Cystitis

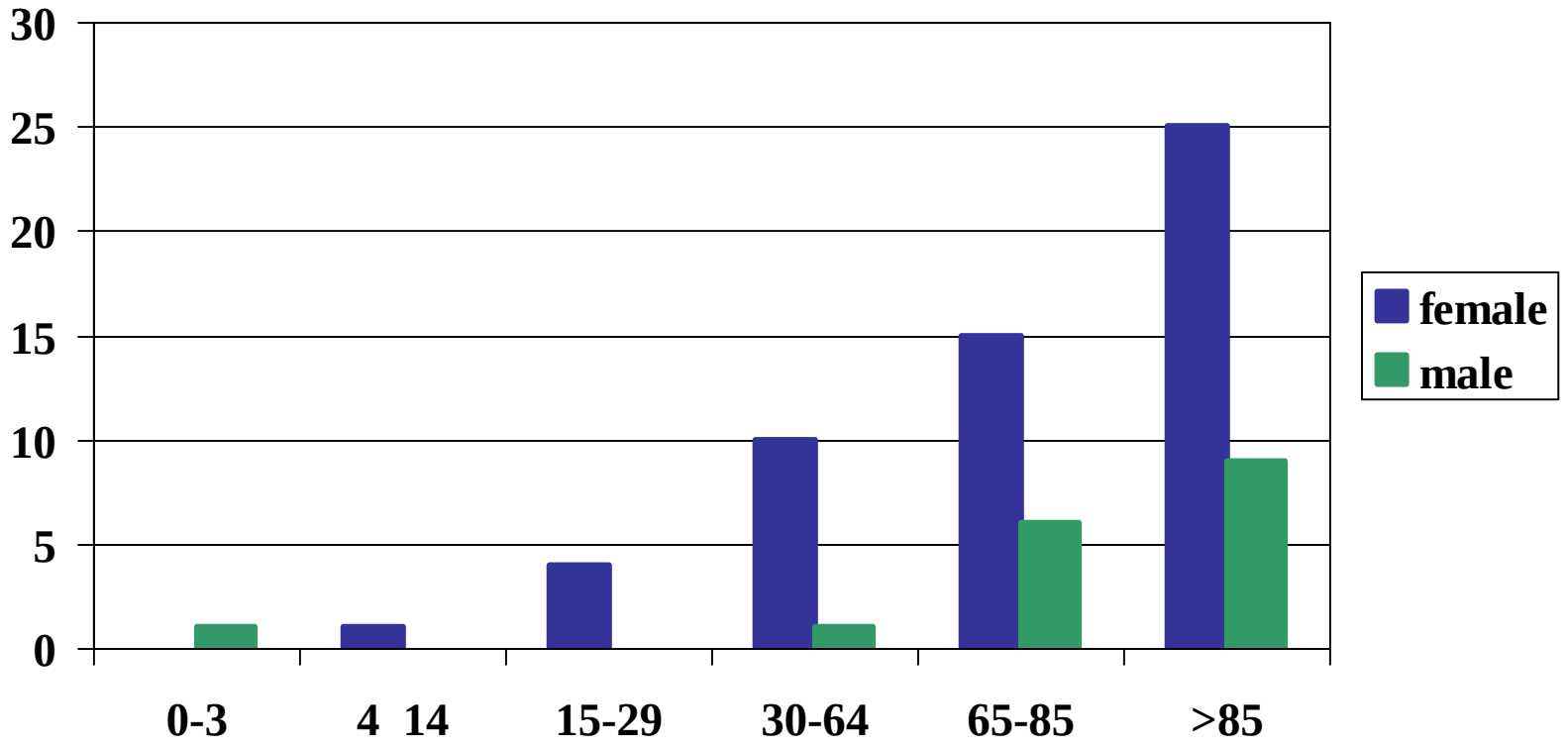
Renal Block

Prof. Hanan Habib Dr Ali Somily

Introduction

- Anatomically Urinary Tract infection (UTI)divided into upper and lower urinary tract infection
- Patient presents with urinary symptoms and significant bacteriuria 10^5CFU/ml
- Asymptomatic bacteriuria when patient present with significant bacteriuria but without symptoms

Prevalence of UTI in different age groups



Classification

Lower UTIs:

- Cystitis (infection of the bladder; superficial mucosal infections)
- Urethritis (sexually transmitted pathogens)
- Prostatitis and epididymitis

Upper UTIs:

- Acute pyelonephritis
- Chronic pyelonephritis

Uncomplicated UTI (healthy non-pregnant young female)

Complicated UTI (nosocomial UTIs, relapses, structural or functional abnormalities, urologic dysfunctionUTI of men)

