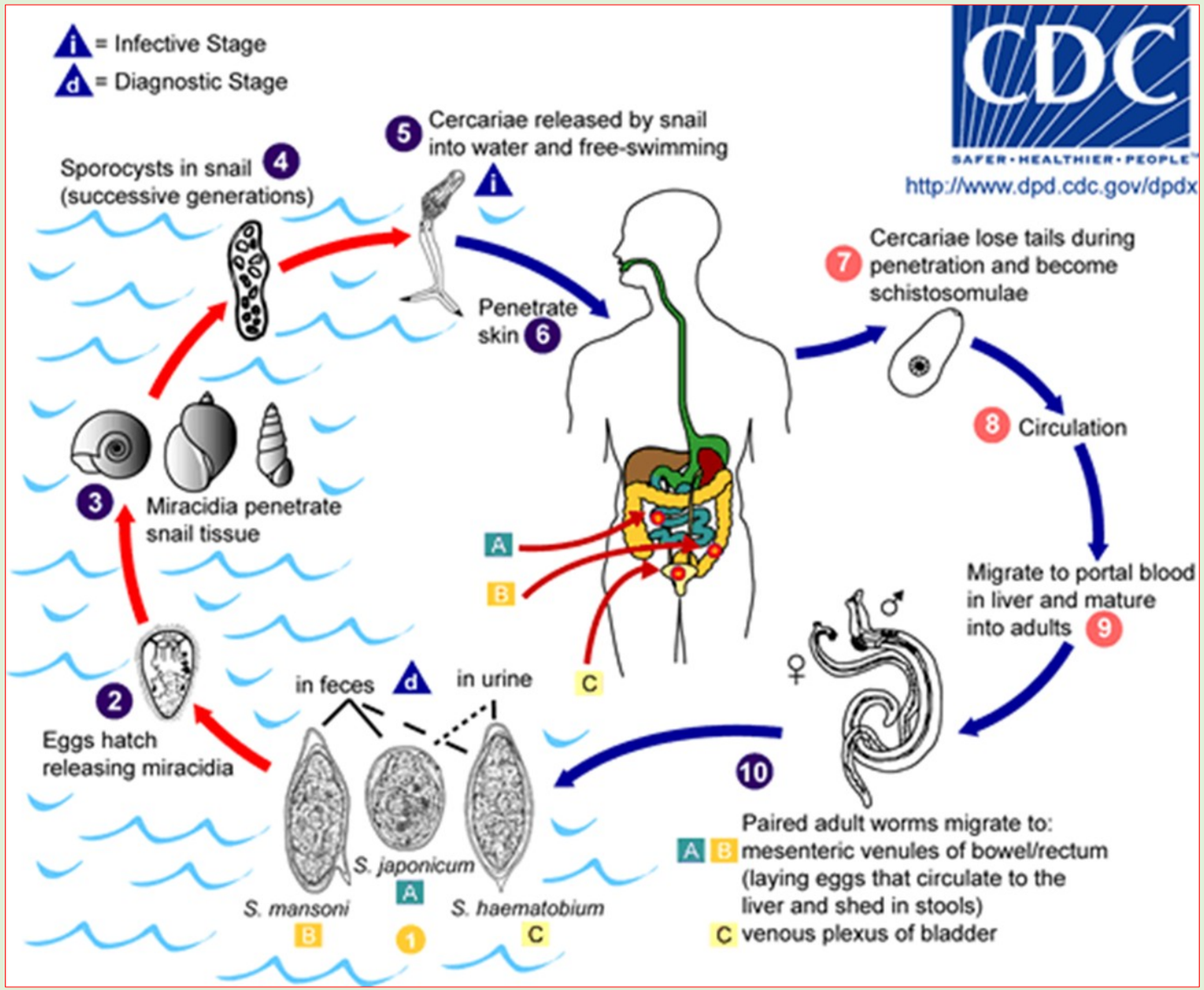
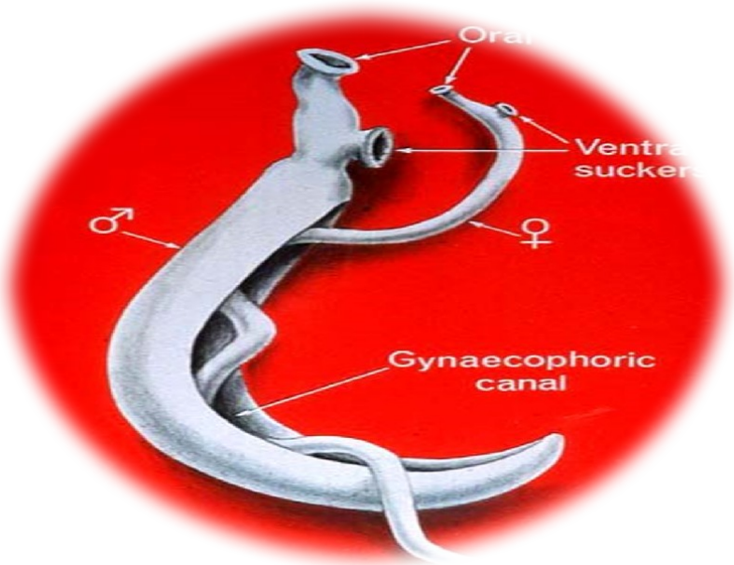
MICRO 1

