infection. Here the kidneys are swell and may be

permanently damage them. Pyelonephritis can be life threatening. When persistent attacks occur, the condition is called chronic pyelonephritis. The chronic form of pyelonephritis is rare, but it happens more often in children or people with urinary obstructions. Symptoms of pyelonephritis appear within two days of infection. Common symptoms include:<sup>11</sup>

- Fever greater than 102 degree farhenite and 38.9 degree celcius
- Pain in the abdomen, back, side, or groin
- Painful or burning urination
- Cloudy urine
- Pus or blood in the urine
- Urgent or frequent urination
- Fishy smelling urine

Other symptoms can include:

- Shaking or chills
- Nausea
- Vomiting
- General acting or ill feeling
- Fatigue
- Moist skin
- Mental confusion

The infection starts in the lower urinary tract. Bacteria enter the body through the urethra and being to multiply and spread up to the bladder. From there, the bacteria travel through the ureters to the kidney. During pregnancy increased level of progesterone and increased pressure on the ureters can increased the risk of pyelonephritis. Pyelonephritis in pregnant women can be threaten the lives of both mother and baby. It can also increase the risk

of premature delivery. For the treatment of pyelonephritis in pregnant women, a urine culture should be conducted between the 12<sup>th</sup> and 16<sup>th</sup> week of pregnancy.<sup>11</sup>

Chronic pyelonephritis are more common in people with urinary obstructions. These can be caused by UTI, vesicoureteral reflux, or anatomical anomalies. Other people who are at increased risk include:<sup>11</sup>

1. Anyone with chronic kidney stones or other kidney or bladder conditions
2. Older adults
3. People with suppressed immune systems, such as people with diabetes, HIV/AIDS, or cancer
4. People with vesicoureteral reflux (a condition where small amount of urine back up from the bladder into the ureters and kidneys)
5. People with an enlarged prostate

Other factors that can make you vulnerable to infection include:

6. Cystoscopic examination
7. Urinary tract surgery
8. Certain medications
9. Nerve or spinal cord damage

#### **CYSTITIS**

This is the inflammation of the bladder. Inflamed part become irritated, red, or swollen. It happens when bacteria enter the bladder or urethra and begin to multiply. The natural occurring bacteria may also responsible for cystitis and cause inflammation. Most of cases of cystitis are acute, or occur suddenly. Cystitis can affect anyone, but it occurs most often in women. Symptoms of cystitis can include:<sup>11</sup>

10. Frequent urge to urinate
  11. Urge to urinate after you have emptied your bladder
  12. Cloudy or strong smelling urine
  13. Low fever if in combination with a UTI
  14. Blood in your urine
  15. Pain during sexual intercourse
  16. Sensations of pressure or bladder fullness
  17. Cramping in your abdomen or back
- Some other symptoms may also occur:
18. Nausea
  19. Vomiting
  20. Back or side pain
  21. Chills

Cystitis can be further two types- acute or interstitial. Acute cystitis is a case of cystitis that can occur suddenly. Interstitial cystitis (IC) is a chronic or long term case of cystitis that affects multiple layers of bladder tissue. The following are types of cystitis.<sup>11</sup>

#### **BACTERIAL CYSTITIS**

Bacterial cystitis occurs when bacteria enter your urethra or bladder and cause an infection. This infection leads to cystitis, or inflammation in your bladder. It is important to

treat a bladder infection. If the infection spreads in your kidney it can become a serious health issue.<sup>11</sup>

#### **DRUG INDUCED CYSTITIS**

Certain medications can cause inflammation in bladder. Some medication can irritate the bladder and they exit from body. For example, the chemotherapy drugs Cyclophosphamide and Ifosfamide can cause cystitis.

#### **RADIATION CYSTITIS**

Radiation therapy is used to kill cancer cells and shrink tumors, but it can also damage healthy cells and tissues. Radiation treatment in pelvic area can cause inflammation in bladder.<sup>11</sup>

#### **FOREIGN BODY CYSTITIS**

Use of catheter in hospitals can also increase the risk of cystitis and damage the tissues in the urinary tract.

#### **CHEMICAL CYSTITIS**

Certain type of hygiene products can irritate the bladder. That are:-

22. Spermicidal jellies
23. Use of diaphragm with spermicide
24. Feminine hygiene sprays

#### **URETHRITIS**

It is a condition in which the urethra become inflamed and irritated. It may causes pain while urinating and an increased urge to urinate.