Cysytitis Risk Factors

- **In women** :
  - Short wide urethra
  - Genetic factors
  - Sexual intercourse
  - Pregnancy (progesterone, obstruction)
  - Decreased estrogen production during menopause.
- **In men**:
  - persistent bacterial infection of the prostate.
- **In both sexes**: :
  - Presence of bladder stone
  - Urethral stricture
  - Catheterization of the urinary tract
  - Diabetes mellitus

Pathogenesis of cystitis

- Infection results when bacteria ascends to the urinary bladder . These bacteria are residents or transient members of the perineal flora, and are derived from the large intestine flora. Toxins produced by uropathogens.
- Lead to frequent irritation of the mucosal surfaces of the urethra and the bladder.
- **Condition that create access to bladder are**:

  - Sexual intercourse due to short urethral distance.

Pathogenesis of cystitis

- **Uncomplicated UTI** usually occurred in non pregnant young sexual active female without any structural or neurological abnormality
- **Risk factors** :

  ~ Catheterization of the urinary bladder instrumentation

  ~ structural abnormalities

  ~ obstruction
- **Hematogenous** through Blood stream (less common) from other sites of infection

Etiologic agents

- ***E.coli*** is the most common (90%) cause of cystitis.
- Other Enterobacteria include (*Klebsiella pnumoniae, Proteus* spp. Other gram negative rods eg. *P.aeroginosa.*
- Gram positive bacteria :*Enterococcus fecalis*, group *B Strept.* and *Staphylococcus saprophyticus* { honeymoon cystitis}.
- *Candida* species
- Venereal diseases (gonorrhea, *Chlamydia)* may present with cystitis.
- *Schistosoma hematobium* in endemic area.

Pathogens involved

Uncomplicated UTI

E. coli	64%
Enterobacteriaceae	16%
Enterococcus spp	20%

Special cases

(*S. epidermidis)*
S. saprophyticus
Yeasts (catheter related result)
Viruses (adeno, varicella)
Chlamydia trachomatis