SCHISTOSOMIASIS BILHARIZIASIS



▪Schistosoma hematobium
- parasite / flukes
-Man the only Natural Host
-D.H : human
-I.H : freshwater "snail"
- Infective stage : cercaria (1mm)
-Diagnostic stage : Eggs



#Schistosomiasis

-it due to immunologic reactions to eggs trapped in tissues.

-Antigens released from the egg stimulate a Inflammation around the ovum "granulomatous reaction"

🔷[Acute schistosomiasis = katayama fever] =

-During early stages ➡️ itching at the site of cercarial penetration "swimmer itch " 1-2 days

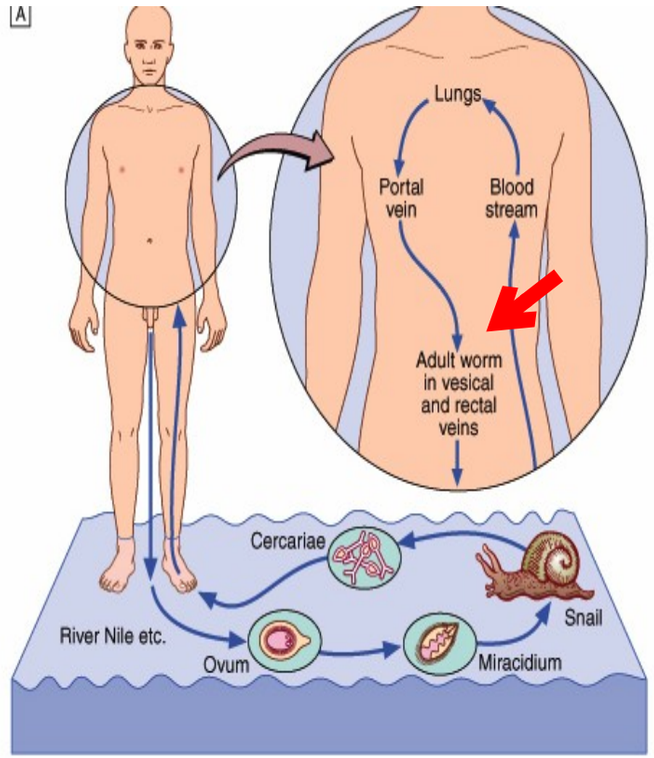
-Later present allergic manifestations " urticaria,

🔷Other chronic symptoms may arise from 2 months to over 2 years:

- Painless Terminal Haematuria : the first sign of infection

-Frequency & urgency of micturation

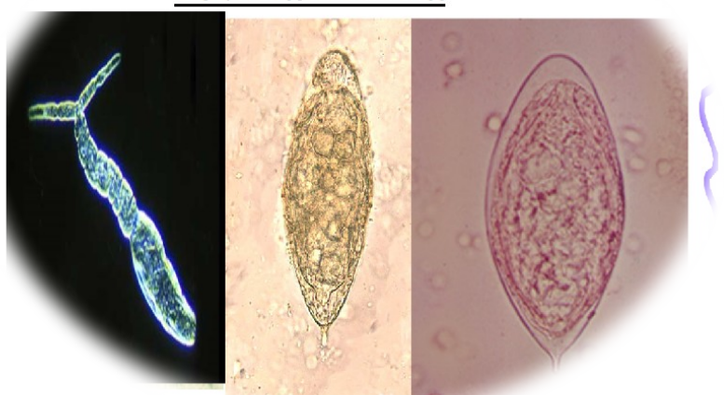
-Hydronephrosis & hydroureter



🔷its complications :
- pulmonary hypertension
-portal hypertension
-obstructive uropathy
- squamous cell Carcinoma of the bladder
-infertility

🔷Diagnosis:
- clinical -hematological - serological test
-radiological -confirmed by: = ova in urine & ovum has sharp terminal spine

