



# Urogenital Tract Module

## 2023-2024

### Gonorrhea

### (Lecture 5)

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# Learning Objectives

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## You should know the:

**Epidemiology** of gonorrhoea

**Pathogenesis** of gonorrhoea

**Clinical manifestations** of gonorrhoea

**Diagnosis** of gonorrhoea

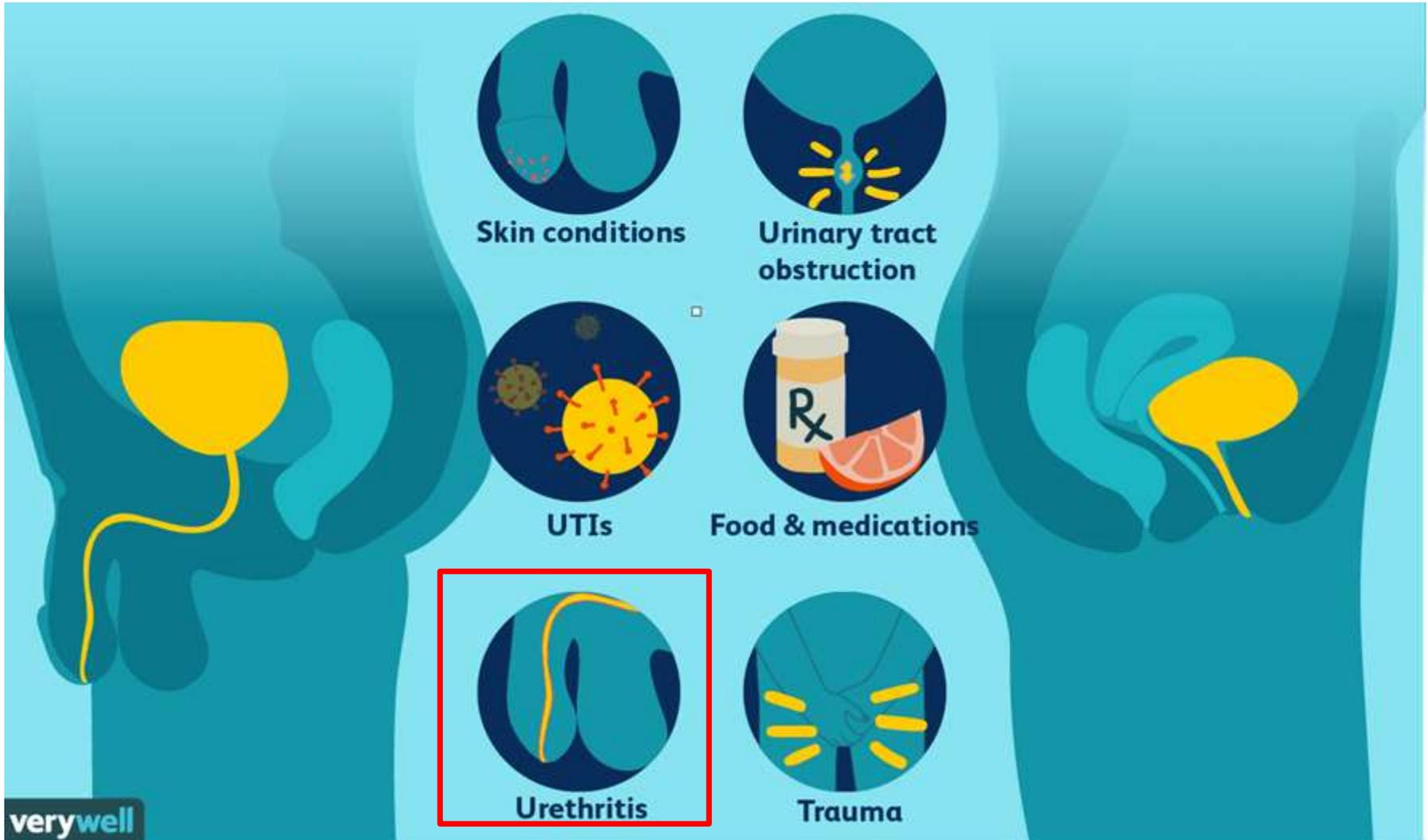
**Prevention** of gonorrhoea



**Top ten  
Sexually  
Transmitted  
Diseases  
(STDs)**

<b>Organism</b>	<b>Disease</b>
Papillomaviruses (types 6 and 11 associated with visible genital warts)	Genital warts, dysplasias
<i>Chlamydia trachomatis</i> (D-K serotypes)	Non-specific urethritis
<i>C. trachomatis</i> (L1, L2, L3 serotypes)	Lymphogranuloma venereum
<i>Candida albicans</i>	Vaginal thrush, balanitis
<i>Trichomonas vaginalis</i>	Vaginitis, urethritis
Herpes simplex virus types 1 and 2	Genital herpes
<i>Neisseria gonorrhoeae</i>	Gonorrhea
HIV	AIDS
<i>Treponema pallidum</i>	Syphilis
Hepatitis B virus	Hepatitis
<i>Haemophilus ducreyi</i>	Chancroid

# What causes urethral pain



# (Urethritis - Causes of urethral discharge)

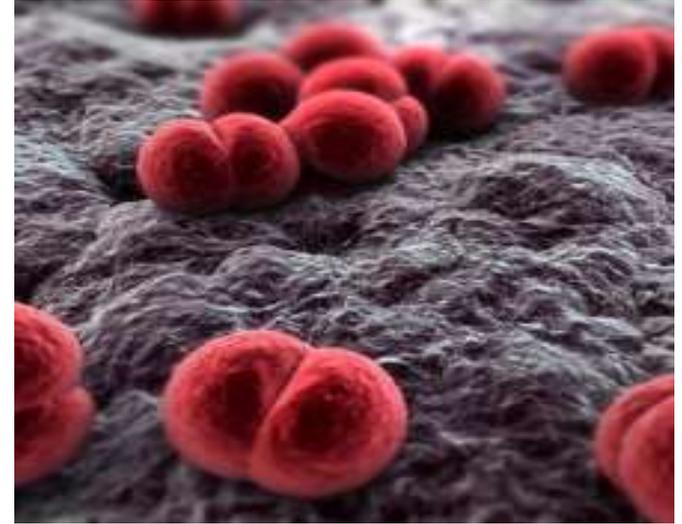
<b>Physiological</b>	Spermatorrhoea/prostatorrhoea Stimulation
