



## LECTURE ( 3 )

### CHLAMYDIA, SYPHILIS & GONORRHEA

#### OBJECTIVES:

- NOT Given

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Very important

Additional information

Male doctor's notes

Female doctor's notes

# (CHLAMYDIA, SYPHILIS & GONORRHEA)

## CHLAMYDIA

Life cycle

epidemiology

pathogenesis

diagnosis

treatment

## N.GONORRHEA

PID & DGI

epidemiology

diagnosis

treatment

## SYPHILIS

epidemiology

pathogenesis

stages

diagnosis

treatment

# CHLAMYDIA



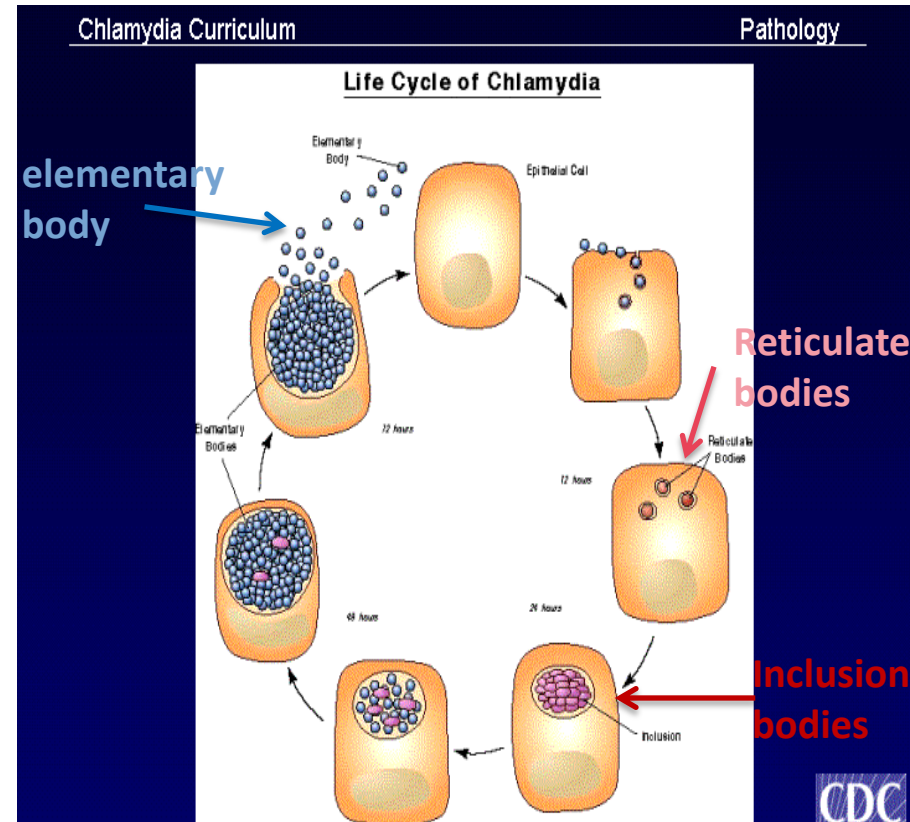
- Chlamydia Spp. Are obligatory intracellular organisms because they uses host cell metabolism for growth and replication.
- They **DON'T have a rigid cell wall**. Therefore, Beta lactam antibiotics **cannot** be used to treat Chlamydia infections. **Also, gram stain is not beneficial in diagnosing chlamydia**
- Fail to grow on artificial media; therefore, they **cannot** be isolated in cultures. (so we have to Uses host cell metabolism for growth and replication).

## LIFE CYCLE:

chlamydiae have a unique life cycle, with morphologically distinct infectious and reproductive forms.

