Urinary Tract Infection (UTI)

Definitions

- **Bacteriuria: multiplication of bacteria in urine within the renal tract.**
- **Significant bacteriuria:** >100,000 organisms /ml(10^5/ ml).
- **Pyuria**: pus cells in urine

Sites

- Upper UTI:
- KIDNEYS-------- Pyelonephritis
- **Lower UTI:**
- URETHRA ------- urethritis
- BLADDER------ cystits

Clinical Features

- **Dysuria** : frequency, urgency, hematuria (cystitis)
- **Loin pain**, fever : (pyelonephritis)
- Patients: women> men why?

Clinical Features (Continue)

- **Urethral syndrome**:
  - women > men
  - frequency of dysuria
  - recurrent
  - no bacteriuria

Clinical Features (Continue)

- **Covert bacteriuria**:
  - symptomless UTI
  - women > men
  - abnormal UT

- Sterility of urine due to:
  - flushing & urination local defence mechanism

Causative Organisms

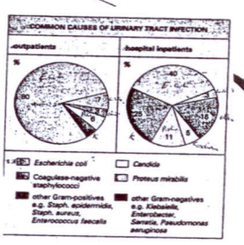
- ***1- E.coli***
- 60-90 %
- Few serotypes ,O_2, O_6, O_7, …etc
- Source: colon
- Some strains more invasive due to:
  - K antigen
  - adherence by pili

Causative Organisms

- 2- ***Staph.saprophyticus***:
  - More common in young females (honeymoon cystitis).
  - *3- **Proteus mirabilis***
  - ***4- Klebsiella sp.***
  - ***5-Enterococcus fecalis***

Causative Organisms

- 6- ***Pseudomonas*** & ***Staphylococci*** (catheter associated)
- 7- MTB (chronic UTI)
- 8- others: Strep. Group B, *Corynebacteria.* yeast,….etc
- 9- **Viral** : Adenovirus-----hemorrhagic cycstitis



Pathogenesis

- Source colonic flora
- Route ascending
  - haematogenous
  - short female urethra
  - colonization of periurethra
  - sexual intercource
  - incomp. Vesico-ureteric valve

Bacterial Attributes & Host Factors

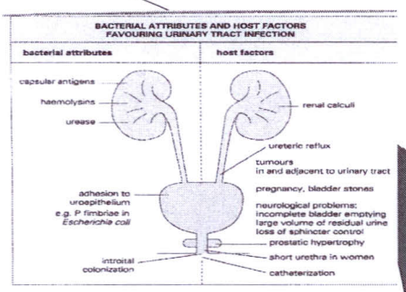
➢ **Bacterial attributes:**

- Capsular antigens
- Hemolysins
- Urease
- Adhesion to uroepithelium
- Introital colonization

Bacterial Attributes & Host Factors (Continue)

➢ **Host factors:**

- Renal calculi
- Ureteric reflux
- Tumors in and adjacent to UT
- Pregnancy
- Bladder stone
- Neurogenic problems
- prostatic hypertrophy
- Short urethra in females
- Catheterization



Diagnosis of UTI

➢ **Specimen:**

- mid-stream urine (**MSU**)
- self adhesive bag (in babies)
- suprapubic aspiration
- catheterization

Transport

➢ **Within 2-4 hrs. if not possible**:

refrigerate at 4C
OR
add boric acid 108%
OR
use Dip slide method

Examination

➢ Direct:

➢ Wet film for : - pus cells (WBC)
- RBC
- bacteria
- casts

Culture

- **Semi-quantitative:**
  - CLED (Cystein Lactose Electrolyte Deficient Agar)
  - MacConkey agar
  - L-J media if TB is suspected :(absent bacteriuria , –ve culture in 3 early morning MSU)

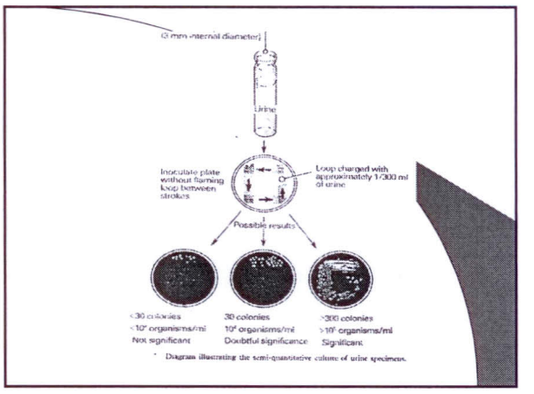
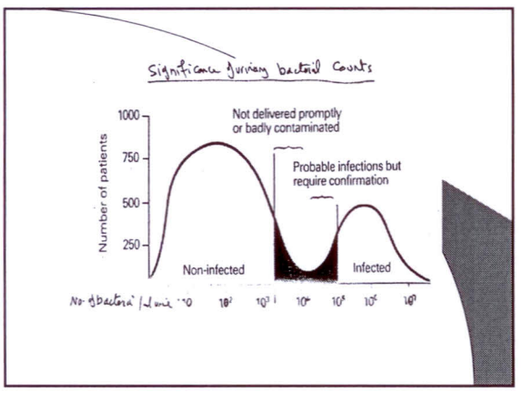


Diagram illustrating the semi-quantitative culture of urine specimen.



Treatment

- Ampicillin
- Augmentin
- Cephradine
- Cefuroxime
- Cotrimoxazole
- Ciprofloxacin
- Norfloxacin
- Nitrofurantoin
- Others according to culture / sens.testing

Treatment (Continue)

- Treatment for 3 days for uncomplicated UTI
- **For complicated / recurrent UTI:**
  - UT investigation (Urogram)
  - Senstivity testing
  - 2 wks treatment
  - oral or IV route
  - GM, or 3rd generation cephlosporins.

Recurrent UTI

- In children <5 yrs. due to :underlying abnormality of UT (vesico-ureteric reflux)
- Can end into: - renal scar/damage
  - chronic pyelonephritis
  - end-stage renal failure
  - In adults: investigate ? diabetes

Catheterization

- -5 % risk of **infection** in hospital
- Depends on the duration: short term
  OR long term
- **- Septicaemi**a: complicate cath. in hospitalized patients

Source of bacteria in catheters

- **Endogenous**: normal flora
- **Exogenous:** - cross infection
  - instrumentation
  - hands of doctors & nurses

Prevention

- Insertion of cath. with aseptic technique
- Closed drainage system
- |Short term prophylaxis - *controversial*