Eggs & cercaria of S.haematobium



Life cycle

-Ovum → in water
-Ciiated miracidium (1-3 W survive in water)enter → snail(multiplies)
-بـتطلع fork-tailed cercariae (2-3 day survive in water)→penetrate host (skin or mucous of mouth)→transform to schistomulae→ pass through lung ,liver,portal vein (mature in it)--> within 4-6 W (venous plexus draining bladder + prostate…, where the females deposit ova – ova then to the bladder – then to urine)

🔷Treatment
-Praziquantel
-response to steroid

🔷prevention
-Travelers to endemic areas
➡️ avoid exposure to freshwater
-No accepted prophylactic
-No vaccine
-Early treatment after high risk exposures
-Improved sanitation to decrease freshwater

MICRO 2

T. vaginalis & Candida

🔷Trichomonas Vaginalis " protozoa From Urogenital Flagellate "
-D.S & I.S : Trophozoites
=MOT
1) Sexual activity " **#NO_CYST** "
2) Infant delivery
3) contaminated towels & underwear

=Pathogenesis
-Excess use of Vaginal disinfectants ⬇️ lactobacilli ⬇️ lactic acid ⬇️ Vaginal acidity 3.8-4.5 PH ➡️ suitable for the growth of T. Vaginalis
-Trophozoites exits either free in vaginal cavity or adherent to the Vaginal epi causing its damage ➡️ micro-ulceration
=Clinical pic & lab diagnosis

🔶In women either asymptomatic or symptomatic : a) Vaginitis: with frothy yellowish - green odorous vaginal discharge b) Urethritis : frequency of urination & dysuria
Diagnosis by : wet film / vaginal swab

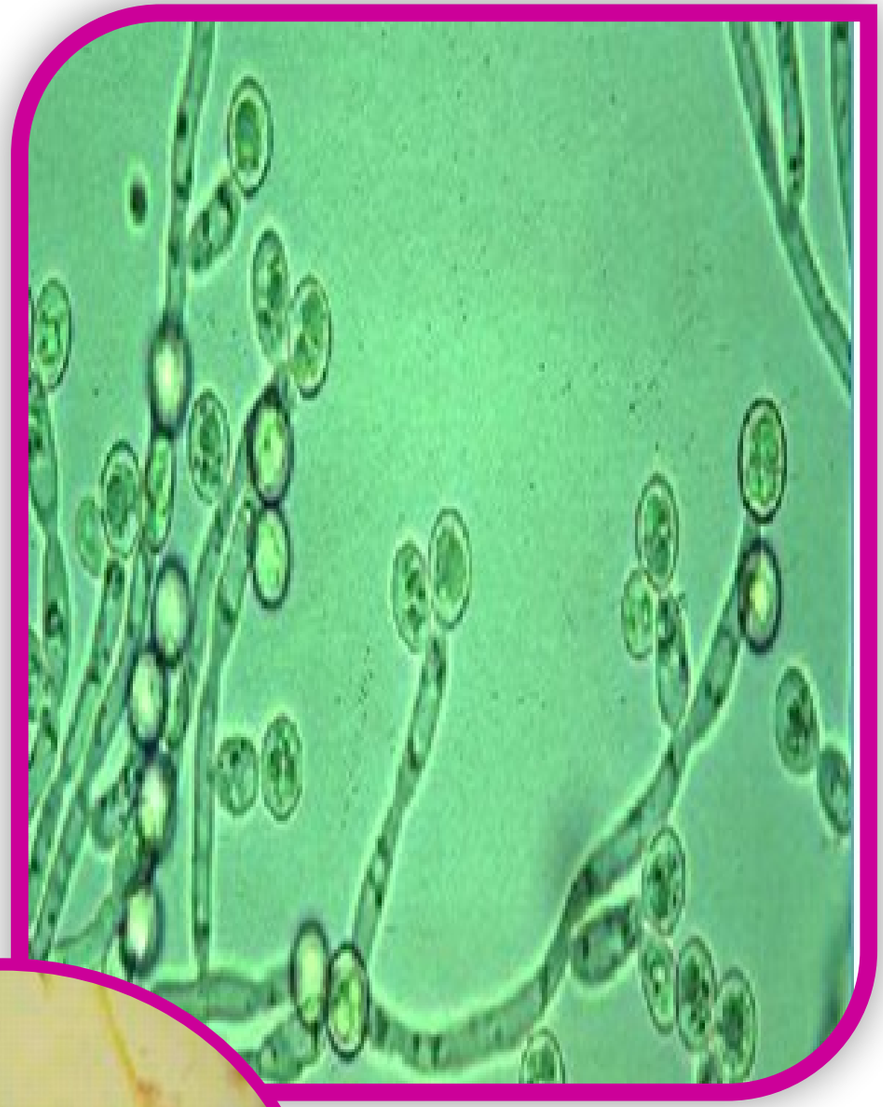
🔶In men either asymptomatic "common " or symptomatic includes urethritis , prostatitis with white discharge
Diagnosis by : trophozoites detected in discharge/ culture/ direct immunofluorescent Ab straining