<b>Pathological</b>	<b><u>Common causes</u></b> <i>Neisseria gonorrhoeae</i> <i>C. trachomatis</i> <i>Mycoplasma genitalium</i>
	<b><u>Other causes</u></b> <i>Trichomonas vaginalis</i> <i>Candida albicans</i> Secondary to intraurethral lesions (Syphilis, herpes, warts) Physical or chemical traumas Foreign body Allergy

# General characteristics

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## *Neisseria gonorrhoeae*

- Gram negative cocci
- Present in pairs  
( the opposing sides are flattened)
- Non-spore forming
- Piliated
- Nonencapsulated
- Nonmotile
- Does not survive in the environment  
(must be transmitted through contact)

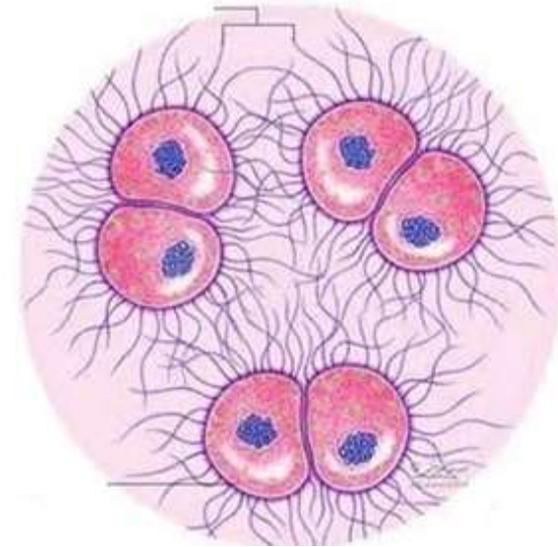


*Coffee beans*



# Virulence factors

1. Pili & Lipooligosaccharides: attachment to and antiphagocytic (nonpiliated strains are a virulent)
3. Outer membrane proteins
  - ✓ Porin A: prevents phagosome lysosome fusion
  - ✓ Opa protein: mediates firm attachment
4. IgA protease: hydrolyzes secretory IgA  
(secretory IgA block bacterial attachment to the mucosa)



# Epidemiology

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- No real estimations for gonorrhoeae in communities
- In Jordan (in 2008)
  - 0.9% (among symptomatic women)
  - 2.2% (among asymptomatic women)

