



Urinary Tract Infection

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Introduction

- Young women are particularly susceptible, 40% of all women will suffer at least one UTI at some point.
- Infection in men occurs less frequently until the age of 50, when incidence in men and women is similar.

Kidney

Ureter

Bladder

Urethra



Upper tract



Pyelonephritis

Cystitis

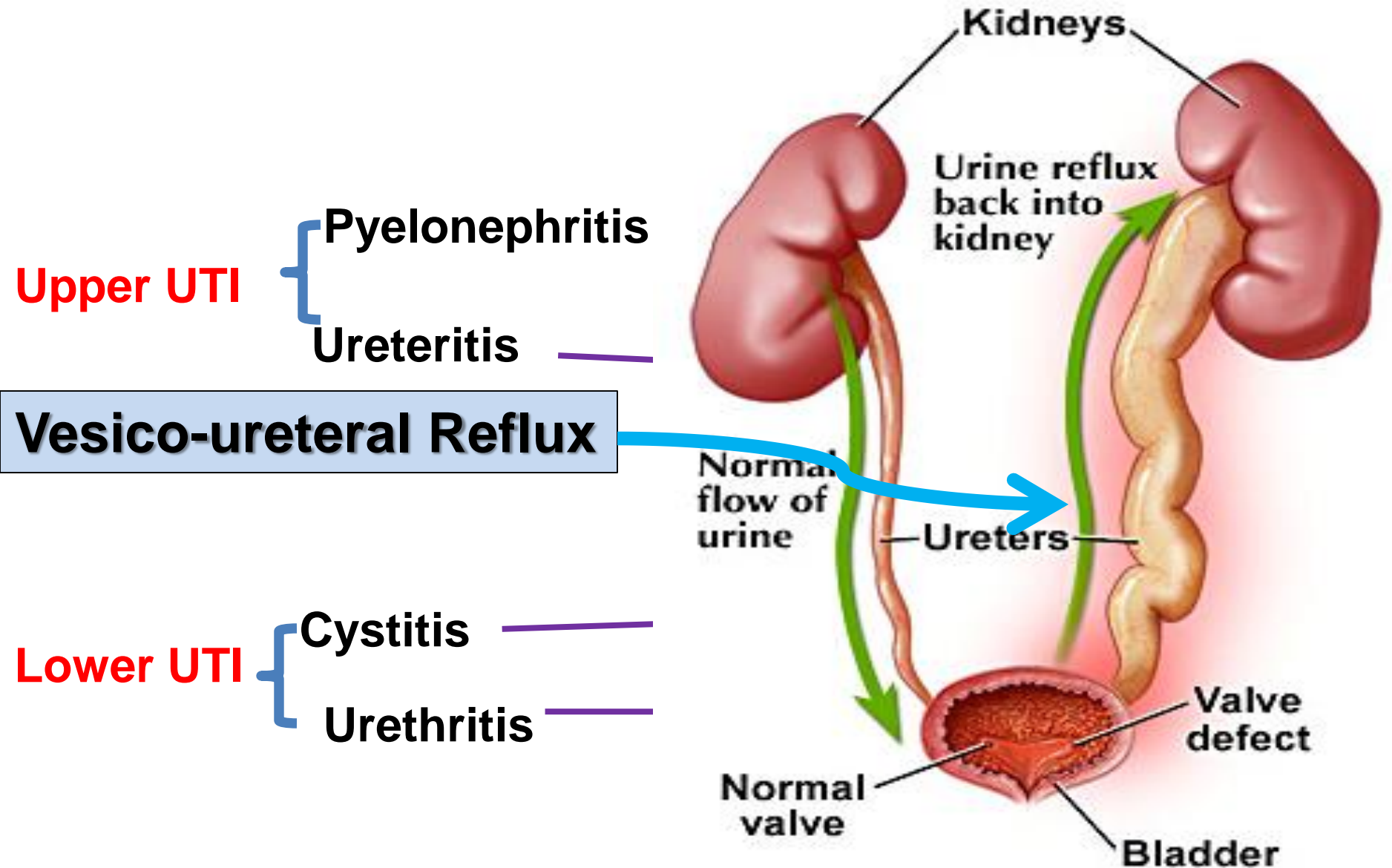


Lower tract



Urethritis

Urinary Tract Infection



Classification

According to Degree

1-Uncomplicated

- Occur in individuals who lack structural or functional abnormalities in the UT that interfere with the normal flow of urine.
- Mostly in healthy females of childbearing age

Classification

According to Degree

2-Complicated

predisposing lesion of the UT such as congenital abnormality or distortion of the UT, a stone a catheter, prostatic hypertrophy, obstruction, or neurological deficit

- All can interfere with the normal flow of urine and urinary tract defenses.