🔷 Urogenital Candidiasis

🔶 most important species :

c.albicans ➢**acid & gas production.**

-which is : oval / gram positive opportunistic fungi / produce pseudohyphea / ferment glucose & maltose / normal flora of m.m of upper RT , GIT, female genital tracts



🔶 predisposing factors to candida infections :

-weakened immune system

-poor hygiene

-HIV / AIDS

-Cancer treatment

-organ transplantation

🔶 its types

1) Renal candidiasis

-spread either by ascending route or hematogenous spread

-may cause a fungus ball or obstructive fungal mass with symptoms as renal colic

2) Bladder candidiasis

-Dysuria , frequency of urination

-lead to cadidiuria , prostatitis & orchitis

-Diagnosis by : MacConkey and blood agar or Sabouraud dextrose (SD)agar

3) Vulvovaginal candidiasis

-itching ,dysuria , dyspareunia , whitish malodorous thick vaginal discharge

-Vulvar and vaginal erythema , edema & fissures

- Diagnosis by: -microscopic examination of discharge using (KOH)

-Culture on (SD) agar

4) Candidal balanitis in male

-inflammtion of the glans penis

-sexually transmitted

-present as itching, swelling and redness of the glans penis

MICRO 3

Urinary Tract Infections

Cystitis is an infection of the bladder or urethra, most commonly due to a bacterial etiology	Pyelonephritis is a complication of Cystitis where the damage extends up to the kidney through ureters
Cystitis is not often severe as Pyelonephritis	Patients are often severely ill and require hospital admission

▼ **Uncomplicated cystitis** (bladder infection)

- **Healthy** adult non-pregnant **women**
- simple (no bad symptoms, no fever, nausea, vominting flank pain)
- Diagnosis: Urinalysis
- **Risk factors**: Intercourse (so recomment post-coital voiding, and prophylactic antibiotic)

▼ **Complicated cystitis**

- Affects: women with comorbidities, males, indwelling catheters, urosepsis and hospitalized people
- Diagnosis: Unrinalysis, culture
- In case of complicated cystitis due to **indwelling folley catheter**:
  - Get rid of foley, treat only when symptomatic, change catheter before culture
  - You find WBC on urinanalysis, catheters are frequently colonized with a lot of bacteria
- **Candiduria**: Candida in urine (happens in patients with indwelling catheters)
  - get rid of foley, treat only if symptomatic

▼ **Recurrent cystitis**

- Obtain urine culture and sensitivity
- Suspect anatomical abnormalities → urologic work-up

Treat 7-14 day

▼ **Pyelonephritis**

In UTI :secondary to blood born infections → Staphylococcus aureus

- Community acquired → E. coli
- Hospital acquired → coliform bacteria, enterococci, Pseudomonas, klebsiella)
- Consititutional symptoms
- Diagnosis: Urinanalysis, culture, CBC, chemistry
- **Complications**:
  - *Perinephric/renal abscess*: patient not improving on antibiotics, diagnosed with CT or ultrasound, may need surgical drainage
  - *Nephrolithiasis*: Patient with severe flank pain, urology consult to treat stones

▼ **Prostatitis**

- **Symptoms**: Pain in perineum, lower abd, testes, and with ejaculation, bladder irritation and outlet obstruction, blood in semen
- **Diagnosis**: History (perineal pain, cloudy urine), edematous tender prostate, elevated PSA, Urinanalysis and culture
- **Risk factors**: Trauma and dehydration

ش شامل جزئية الanalysis

- Urethritis
  - *Chlamydia*
    - Asymptomatic in females, may have dysuria, discharge, or pelvic inflammatory disease (PID)
    - Urinanlysis and culture (**Pyuria with no bacteria → Chlamydia**)
    - Pelvic exam (check discharge from cervix or urethra for chlamydia PCR)
  - *Neisseria gonorrhoea*
    - Dysuria, discharge, PID
    - Urinalysis, culture, pelvic exam (send discharge for gram stain, culture and PCR)

MICRO 4

Gardenella +chlamydia + ureaplasma

●Gardnerella Vaginitis

- Gram- variable staining

Actually G+

-Rod

-Facultative anaerobic

-Small

-non-spore forming

-non-motile

-Growth : small/circular/convex/gray/on chocolate agar or blood agar / or HBT agar