Complicated UTI

E. coli
Enterobacteriaceae
Pseudomonas spp
Acinetobacter spp

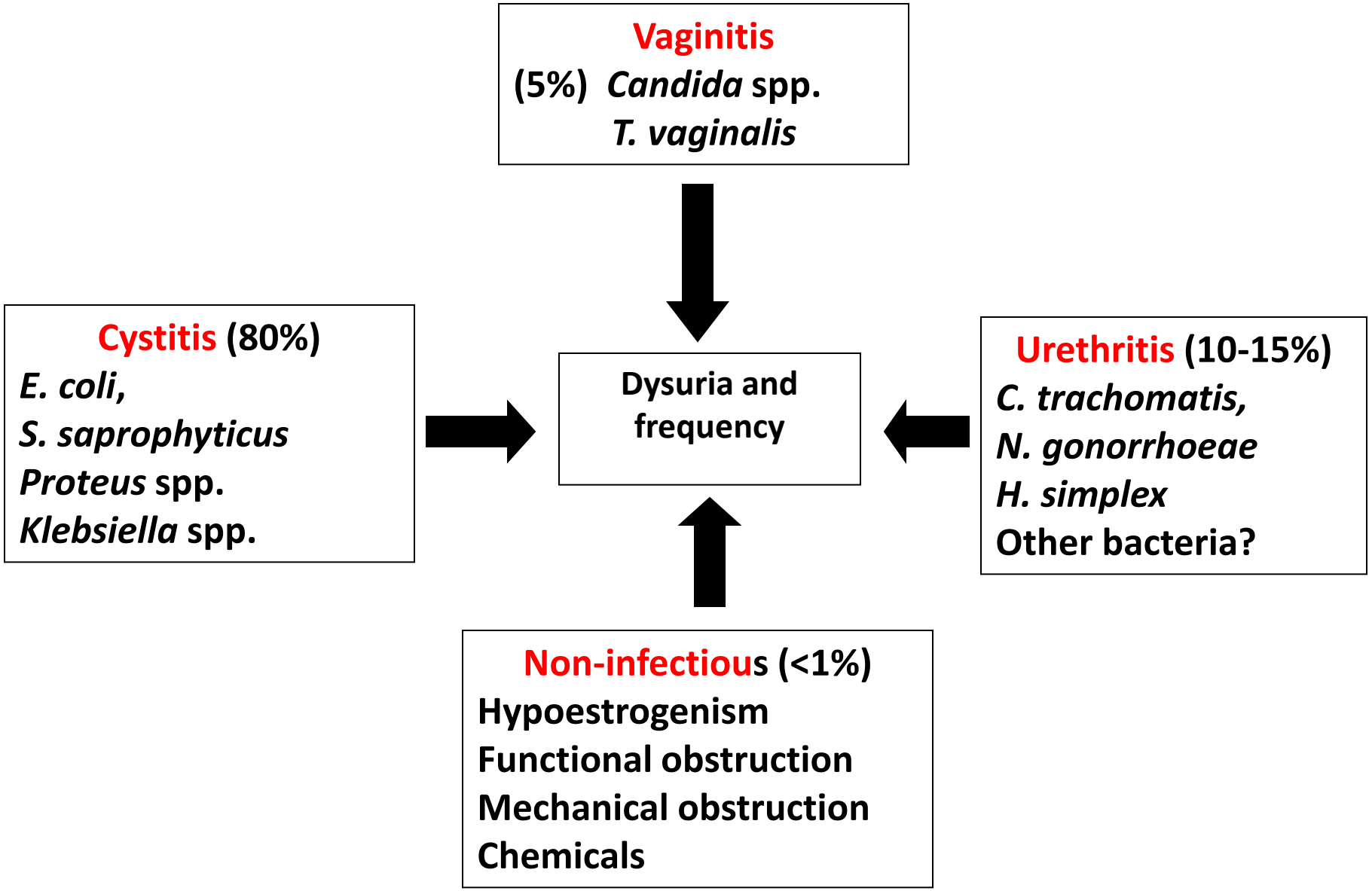
% is not possible to judge

(often multiresistant strains)

Clinical presentation

Symptoms usually of acute onset

- Dysuria (painful urination or micturation)
- Frequency (frequent voiding)
- Urgency (an imperative call for toilet)
- Hematuria (blood in urine) in 50% of cases.
- Usually no fever.


Vaginitis
(5%) Candida spp.
T. vaginalis
Cystitis (80%)
E. coli,
S. saprophyticus
Proteus spp.
Klebsiella spp.
Dysuria and frequency
Urethritis (10-15%)
C. trachomatis,
N. gonorrhoeae
H. simplex
Other bacteria?
Non-infectious (<1%)
Hypoestrogenism
Functional obstruction
Mechanical obstruction
Chemicals

How to differentiate between cystitis and urethritis ?

- Cystitis is of more acute inset
- More sever symptoms
- Pain, tenderness on the supr-apubic area.
- Presence of Bacteria in urine (*bacteriuria*)
- Urine cloudy, malodorous and may be bloody

Differential diagnosis (types of cystitis)

- **Non-infectious cystitis such as:**

1. **Traumatic cystitis** in women
2. **Interstitial cystitis** (unknown cause, may be due to autoimmune attack of the bladder)
3. **Eosinophilic cystitis** due to *S.hematobium*
4. **Hemorrahagic cystitis** due to radiotherapy or chemotherapy.

Laboratory diagnosis of cystitis

1. Specimen collection:

- Most important is clean catch urine [Midstream urine (**MSU**)] to bypass contamination by perineal flora *and must be before stating antibiotic.*
- **Supra-pubic aspiration** or **catheterization** may be used in children.
- Catheter urine should not be used for diagnosis of UTI.

2- **Microscopic examination**:

- About 90% of patients have **> 10 WBCs /mm^3**
- Gram stain of uncentrifuged sample is sensitive and specific but rarely done.
- One organism per oil-immersion field is indicative of infection.
- Blood cells, parasites or crystals can be seen

3- **Chemical screening tests:**

- **Urine dip stick** –rapid detects *nitrites* released by bacterial metabolism and *leukocyte esterase* from inflammatory cells. Not specific.

4- **Urine culture**: important to identify bacterial cause and antimicrobial sensitivity .

- **Quantitative culture** typical of UTI ($>10^5$ /mm^3). Lower count ($<10^5$ or less eg. 1000/mm^3) is indicative of cystitis if the patient is *symptomatic.*

Recurrent cystitis

- 3 or more episodes of cystitis /year
- Requires further investigations such as Intravenous Urogram (**IVU**) or ultrasound to detect obstruction or congenital deformity.
- Cystoscopy requires in some cases.

Treatment of cystitis

- **Empiric treatment** commonly used depending on the knowledge common organism and sensitivity pattern.
- **Treatment best guided by susceptibility of the causative bacteria.**
- Common agents: Ampicillin, Cephradine, Ciprofloxacin, Norfloxacin, Gentamicin ,TRM-SMX or nitrofurantoin .

- **Duration** of treatment: 3 days for uncomplicated cystitis
- 10-14 days for complicated and recurrent cystitis.
- **Prophylaxis** for recurrent cases required by Nitrofurantoin or TRM-SMX.
- **Prevention** : drinking plenty of water and prophylactic antibiotic.