Some symptoms of urethritis in women include:<sup>11</sup>

25. More frequent urge to urinate
26. Discomfort during urination
27. Burning or irritating at the urethral opening
28. Abnormal discharge from the vagina may also be present along with the urinary symptoms

Sources of bacteria associated with urethritis include:

29. Neisseria gonorrhoea
30. Chlamydia trachomatis
31. Mycoplasma genitalium

#### **1.1.2 CLASSIFICATION ON THE BASIS OF CASE COMPLEXITY**

##### **1.1.2.1 COMPLICATED UTI**

These UTI are associated with metabolic disorders, that are secondary to anatomic or functional abnormalities that impair urinary tract drainage.

##### **1.1.2.1 UNCOMPLICATED UTI**

These are the episodes of cystourethritis following bacterial colonization of the ureteral and bladder mucosa.

#### **1.1.3 CLASSIFICATION ON THE BASIS OF PRESENCES OF SYMPTOMS**

##### **ASYMPTOMATIC BACTERIURIA**

ASB refers to 2 consecutive urine culture growing more than 100,000 colony forming units (CFU)/ml of a bacterial species in a patient lacking symptoms of a UTI. In this the microbes involve are E.coli.<sup>2</sup>

##### **PATHOGENESIS**

Pregnant women are increased risk of UTI.<sup>1</sup> Increased incidence of UTI during pregnancy is due to the

morphological and the physiological changes that take place in the genitourinary tract during pregnancy. Pyelonephritis is the most common serious condition seen in pregnancy.

Pregnancy cause numerous and mechanical changes in the body. Beginning in the 6<sup>th</sup> week, with peak incidence during 22<sup>nd</sup>-24<sup>th</sup> weeks of gestation, 90% of the pregnant women develop ureteric dilation there by increasing the risk of urinary stasis and vesicoureteric reflux. Increased bladder volume and decreased urinary tone, along with decreased ureteral tone, contribute to urinary stasis and ureterovesical reflux.<sup>4</sup>

Increases in urinary progesterone and estrogen may also lead to a decreased ability of the lower urinary tract to resist invading bacteria. This is due to decreased ureteral tone or possibly by allowing some strains of bacteria to selectively grow.<sup>1,3</sup> these factors contribute to the development of UTI during pregnancy.<sup>13</sup>

#### PREVALENCE

UTI present in pregnancy either as asymptomatic bacteriuria or as symptomatic infection. Asymptomatic bacteriuria has been estimated to range from 2% to 10% in various studies. In India the prevalence range from 3% to 24%. About 40% of women and 12% of men experience at least one UTI in their life. About 40% to 50% women reported at least one UTI in their life.<sup>8</sup>

The prevalence of UTI during pregnancy increases with maternal age. In retrospective analysis of 24000 births found the prevalence of UTI during pregnancy to be 28.7% in whites and Asians.<sup>10</sup>

#### TREATMENT

Pregnant women treated when bacteriuria is identified. Ampicillin has been the drug of choice, but in recent year E.coli has become resistance to ampicillin. Ampicillin resistance found in 20 to 30 percent of E.coli cultured from urine in the out patient setting. Nitrofurantoin is a good choice because of its higher urinary concentration. Cephalosporins are well tolerated and adequately treat the important organism. Fosfomycin is the new antibiotic that is used during days in single dose. Sulfonamide can be taken during first and second trimester of pregnancy but during third trimester of pregnancy it is risky to use the sulfonamides because it cause fetal KERNICTERUS, especially preterm infants.<sup>16</sup>

#### 5. Screening

In the screening for the treatment of pregnant women with asymptomatic bacteriuria, this is significantly decrease the annual incidence of the pyelonephritis during pregnancy.<sup>12</sup> This is the process where the treatment of a pregnant women with asymptomatic bacteriuria has been shown to decrease the incidence of preterm birth and low birth weight infant.<sup>13</sup>

The decision about how to screen the asymptomatic women for bacteriuria and it is a balance between the cost

of screening versus the sensitivity and specificity of each test. Only one half of the patients with bacteriuria were identified compared with the screening by urine culture. In India regular screening is not available for the presence of symptomatic urinary infections or asymptomatic bacteriuria during pregnancy.