Other Definitions

Asymptomatic bacteriuria

- Common among the elderly
- Bacteriuria $> 10^5$ bacteria/ml of urine without symptoms

Symptomatic abacteriuria:

- Symptoms of frequency and dysuria in the absence of significant bacteriuria

Other Definitions

Significant bacteriuria

- More than 10^5 bacteria /ml (CFU) of urine in clean catch specimen
- 1/3 of symptomatic women have CFU counts below this level
- A bacterial count of 100 CFU/ml has a high positive predictive value of cystitis in symptomatic women

- ***Upper Urinary tract (Kidney, Ureter)-***
 - *Less common but More dangerous,*
 - *Long term therapy*

- ***Lower Urinary tract (Bladder, Urethra)-***
 - *More common but Less dangerous*
 - *Short term therapy*

•Organisms-

- Mostly Gram Negative (**E.coli**, Klebsiella, Proteus, Pseudomonas, Enterobacter,)
- Others- Staphylococcus, Viral, Fungal, ...
- Single in acute, mixed in chronic

•Entry-

- Mostly from lower to upper (**Ascending**),
- Some times
 - Directly from the surrounding sites or
 - From blood (bacterimia)

Symptoms



FEVER
100°F OR GREATER

ACHES
SUDDEN, UNEXPLAINED

CHILLS
UNEXPLAINED

Symptoms- (Severe Pain During UTI)

- Systemic symptoms- myalgia, vomiting, weakness etc.
- Pain (Pelvic, Rectal, lower abdomen or renal angle)
- Pungent smell of urine
- Dysuria (Burning),
- Denies urination (Fear of Urination)
- Discharge through urethra
- Discoloration of urine (Haematuria, Pyuria, Haziness, Clouding)
- Urgency
- Temperature (Fever with chills)
- Incomplete emptying (Retention)
- Incontinence of urine



- **More common in Females-** Anatomical differences
- **Other part involved -**
 - Prostate, Epididymis
- **More common if-**
 - Stones
 - Strictures
 - Stents (Urinary Catheter)
 - Structural abnormality
 - Straight entry of ureter
 - Sexually active
 - Store urine (Faulty urinary habit)
 - Surgical (abdomen)
 - Scanty fluid intake
 - Semiconscious (Unconscious),
 - Site trauma,

DIGNOSIS

● *Acceptable methods for urine collection:*

1. Midstream clean catch

*2. Catheterization 3. Suprapubic
aspiration.*

● *Microscopic examination of urine (U/A):*

1. WBC 2. RBC 3. Casts 4. Pro

5. S. Gravity

6. Bacteria 7. Nitrite

- Urine obtained by **midstream, clean-catch technique** (for older children and adolescents) is considered significant with bacterial growth of a single organism of **more than 100,000 colony forming units (CFU)/mL**.
- Urine obtained by **catheterization** is considered significant with bacterial growth of **more than 10,000 CFU/mL**.
- Urine obtained by **suprapubic aspiration** is considered significant bacterial growth of **more than 1000 CFU/mL**.
- **Perineal bags** for urine collection are prone to contamination and **are not recommended** for urine collection for culture.

Urinalysis

- **Pyuria** (leukocyturia of >10 white blood cells [WBCs]/mm³) suggests infection, but also is consistent with urethritis, vaginitis, nephrolithiasis, glomerulonephritis, and interstitial nephritis.
- Urinary dipstick tests that combine both the **leukocyte esterase** and **nitrite** have high sensitivity and specificity for detecting a UTI.

Imaging

- Ultrasonography,
- Voiding cystourethrogram (VCUG)
- Radionuclide cystography
- Renal nucleotide scans
- Computed tomography (CT)
- Magnetic resonance imaging (MRI)

- Ultrasound provides limited information about renal scarring and is performed to exclude an anatomic abnormality.

- VCUG is the best imaging study for determining the presence or absence of vesicoureteral reflux, which is ranked from grade I (ureter only) to grade V (complete gross dilation of the ureter and obliteration of caliceal and pelvic anatomy).

- A technetium- 99m DMSA scan can identify acute pyelonephritis and is most useful to define renal scarring as a late effect of UTI.

Management of Uncomplicated Urinary Tract Infection

◆ *Nonspecific Therapy*

-Hydration -Urinary PH -Analgesics

◆ *Lower UTI. (U/A)*

Nitrofurantoin 100 mg BID (5-7 days)

TMP-SMX 1 DS tab BID (3 days)

Fosfomycin 3g Single dose

Pivmecillinam 400 mg BID (3-7 days)

Fluoroquinolone (3 days)

Beta-Lactams (5-7 days))

•Urinary analgesics (Local)-

- Phenazopyridine (Symptomatic relief only, **No antibacterial property**, Urine becomes orange red)

•Urinary antiseptics-

•Nitrofurantoin-

- Generates **nitro-anion superoxide** to damage bacterial DNA,
- Dark brown urine,
- Peripheral neuritis, Intra-hepatic cholestasis
- Antagonism with Nalidixic acid

Antimicrobials-----**(Q-BACTS)**

- **Quinolones** -(Nalidixic acid, Norfloxacin.....)
- **Betalactams**- Ampicillin/ Amoxicillin,
- **Aminoglycosides**- Gentamicin, Amikacin, ...
- **Cephalosporins**- Third generation
- **Tetracyclines** -
- **Sulfonamides and Cotrimoxazole**
- **Other Antimicrobials**-
 - Chloramphenicol, Methicillin, Carbenicillin etc.....