## Risk Factors

- Multiple sex partners
- Inconsistent use of barrier methods
- Residence in areas with disease prevalence
- Adolescents (20-25 years)
- Lower socio-economic status

## Transmission

- A symptomatic patients are the major source of infections (infectious for several months)
- Greater efficiency of transmission from male to female
- mother to infant

# Pathogenesis

## 1. Attachment:

Attachment is mediated by Pili, Opa, and LOS

## 2. Invasion:

Opa & protein 1A mediate the gonococci uptake by the epithelial cells

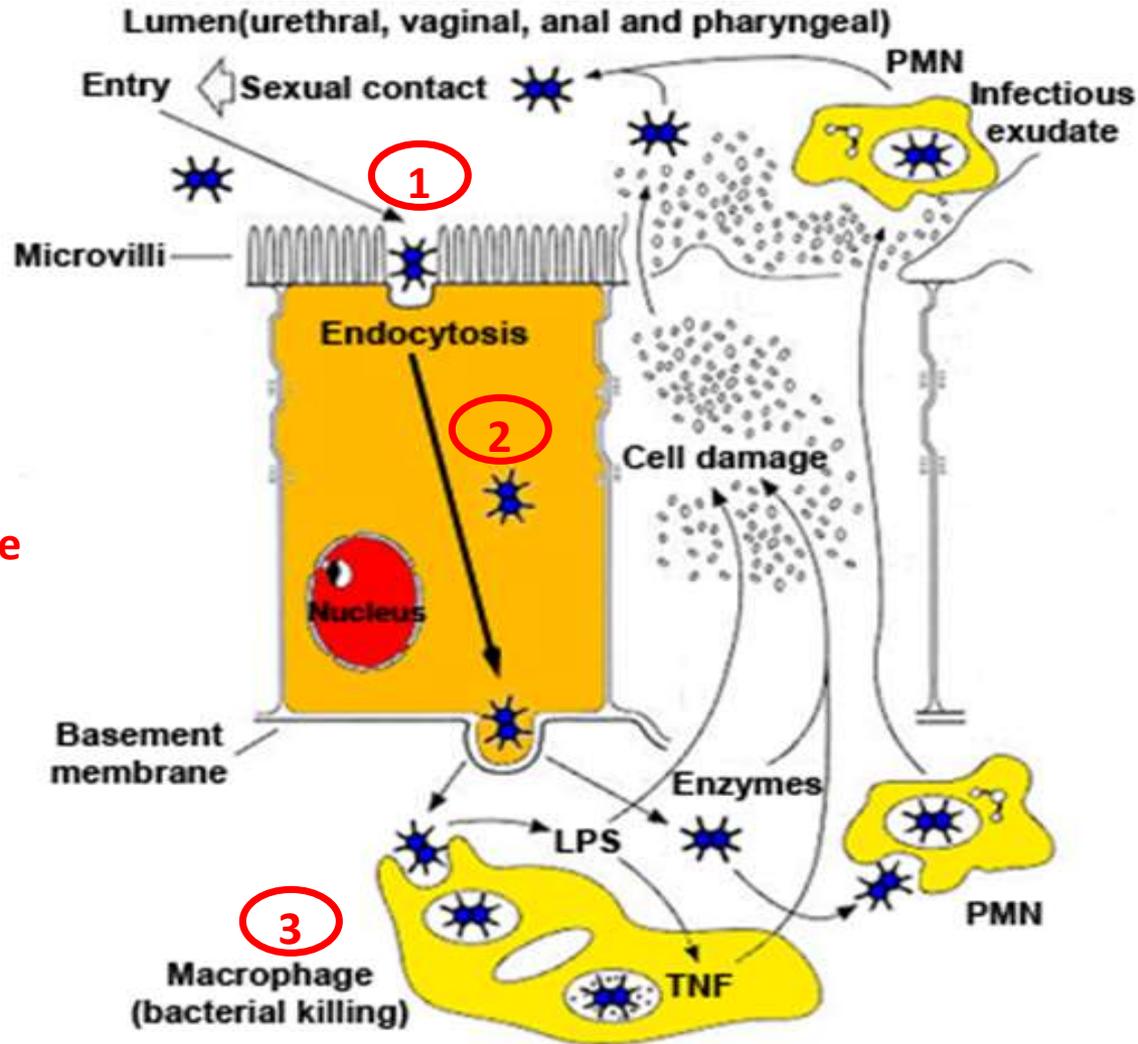
## 3. Immune response with local tissue injury

## 4. Spread

Local spread is to epididymis and fallopian tubes

## 5. Dissemination

In a small proportion of infections, organisms reach the bloodstream to produce disseminated Gonococcal infection (DGI).