#### REFERENCES

1. Urinary tract infections, viewed 25 March 2020. ([www.mayoclinic.org/disease-conditions/urinary-tract-infections/symptoms-causes/syc20353447](http://www.mayoclinic.org/disease-conditions/urinary-tract-infections/symptoms-causes/syc20353447))
2. James McIntosh 2010, What to know about urinary tract infections, Medical News Today. Viewed 25 March 2020. (<http://www.medicalnewstoday.com/artical/189953>)
3. Jancel, T & Dudas, V2020, ' Management of uncomplicated urinary tract infection' , West J Med, vol176,pp.5155
4. Peddie BA, Bailey RR, Wells JE. Resistance of urinary tract isolates of E. coli to cotrimoxazole, sulfonamide, trimethoprim and ampicillin: an 11- year survey. N Z Med J. 1987;100:3412.
5. Kant,S, ,Lohiya, A, Kapil, A, Gupta,SK 2017, Urinary tract infection among pregnant women at a secondary level hospitals in northern India, Indian Journal of Public Health, Vol. 62, no. 2, pp. 118-123
6. Lee et al. 2020, Urinary tract infection in pregnancy in a rural population of Bangladesh: population based prevalence, risk factors, etiology and antibiotic resistance, BMC Pregnancy and child, (2020) 20:1, pp. 1-11, <https://doi.org/10.1186/S12884-019-2665-0>
7. Patrica, JH, Robart, PG, 2019, ' Urinary tract infection in pregnancy,' Stat Pearls Publishing, NCBI Book shelf. A service of the National Library of Medicine, National Institute of Health. Viewed 30 March (<https://www.ncbi.nlm.nih.gov/books/NBKS7047/>)
8. Ramnath, KV, Shafiya, SB 2011, ' Prescription pattern of antibiotic usage for urinary tract infection treated in a rural tertiary care hospital, ' Indian Journal of Pharmacy Practice, Vol.4, no. 2, pp. 57-63
9. Raisa O Platte 2019, Urinary tract infection in Pregnancy, Medscape. Viewed 30 March 2020(<http://emedicine.medscape.com/article/452004-overview#a1>)
10. Joanna, MR, Jolanta, M, Monika W 2013, "Urinary tract infection in pregnancy: Old and new unresolved diagnostic and therapeutic problem", Arch Med. Sci2015, Vol.11, no.1, pp. 67-77, DOI:10.5114/ aoms.2013.39202
11. Thomas, MH Gupta, K2020,"Urinary tract infections and asymptomatic bacteriuria in pregnancy, Up To Date, Viewed 03 April 2020.(<https://www.uptodate.com/contents/urinary-tract-infections-and-asymptomatic-bacteriuria-in-pregnancy>)

12. Chritine DiMaria, Matthew Solan and Ana Gotter 2018, asymptomatic bacteriuria, healthline, viewed 03 April 2020.(<http://www.healthline.com/health/pregnancy/infections-asymptomatic-bacteriuria>)
13. Imade et al.2010,'Asymptomactic bacteriuria among pregnant women, 'N AMJ MedSci.2010,vol.Jun;2(6), pp. 263-266, doi:10.4297/najms.2010.2263.
14. Najar,MS, Saldanha,CL, Banday AK 2009,'Approach to Urinary tract infections', Indian J Nephrol, Vol. Oct; 19(4), pp.129-139.doi:10.4103/0971-4065-59333.
15. Loh, KY, Sivalingam, N,' Urinary tract infection in pregnancy', Malaysian family physician. Vol.2007; 2(2),pp. 54-57
16. Nowicki, B, Sledzinsk, A, Samet, A, Nowicki, S2010, pathogenesis of gestational urinary tract infection: Urinary obstruction versus immune adaption and microbial virulence. BJOG 2011,vol. 118, pp. 109-112
17. Delzell, JE, Lefevre, ML 2000', Urinary tract infections during pregnancy, AM Fam Physician, Vol. 2000 feb 1,61(3), pp. 713-720
18. Managing Urinary tract infection in pregnancy, Viewed 03 April 2020 ( <http://bpac.org.nz/BPZ/2011/April/pregnant-uti.aspx>)
19. Patrik, D2018', which antibiotic & whould be used with caution in pregnant women with UTI?, OBG Management, Vol.30, no. 3, pp. 14-17\ICMR (2019), Treatment guidelines for antimicrobial use in common syndrome, 2nd edition, ICMR publication, Viewed 29 May 2020. ([http://www.ijmm.org/documents/Treatment Guidelines 2019-final pdf](http://www.ijmm.org/documents/Treatment%20Guidelines%202019-final.pdf))