-Catalase -ve

-Oxidase -ve

-Can cause Bacterial vaginosis

🔷Bacterial vaginosis :-

-Most common cause of abnormal vaginal odour and discharge

-Caused by changes in the type of bacteria found in vagina "Normally Lactobacillus"

-Risk Factors: 1️⃣Multiple Sexual partners

2️⃣ Sexual relationship with new partner

3️⃣ Cigarette smoking 4️⃣IUD

5️⃣ vaginal douching /// can be developed in women who had never vaginal intercousre

-Symptoms : 1️⃣ unpleasant "fishy" vaginal odor 2️⃣ yellow or white "thin" vaginal discharge /// NO PAIN

Or irritation

-Diagnosis : 3 of 4 these criteria :-

1️⃣White , thin , coating on vaginal wall

Greater than 4.5

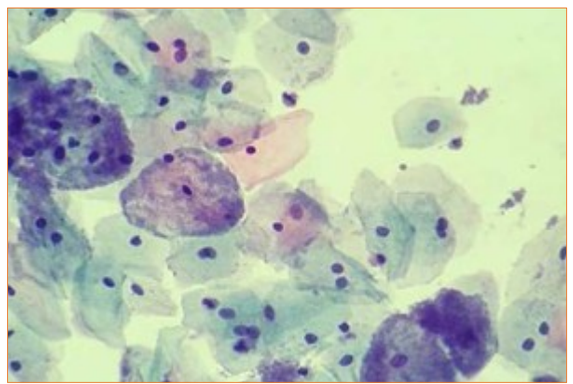
2️⃣pH test of Vaginal discharge is low acidity

3️⃣Fishy odor discharge, when combined with drop of potassium ➡️ Hydroxide "whiff test "

4️⃣Clue cell

🔴Newer methods for diagnosis:

- DNA probes : detecting only pathogenic levels of Gardnerella



●GENITAL MYCOPLASMA

-Human Urogenital pathogens

-ASS with STDs & puerperal infections

🔷 Ureaplasma urealytic

-Normal genital flora of both men & women

-Gram -ve

-Found in 70% of Sexually active human

-Symptoms can be "silent" or (discharge/burning/urinary frequency & urgency/ PAIN)

-Common cause of urethritis (when neither gonococcus nor chlamydia)

-Can be transmitted to infant

-Diagnosis by biopsy or swab for PCR test

-Can be distinguished By their carbon utilization patterns :

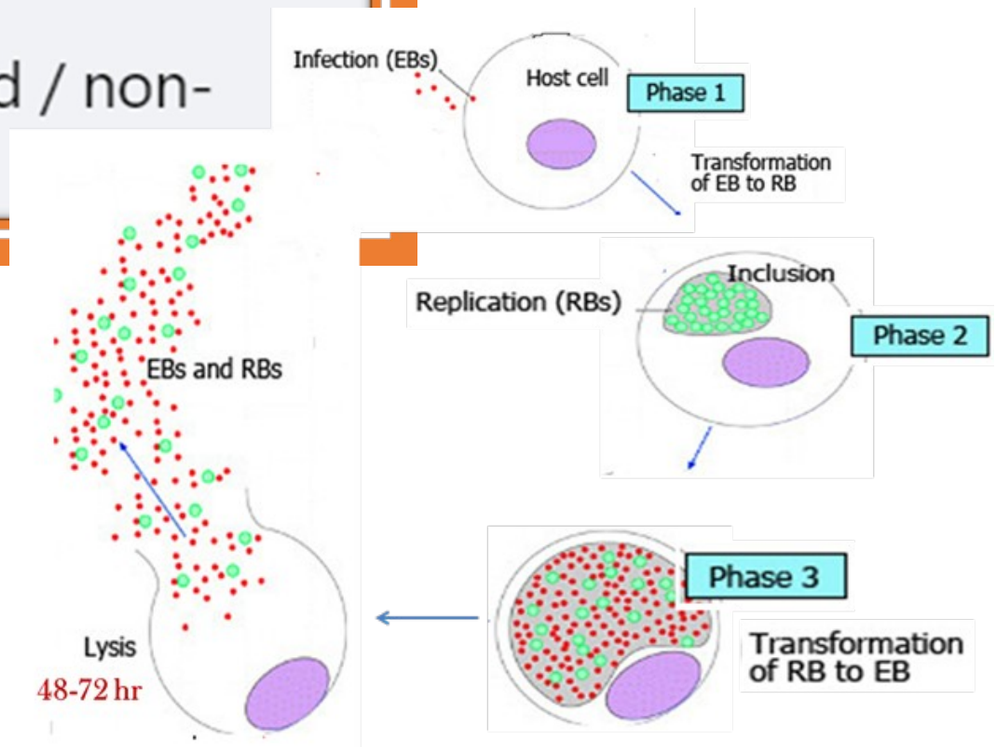
M.hominis ➡️Arginine

M. urealytic➡️ Urea

●Chlamydia
-STDs
-higher than gonorrhea among male & female
-Reinfection is frequent