# Clinical manifestations

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## Levels of Gonococcal infection

Systemic infections

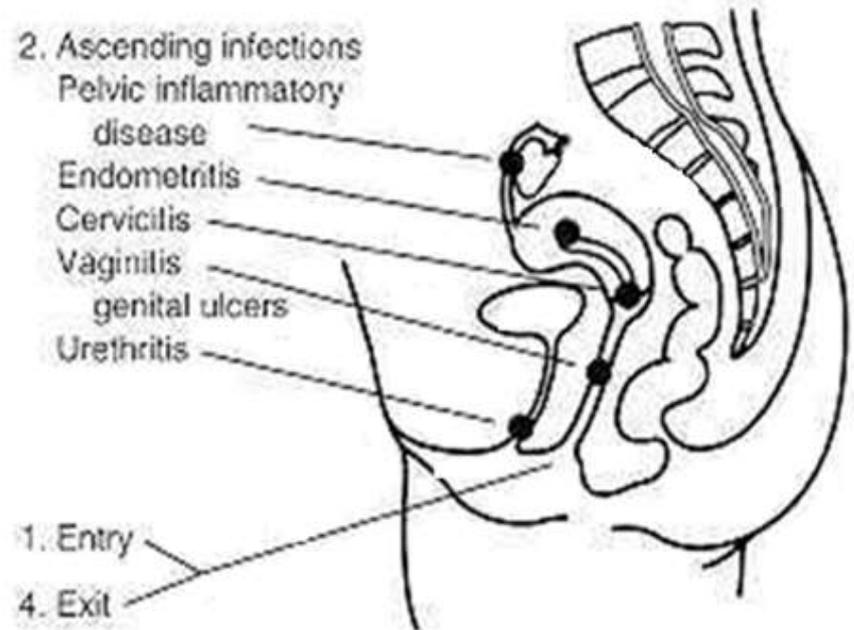
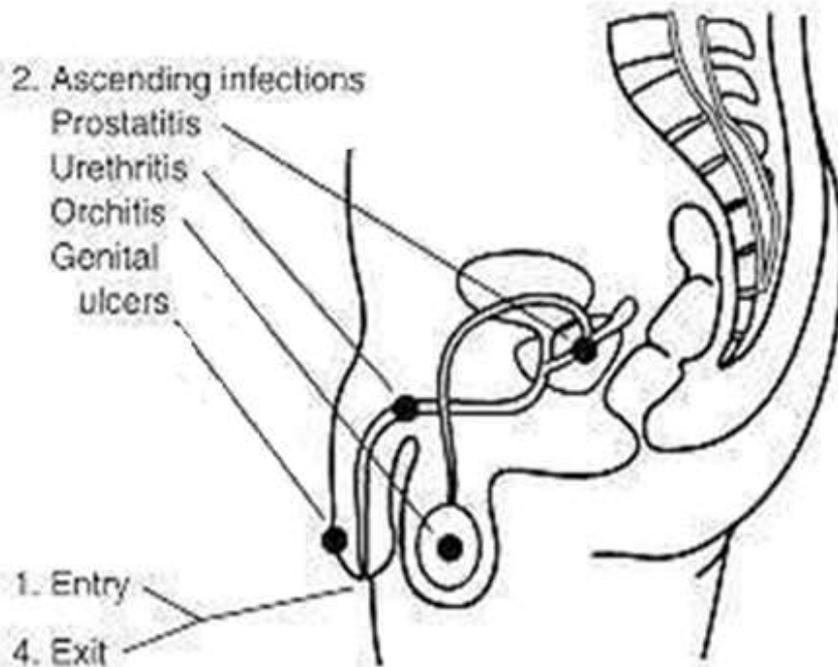
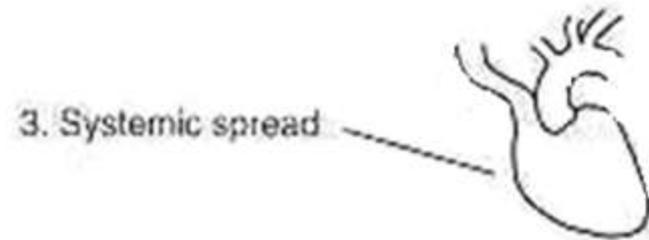
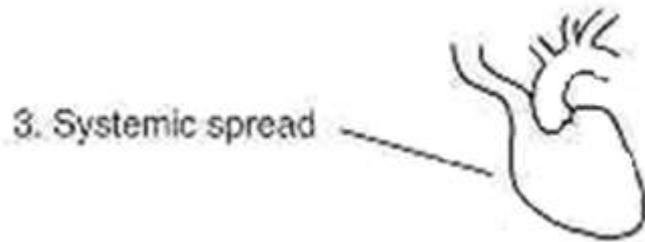
Pelvic inflammatory disease