Management of Uncomplicated Urinary Tract Infection

◆ *Acute Pyelonephritis. (U/A & U/C)*

-In patient:

*(Third Generation Ceph., AMG, Ampic-Sulbactam,
Tazocin, Fluoroquinolone (IV), Carbapenem,
Ampicillin?, Cefazolin?,.....)*

-Out patient:

*(Trimethoprim, Trimethoprim-Sulfamethoxazole
, Cephalexin, Amoxicillin-Clavonic acid,
Fluoroquinolones,.....*

Management of Urinary Tract Infection in Other Groups

- *UTI in pregnant women*
- *UTI in men*
- *Complicated UTI*
- *Asymptomatic Bacteriuria*
- *Catheter Associated UTI*
- *Candiduria*

Infection in males

- Infection in males are considered complicated
- Occur in presence of functional or structural abnormalities that disrupt the normal defense mechanism of urinary tract.

Infection in males

Treatment

- Urine culture is needed because causative organism is not easily predictable
- A urine culture with >100 CFU/ml is best sign of infection
- If Gm -ve is TMP/SMX
- Duration therapy should be 10-14 days

Recurrent infection

Reinfections:

- Infection by an organism different from the initial infection
- Mostly occurs in females where reinfection rate is 20%

Factors contributing to infection:

1-sexual intercourse

2-diaphragm and spermicidal use

3- postmenopausal women

Recurrent infection

Divided into two groups:

- 1- Those with less than 2 or 3 episodes per year
 - Each episode should be treated as a separate infection
 - Short course therapy is appropriate
 - Can be self administered

Recurrent infection

Divided into two groups:

2-Those with more than 3 episodes per year

- Long-term prophylaxis may be needed
- Patient should be treated conventionally before prophylaxis is started

Recurrent infection

Regimen:

- TMP/SMX
- Nitrofurantion 50-100 mg OD
- Continued for 6 months
- Urine cultures followed monthly
- If symptomatic episodes develop they should be treated with a full course

Recurrent infection

Infection related to sexual activity:

- Voiding after intercourse
- Single-dose prophylactic with TMP/SMX taken after intercourse

In postmenopausal women

- Recurrent episodes related to decreased estrogen and changes in bacterial flora

Relapses

- Persistence of the infection with the same organism after therapy
- Usually indicate structural abnormality, renal involvement, or chronic bacterial prostatitis

Relapses

In women:

- If relapse after short course treat with 2 week course
- In-patient who relapse after 2 wk course continue for another 2-4 wks
- If relapse after 6 wks of therapy, urologic evaluation and any obstruction corrected
- May need therapy for 6 months

Relapses

In males

- Relapse usually indicate bacterial prostatitis
- TMP/SMX appear to be highly effective for relapses

Pregnancy

Predisposing factors:

- Dilation of the renal, pelvis and ureters
- Decrease urethral peristalsis
- Reduced bladder tone
- All lead to urine stasis and reduced defenses against reflex of bacteria to the kidney
- Hormonal changes predispose to infection

Pregnancy

- Asymptomatic bacteriuria Occur in 4-7%
- 20-40% will develop acute pyelonephritis
- Routine screening for bacteriuria should be performed at the initial prenatal visit and at 28 wks

Pregnancy

- Significant bacteriuria should be treated regardless of symptoms
- Organism is the same for uncomplicated UTI
- Therapy should be for 7 days

Pregnancy

Regimen

- amoxicillin
- augmentin
- cephalexin
- nitrofurantion
- Follow up urine culture 1-2 wk after completing therapy, then monthly until gestation

Catheterized patients

- Most common cause of hospital acquired UTI
- diagnosis is difficult,
 - patients often have some degree of pyuria
 - Virtually all patients with catheters for 1 to 2 wks exhibit bacteriuria, making differentiation of infection from colonization difficult.
 - often lack symptoms
- Occur in 5% of patients

Catheterized patients

Etiology

- often polymicrobial.
- Causative agents include *P aeruginosa* and nosocomial gm -ve rods, with more resistant susceptibility profiles; enterococci; and *Candida* species.
- Diagnosed with > 100 CFU/ml of urine from catheter
- Urinalysis and urine cultures should always be obtained.

Catheterized patients

Management

1-Asymptomatic,

- Remove the catheter

Do not treat unless

- immunosuppressed patient
- Patient at risk of endocarditis
- Patient who will undergo urinary tract instrumentation

Catheterized patients

Management

2-Symptomatic

- Remove the catheter and treat as complicated UTI

• **Prophylaxis for UTI- Needed in**

- Catherised,
- Uncorrectable anatomical abnormalities
- Inoperable prostate,
- Septicemia,
- Immuno-compromised,
- Trauma

• **Note-**

- In patients with impaired renal functions avoid
 - Nitrofurantoin, Nalidixic acid,
 - Aminoglycosides,
 - Potassium salt, and Acidifying agents



Vitamin C



drink plenty of water



Pineapple

www.MyHealthTips.in



Apple Cider Vinegar

Home Remedies for Urinary Tract Infection

www.MyHealthtips.in



Blueberries



Cranberries



Tea Tree Oil



Baking soda