🔷Chlamydia curriculum

-Obligatory intracellular bacteria
-Gram -ve / ovoid / non-motile



-its life cycle: (Two forms)
1️⃣Elementary body (very small / infectious nonreplicating/condensed genetic material/released from ruptured infected cells)
2️⃣Reticulate body (intracytoplasmic form / non infectious replicating / replication&growth in inclusion body / diffuse genetic material)

◇Pathogenesis
-Have Tropism ➡️ epithelial cell of endocervix / UGT of women/ urethra/ rectum/ conjunctiva

◇Clinical syndrome

🔷 In men

1️⃣ Urethritis

-most common cause of non gonococcal urethra

-I.P = 5-10 Ds

-Discharge is so scant (tnick/white/odorless/curd-like) like cottage cheese

2️⃣ Epididymitis

3️⃣ Prostatitis

- Dysuria / urinary dysfunction/ pain with ejaculation/ pelvic pain

🔶 In women

1️⃣ Urethritis

2️⃣ Cervicitis (discharge/edema/erythema

3️⃣ proctitis

4️⃣ Reiter's syndrome (Arthritis/ non gonococcal Urethritis/ conjunctivitis)

5️⃣ LGV (Painless ulcer / Genital ulcer heal spontaneously/ tender and painful lymphadenopathy)

Genital strains (

Ocular strains (A

Genital strains (L1, L2, L3)

Stages :

- Primary stage

-self limited Painless ulcer

-Heals in few days

- Secondary stage

-(10-30)Days later

-Infection spread to LN

-Tender Lymphadenopathy

-Necrosis

- Third stage

-fibrosis

-lymphatic obstruction & chronic edema

-Genital elephantiasis

Diagnosis:

1. Nucleic acid amplification test
2. Urine test
3. Swab
4. TYPICAL intracytoplasmic inclusion in Giemsa stain
5. PCR
6. + ve culture
7. Serology test

MICRO 5,6

Gonorrhea, Syphilis

Gonorrhea

- ***Causative agent:*** Neisseria gonorrhoeae (gonococcus)
  - ***Characters:*** G-ve diplococci (kidney beans), oxidase +ve, non-capsulated, sensitive to dehydration and cooling, Glucose fermenter (not maltose or lactose fermenter), infects humans ONLY (not flora)
  - ***Virulence factors:*** Pili, IgA protease, Endotoxin, outer membrane protein (OMP)
  - ***Immunity:***
    - Repeated infection occur (bcz of antigen variability)
    - Infect mucosa of urethra, vagina, cervix, rectum, pharynx, conjunctiva
    - Can disseminate (esp in complement deficiency)
- ***Clinically***
  - Transmitted sexually to adults and perinatally to newborns
  - 95% of men are symptomatic, 40% of women are symptomatic
  - **I.P**: 2-5 days

- *Clinical manifestations:*
  - In men:
    - **Urethritis**: (I.P: 2-7) 10% asymptomatic
      - Frequency, urgency, dysuria
      - Purulent discharge
      - Blood in semen or urine
    - **Epididymitis**
      - Testicular pain and swelling+ abdominal and lower back pain
      - fever, nausea
      - Urethral discharge, pain on urination

- In women
  - **Endocervical infection** (most common uncomplicated gonorrhoea)
    - Vaginal discharge +- dysuria
    - cervical os erythematous and friable + purulent exudate
  - **Proctitis** (rectal infection)
  - **Acute salpingitis** (bacteria ascends to fallopian tubes)
    - May be followed by ***Pelvic Inflammatory Disease*** (inflammation of uterus, fallopian, ovaries) so high prob of sterility and ectopic pregnancy
- In neonates
  - **Ophthalmia neonatorum**: severe purulent eye discharge + periorbital edema
    - May lead rapidly to *blindness*
    - Prevented by aqueous silver nitrate drops in eyes OR topical erythromyocin (which is also active against chlamydia)

- *Diagnosis*
  - **Samples:** exudates, urine, cervical, throat
  - N. gonorrhoea intolerent to drying and temp changes and quickly autolyses so test quickly, or put in transport media if there is delay