Genital infections

# Clinical manifestations

Male

Female



# Clinical manifestations

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## 1. Genital Infection

### In men:

#### a- Urethritis

- 2-7 days incubation period
- Symptoms
  - frequency, urgency, dysuria
  - purulent urethral discharge
  - blood in the semen or urine
- Asymptomatic in 10% of cases
- Male seeks treatment early preventing serious complications, but not soon enough to prevent transmission to other sex partners

#### b. Epididymitis

- Signs and symptoms
  - abdominal or lower back pain
  - fever, nausea
  - testicular pain and swelling
  - discharge from the urethra
  - pain on urination, occasionally blood in the urine

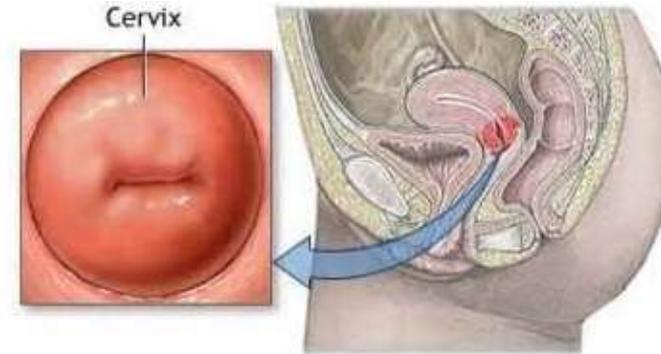
# Clinical manifestations

## 1. Genital Infections

In women → Most infections are asymptomatic

### a. Cervicitis

- Endocervix is the primary infection site
- Symptoms:
  - mucopurulent abnormal vaginal discharge
  - intermenstrual bleeding
  - dysuria
  - lower abdominal pain
- 50% of women are asymptomatic
- Incubation period (within **10 days of infection**)
- 40%-60% of women with cervical gonococcal infection may have urethral infection



