

# Mircobiology

# Team

# 431

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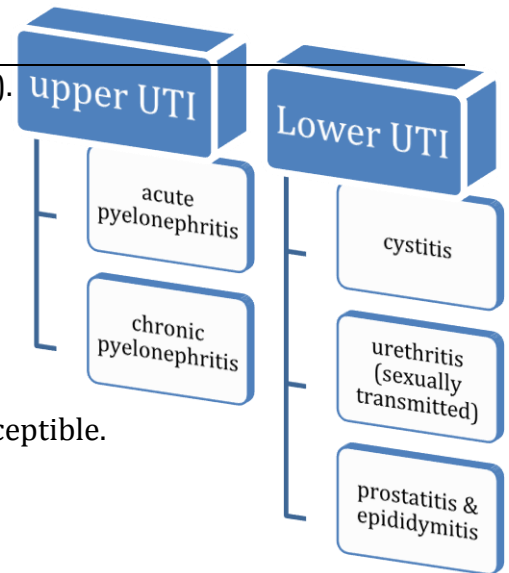
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# CYSTITIS

= Lower urinary tract infection (bladder; superficial mucosa).



Urine is sterile, but gets contaminated by normal flora.

- Patient with urinary SYMPTOMS + **bacteriura =  $10^5$**
- Some cases are asymptomatic
- **Incidence higher in females** and increases with age.
  - **Short and wide urethra**
  - Pregnancy
  - Decrease estrogen during menopause
- Men with prostate infection/hyperplasia are more susceptible.

## Common Risk Factors:

1. Bladder stones
2. Urethral constriction
3. Catherization of urinary tract
4. Diabetes (lack reflex to empty bladder → stagnant urine in bladder)
5. Genetic predisposing factor

hematogenous spread is rare and more to the kidney (TB)

## Pathogenesis:

1. frequent irritation of mucosal surface of urethra → infection when bacteria **ascends** to bladder from pereneal flora/ large intestine flora
2. toxins produced by uropathogens
  - Sexual intercourse creates access to the bladder (increase risk) for females.

**Uncomplicated UTI:** non-pregnant, young sexually active **female**, without structural abnormality (**almost all females get UTI at least once in their life**)

Etiologic agents: 1. **E.coli** (90%)

+ other enterobacteria: klebsiella pneumoniae, proteus

+ other gram negative rods: pseudomonas aeruginosa

2. gram positive bacteria: enterococcus faecalis  
group B strep

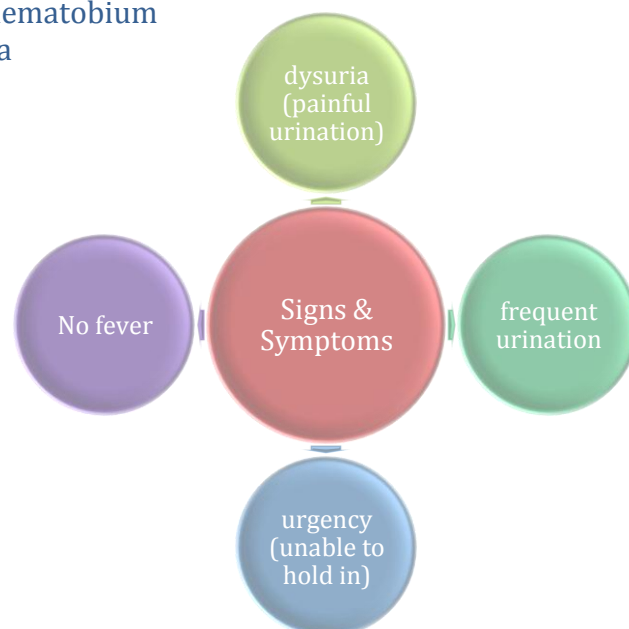
**staph saprophyticus (honeymoon cystitis)  
for newly married females.**

3. Fungus: Candida (catheters)
4. Venereal (sexually transmitted): gonorrhea, Chlamydia
5. Parasite: schistosoma hematobium
6. Viruses: adeno, varicella

**Complicated UTI:** males, children ..etc

Etiologic agents: 1. E.coli

2. Enterobacteria
3. Pseudomonas
4. Acinobacter



## How to differentiate between cystitis and urethritis?

- Cystitis is more acute
- The symptoms of cystitis are more severe
- Pain, tenderness on the supra-pubic area (bladder area)
- Bacteriuria
- Cloudy urine with no odor (blood may be found)

## Non-infectious Cystitis (differential Dx):

- Traumatic cystitis [in women]
- Interstitial cystitis [idiopathic/may be immunological]
- Eosinophilic cystitis [Schistosoma hematobium parasite]
- Hemorrhagic cystitis [radiotherapy/chemotherapy]

## Laboratory Diagnosis:

1. urine collection: better to use **Mid Stream Urine** (MSU, to avoid contamination) before starting antibiotics  
supra-pubic aspiration/ catheterization may be used in children  
catheter urine is not accurate for diagnosis because of contamination
2. Microscopic examination: (of urine)  
**90% have >10WBC/cmm (leukocytosis)**  
gram stain is sensitive and specific (not used anymore)  
one organism per oil-immersion field indicates infection  
blood cells, parasites, crystals may be seen  
**casts**
3. Chemical screening test: URINE DIP-STICK:  
Is preferred because its quick, detects **NITRITES** from bacterial metabolism (negative for gram positive) as well as **leukocyte esterase** from inflammatory cells  
→ NOT specific
4. Urine Culture: **IMPORTANT** for identifying bacteria and its antimicrobial sensitivity (culture itself isn't enough, symptoms or high WBCs should accompany it)

## Recurrent Cystitis = 3 or more cystitis/year

This case requires more investigations, like IVU: intravenous urogram  
Or ultrasound to detect obstruction, deformity or **stones (proteus infection)**  
Cystoscopy may be required (procedure to examine the bladder)  
Children with recurrent UTI may have congenital abnormalities

## Treatment of Cystitis:

Empiric treatment: depending on the knowledge of common organism and sensitivity pattern

Ex: ampicillin

Cephadrine

Ciprofloxacin

Norfloxacin

Gentamicin

TMP-SMX

Duration: 3 days for uncomplicated

10-14 days for complicated/recurrent

Prophylaxis: for recurrent cases by: Nitrofurantoin (dosage for prophylaxis are less)

TMP-SMX

Prevention: drink water and prophylactic antibiotics

Q: Which of the following organisms is the most common cause of Cystitis?

- A. Mycobacterium Tuberculosis
- B. Staphylococcus Aureus
- C. E. Coli
- D. Group A Streptococci

Q: A recently married girl comes to the hospital with suprapubic pain, she also suffers from frequent and painful micturation. Which of the following organisms is associated with her condition?

- A. Mycobacterium Tuberculosis
- B. Staphylococcus Saprophyticus
- C. Streptococcus Pneumoniae
- D. Candida albicans

Ans: C - B