1. **Gram stain:** Gram-ve intracellular diplococci (inside neutrophils) not enough alone
2. **Culture:** on **Chocolate** agar (it's fastidious, requires 5-7% CO_2 + complex media) Gives **Oxidase +ve colonies**

- *Treatment*
  - Treat both sides
  - **First-line:** Ceftriaxone or cefixime... alternatives: azithromyocin (also treats chlamydia)
- *Prevention*
  - **No vaccine** (bcz non-capsulated antigenic variability)
  - **ABC** (Abstain, Be faithful, Condom) + Rapid diagnosis, use antibiotics, tracing

Syphilis

- *Causative agent:* Treponema pallidum
  - from Spirochetes (thin-walled, flexible, spiral rods)
- *Transmission*
  - Contact with treponema containing lesion OR congenital OR Blood donation
- *Pathogenesis*
  - No toxin
  - Multiplication at primary site → **Painless ulcer** (**Chancre**) → widespread by blood to many tissues
- *Clinically*
  - **I.P:** 2-10 weeks (avg 3 w)
  - 1/3 heal without treatment, 1/3 go into latent, 1/3 into tertiary

- **Primary Syphilis**
  - Single chancre on genital, infectious, disappears spontaneously after 3-6 w
  - Inguinal lymph node enlargement (LNE)
- **Secondary syphilis**
  - 2-12 w after Chancre disappeared, Non-specific symptoms, **Rash** on soles, palms and m.m, heal spontaneously
- **Latent syphilis:** No lesion but has **serological evidence**
- **Tertiary syphilis** (3-30 years) **Systems** involved
  - Neurosyphilis → paralysis
  - CVS
  - Granulomatous lesion in skin and bone (Gummas)

- **Congenital syphilis**
  - Intrauterine death, abortion, low birth weight
  - **Facial abnormalities** (saddle shape nose, Mulberry molars, frontal bossing, Hutchinson's teeth)

- *Diagnosis*
  1. **Detection of Treponema** in exudate and lesion
  2. **Serology**
     a. Non-specific but sensitive antibodies (after chancre appears): **VDRL**
     b. Specific antibody detection (confirms +ve VLDR result)
        - ELISA, FTA-Abs, TPHA

Test / stage	Primary	Secondary	Latent	After treatment
VDRL/RPR	70%	99%	ZERO	ZERO
FTA-Abs	80%	100%	95%	100%
TPHA	70%	100%	90%	100%

FTA can be positive in tertiary

- ***Treatment:*** Penicllin G
- ***Prevention:*** No vaccine, ABC, early diagnosis and treatment (test for it if any other STD exist)

MICRO 7

HIV and HPV

HIV and AIDS

- ***Structure:*** **Retrovirus** (*+ve ss RNA with reverse transcriptase RT gene*)
  - **Pol gene:** codes for RT, integrase, protease
  - **gag gene:** p24, p17, p7 + group specific proteins
  - **Env gene:** **gp120** (mediates receptor attachment, mutates because no proofreading in RT), and **gp41** (mediates envelop fusion)
  - **Regulatory proteins:** tat, Nef, rev
  - HIV has 2 strains (HIV2 is called lentivirus)
- ***Inactivated by:*** heat (autoclave or hot-air oven), glutaraldehyde, hypochlorite, bleach, alcohols... it can survive in room temp for 15 days (and even at 37c) inactivated at 60c
- ***Pathogenesis***
  - Enters by **binding gp120 to CD4 and CCR5** (important in establishing infection, some don't have CCR5 so are resistant)
    - CD4 cells: T helper, monocytes, dendritic, microglia
  - Virus infects and kills CD4+ cell → **suppression of cell-mediated immunity**
  - ***Immune evasion:*** Integration (makes it's genome part of cell's DNA → infected people are **infected for LIFE**) mutations (can't develop immunity against it)

- *Clinically*
  - ***Transmission:*** Sexually, infected blood, perinatally
  - **Acute stage** (2-4 w after infection)
    - Like mononucleosis (fever, sore throat, lethargy, lymphadenopathy, rash) → spontaneous recovery in 2 w
    - Antibodies appear after 3-4 w from infection
  - **Latent stage** (progression to AIDS)
    - **Asymptomatic** but sometimes (weight loss, diarrhoea, node enlargement)
    - **Progression to AIDS can be:** typical (takes 8-10 years), rapid (1-2 years), long-term non-progressor (infected person survives for 20 y)
  - **Immunodeficiency stage (AIDS)**
    - ***Case definition:*** **Infected with HIV + CD4 count <200 (or <14%) + other clinical conditions:-**
      - Candida in bronchi, trachea, lung, esophagus
      - Cervical cancer
      - CMV, encephalopathy, HSV (herpes ulcers are chronic), Histoplasmosis...
      - Herpes zoster
      - Mycobacterium avium intracellulare in lymph nodes