### Urethritis

frequency, urgency, dysuria

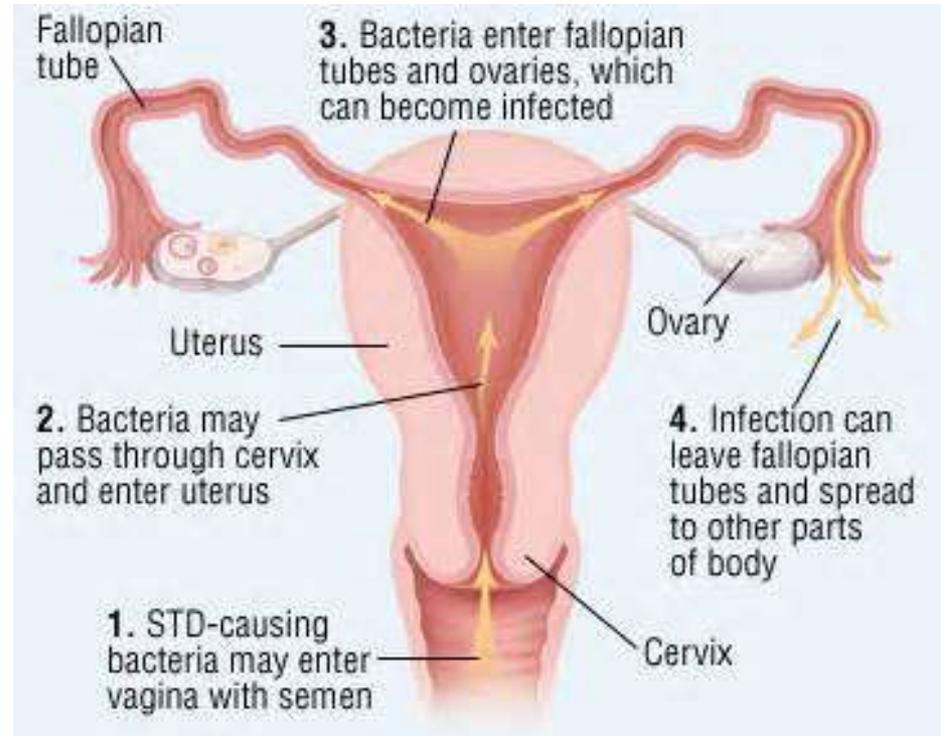
Pain during sex

Discharge from the urethral opening or vagina

# Clinical manifestations

## 2. Pelvic Inflammatory Disease (PID)

- Is a term for inflammation of the uterus, fallopian tubes, and/or ovaries
- causes severe lower abdominal pain, especially during intercourse.
- PID infection **itself may be cured** but effects of the infection may be **permanent** (due to scarring inside the reproductive organs, which can later cause serious complications, including chronic pelvic pain, infertility, ectopic pregnancy)
- infection can **spread to the peritoneal cavity** causing inflammation
- Infection in the abdomen may **concentrate around the liver** (perihepatitis)



# Clinical manifestations

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## **Syndromes in Men and Women**

- Anorectal infection
- Pharyngeal infection
- Conjunctivitis
- Disseminated gonococcal infection (DGI)

# Clinical manifestations

## Conjunctivitis

- Neonatal conjunctival infection called **ophthalmia neonatorum (neonatal conjunctivitis)**
- A severe purulent eye discharge with peri-orbital edema.
- Blindness if untreated.
- It may be prevented in areas of high prevalence by the instillation of 1% aqueous silver nitrate in the eyes of newborn babies.
- Topical erythromycin can be used; this has the advantage of being active against chlamydia and less toxic
- May occur at any age



## Types of conjunctivitis

- **Chemical** conjunctivitis (presents within the first **24 hours** following birth)
- **Neisseria** gonorrhoea (presents **3-5 days** after birth)
- **Chlamydia** trachomatis (presents **5-14 days** after birth)
- **HSV** (presents **1-2 weeks** after birth)

# Clinical manifestations

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## Disseminated gonococcal infection (DGI)

### Manifestations :

- Occurs in < 5% of GC-infected patients
- More common in females
- Patients with congenital deficiency of C7, C8, C9 are at high risk

### Clinically

- Dermatitis-arthritis syndrome
  - Arthritis 90% (Characterized by fever, chills, skin lesions, arthralgias, tenosynovitis)
  - Skin rash characterized as macular or papular, pustular, hemorrhagic or necrotic, mostly on distal extremities
- **Rarely**, disseminated gonococcal infection may present as **endocarditis** or **meningitis**.

# Gonorrhoea

<u>Females</u>	<u>Males</u>
<b>50% risk</b> of infection after single exposure	<b>20% risk</b> of infection after single exposure
<b>Asymptomatic</b> infections <b>frequently not diagnosed</b>	<b>Most</b> initially symptomatic (95% acute)
<b>Major reservoir</b> is asymptomatic carriage in females	<b>Major reservoir</b> is asymptomatic carriage in females
<b>Genital infection primary site is cervix (cervicitis), but vagina, urethra, rectum can be colonized</b>	Genital infection generally restricted to urethra (urethritis) with purulent discharge and dysuria
<b>Ascending infections</b> in 10-20% including salpingitis, tubo-ovarian abscesses, pelvic inflammatory disease (PID) , chronic infections can lead to sterility	<b>Rare complications</b> may include epididymitis, prostatitis, and periurethral abscesses
<b>Disseminated infections more common</b> , including septicemia, infection of skin and joints (1-3%)	<b>Disseminated infections are very rare</b>
<b>Can infect infant at delivery</b> (conjunctivitis, ophthalmia neonatorum)	<b>More common in homosexual/bisexual men than in heterosexual population</b>

# Diagnosis

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## Type of specimens

- ✓ Discharge swab tests
- ✓ Urine tests
- ✓ Cervix swab test
- ✓ Throat swab

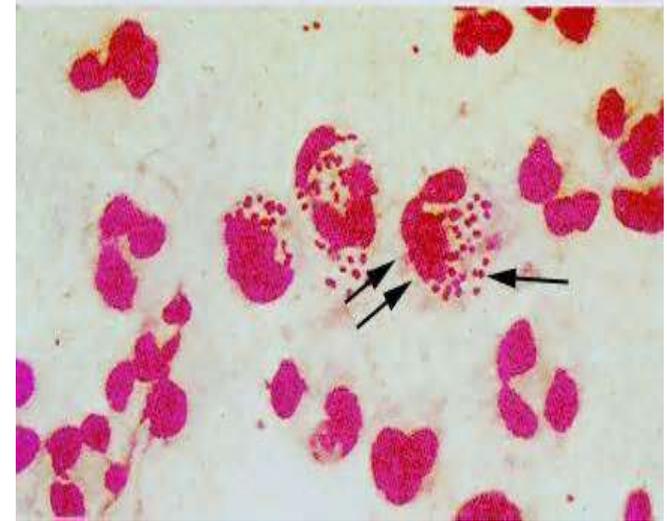
## Methods of diagnosis

1. Staining
2. Culture
3. Direct detection

# Diagnosis

## 1. Staining

- The presence of multiple pairs of bean-shaped, Gram-negative diplococci within a neutrophil is diagnostic specially in men
- Sensitivity & specificity
  - Symptomatic males: >92%.
  - Asymptomatic males and females: 40–50% (due to reduced bacterial load)
- it should not be used as the sole source for diagnosis when the findings are unexpected or have social (divorce) or legal (rape, child abuse) implications.



# Diagnosis

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## 2. Culture

### In men

- the best specimen is urethral **exudate** or **urethral scrapings** (obtained with a loop or special swab).

### In women

- **Cervical, urethral, or vaginal swabs**
- Swabs may be streaked directly (delay not more than 4 hours).
- The most common medium is **Martin–Lewis agar**.
- They may be identified as *Neisseria* by demonstration of typical Gram stain morphology and a positive oxidase test.

# Diagnosis

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## 3. Direct detection

DNA amplification methods that detecting gonococci in clinical specimens without culture

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**No vaccine**

# Case study

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## History

- **Robert 33-year-old** who presents to his doctor reporting **a purulent urethral discharge and dysuria for 3 days**
- New female sex partner for 2 months (**the last intercourse being 3 days ago**).
- Also had a **one-time** sexual encounter with a woman he **met 3 weeks ago**.
- No history of urethral discharge or STDs, no ulcers or rectal discomfort. Negative HIV test 1 year ago.

# Case study

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## Physical Exam

- Normal vital signs
- Chest, heart, musculoskeletal, and abdominal exams within normal limits
- No flank pain, normal rectal exam, no ulcers or rashes
- The genital exam reveals a reddened urethral meatus with a purulent discharge, without lesions or lymphadenopathy.

## Questions

1. Which laboratory tests are appropriate to order or perform?
2. What should be included in the differential diagnosis?
3. What is the appropriate treatment regimen?

# Case study

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## Results of laboratory tests:

- **Gram stain:** Gram-negative diplococcus associated with neutrophils
- Urethral culture: showed growth of a Gram-negative diplococcus that was oxidase-positive. Biochemical and FA conjugate testing confirmed this isolate to be *N. gonorrhoeae*.

## differential diagnosis:

- PCR for *Chlamydia*: negative
- RPR: nonreactive
- HIV antibody test: negative

# Case study

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## Follow-up

- Notify all sexual partners to be tested for infection. They should be treated or tested so the infection is not passed back and forth.
- Patients should be tested 72 hours after they finish all the antibiotics
- Avoid sexual intercourse until therapy is completed and both partners no longer have symptoms
- Get tested for other sexually transmitted diseases, especially Chlamydia and human immunodeficiency virus (HIV).

# Treatment

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- Treat both sides of the relation and contacts
- Ceftriaxone or cefixime are recommended as first-line therapy, but these drugs are expensive and may not be affordable in developing countries.
- Alternatives to cephalosporins and penicillin include fluoroquinolones (e.g. ciprofloxacin), azithromycin, tetracyclines, co-amoxiclav
- Single-dose therapy appears adequate for uncomplicated cases of acute genital gonorrhoea in men and women.
- Cefixime + Doxycycline or azithromycin to cover for Chlamydia
- In disseminated gonococcal disease and any complicated infection, treatment for 7-10 days is necessary.