- *Diagnosis*
  - Virus isolation (research only)
  - Antigen detection (p24)
  - Nucleic acid detection
  - **Serology (testing for HIV antibody)** screening and diagnostic
    - not positive during window period (2-3 months)
    - if serology +ve → do **western blot**
- ***Treatment:*** Highly-active anti-retroviral therapy (HAART)
  - **2 RT inhibitors + 1 protease inhibitor**
    - These are used for treatment, postexposure prophylaxis, infant of infected.
  - Monitor treatment by CD4 count and viral load + treat oppurtunistic infections
- ***Prevention:*** No vaccine, avoid exposure, screen blood

Human papilloma virus (HPV)

- DNA **non-enveloped** virus (has >100 genotypes)
- ***Transmission:*** Sexually, skin contact, perinatal
- ***Pathogenesis:*** Inoculation on epithelium of hand, foot, throat, cervix → Local multiplication → Wart → resolves OR transforms to cancer
- ***Risk factors:*** 1) multiple sex partners 2) Combined OCP 3) Smoking 4) Immunosuppression
- ***Clinically***
  - **Low risk types (HPV 6 and 11)**
    - **Papillomas:** benign lesion of epidermal thickening + hyperkeratosis and parakeratosis
      - Develop after weeks or months of infections
      - if **on skin → called warts.** On **genitalia → Condyloma**
    - **In children: Laryngeal papilloma** (or sino-nasal, tracheal, lung)
      - ***Presentation:*** Hoarseness, or even life-threatening airway obstruction (need tracheostomy)
      - in infants and children who acquire infection during birth

- High risk types (16, 18, 31, 33, 45) → Cervical cancer
  - **Persistant HPV infection → pre and malignant cervical cancer** (and other cancers)
  - E6 inhibits p53, E7 inhibits RB
  - Cervical cancer and precancerous changes of cervix **start in transformation zone** (area where squamous cells of ectocervix join columnar cells of endocervix, columnar cells constantly transform to squamous here)

- *Diagnosis*
  - **Clinically**
  - **Cytology** (sample collected by pap smear or colposcopy) detects premalignant lesion
  - **PCR and HC2** (+- genotyping)
  - **Electron microscope** (rare)
- *Treatment*
  - **Warts:** asymptomatic and regress, but treatment include cryotherapy and excision
  - **Premalignant lesion:** CO2 laser treatment OR cold coagulation OR excision
  - **Malignant lesion:** based on stage, surgical excision, radiotherapy, and/or chemotherapy
- *Prevention*
  - STI so no multiple partners, ABC (abstain, be faithful, condom)
  - **Screening by cervical smear**
  - ***Vaccines:*** Against L1 proteins (for main high risk genotypes) one vaccine protects against 16,18.. the other protects from 6,11,16,18

MICRO 8

Herpes & molluscum

Genital herpes

- ***Caustive agent:*** Herpes simplex type 2 and type 1 (mostly TYPE 2)
- ***Transmission:*** HSV2 spreads by secretion from mouth or genitals... HSV1 spreads from mouth to genitals during oral sex
- ***Symptoms:***
  - **Small, painful blisters/vesicles** filled with fluid
    - Before blisters, may feel tingling, burning, itching, or pain
    - After blisters break, leave painful shallow ulcers → ulcers crust over → heal over 7-14 days
  - Enlarged and tender lymph nodes
  - Dysuria + women may have vaginal discharge
- **Recurrence is possible** (bcz virus remains latent in dorsal ganglia, recurs when immunity is suppressed)
- ***Diagnosis:***
  - Fluid from blister under microscope
  - Antigen detection
  - Culture, PCR
- ***Treatment:*** Analgesia + **Acyclovir**

Molluscum Contagium

- *Causative agent:* Poxvirus (DNA virus)
- *Transmission:* Skin contact or sexually
- *Disease:* benign superficial, characterized by small pearly papules with central depression, core may produce white cheesy material (it is **warty** like)
  - Lesions: 2-5 mm, painless, may become inflammed, red and swollen
  - disappear spontaneously within 6-12 month (may take 4 y)
  - Patients with HIV/AIDS or immunocompromised can develop giant lesions
- *Diagnosis*
  - Based on appearance of lesion
  - Biopsy and histopathology: Molluscum bodies (eosiophilic inclusions in epidermis)
  - PCR
- *Treatment:* Cryotherapy, curretage, laser therapy, topicals