1. The extracellular infectious form, **the elementary body**, can survive extracellular cell-to-cell passage. Once it is inside the host cell,
2. The particle reorganizes into a reticulate body, which become metabolically **active** and divides repeatedly within the cytoplasm of the host cell.
3. **As they divide, the reticulate bodies form an inclusion body.**

After that, multiplication stops and all the reticulates become new infectious **elementary bodies**. They are then released from the cell, ending in host cell death. (These **Inclusions can be stained with Geimsa or Iodine stain!!**)



Source: California STD/HIV Prevention Training Center

Species	Disease
C. Trachomatis A,B,C	Trachoma (eye infection, blindness)
C. Trachomatis D-K	Inclusion conjunctivitis, genital infection
C. Trachomatis L1,L2,L3	Lymphogranuloma venerum (LGV)
C.psittaci	Psittacosis (Parrots)
C.pneumoniae	Respiratory infections (atherosclerosis )

Most common

## EPIDEMIOLOGY:

- #*C.trachomatis* is a common cause of sexually transmitted disease (STD).
- #Spread by genital secretions , anal or oral sex.
- #Wide spread, 5-20 % among STD clinic in USA.
- #Human are the sole reservoir.
- #1/3 of male sexual contacts of women with *C.trachomatis* cervicitis develop urethritis after 2-6 weeks incubation period.
- Commonly, males develop the symptoms while females are usually asymptomatic

## PATHOGENESIS:

- #Chlamydia have tropism for **epithelial cells** of endocervix and upper genital tract of women, urethra, rectum and conjunctiva of both sexes.
- #LGV can enter through skin or mucosal breaks
- #Release of proinflammatory cytokines, leads to tissue infiltration by inflammatory cells, progress to necrosis, fibrosis then scarring.

# GENTIAL INFECTION OF CAUSED BY *C.TRACHOMATIS*:



- **In men:** urethritis ( **non gonococcal urethritis** ,NGU), epididymitis & proctitis.
- **In women:** cervicitis, salpingitis, urethral syndrome, endometritis & proctitis.
- Urethritis present as dysuria and **thin urethral discharge** in 50 % of men.
- Uterine cervix infection may produce vaginal discharge but is **asymptomatic** in 50-70% of women.
- **Salpingitis and pelvic inflammatory disease can cause sterility and ectopic pregnancy.**
- 50% of infants born to mothers excreting *C.trachomatis* during labor show evidence of infection during the first year of life. Most develop **inclusion conjunctivitis**, 5-10% develop infant pneumonia syndrome.

## **LGV (LYMPHOGRANULOMA VENERUM )CAUSED BY *C.TRACHOMATIS* STRAINS L1,L2,L3**

- LGV is Common in S. America and Africa.
- LGV presents as papule and inguinal lymphadenopathy.
- Chronic infection leads to abscesses, strictures and fistulas.

## DIAGNOSIS:

- ❖ History is very important.
- ❖ **Polymerase chain reaction (PCR)** is the **most sensitive** method of diagnosis. Performed on vaginal ,cervical , urethral swabs, or urine .
- ❖ Isolation on tissue culture ( McCoy cell line) but *rarely done*.
- ❖ *FOR culture C.tracomatis* inclusions can be seen by iodine or Giemsa stained smear.
- ❖ Serology : searching for antibodies

## TREATMENT:

- **Tetracycline** is the best treatment for Chlamydia infections.
- Azithromycin single dose for non- LGV infection.
- **Erythromycin** for **pregnant** women.
- Doxycycline for LGV.
- Prevention and control through early detection of asymptomatic cases , screening women under 25 years to reduce transmission to the sexual partner

# GONORRHEA



A STD\* disease acquired by direct genital contact. It is localized to mucosal surfaces with infrequent spread to blood or deep tissues. Caused by *N.gonorrhoeae* (*it is a pathogen not a normal flora!*)

**Clinical manifestations (IP 2-5 days) short incubation period:**

- **Men:** acute urethritis and acute profuse **purulent urethral discharge**.
- **Women:** mucopurulent cervicitis, urethritis with discharge.
- **In both sexes:** urethritis ,proctitis\*\*.

Symptoms similar to *Chlamydia* infection.

- Pharyngitis may occur **due to oral sex**

## PELVIC INFLAMMATORY DISEASE (PID):

PID occurs in 10-20% of cases, including fever, lower abdominal pain, adnexal tenderness, leukocytosis with or without signs of local infection.

Salpingitis and pelvic peritonitis cause **scarring** and **infertility**.

## DISSEMINATED GONOCOCCAL INFECTION (DGI):

Due to spread of the bacteria to the bloodstream.

**Clinically** :Fever, migratory **arthralgia** and **arthritis**. Purulent arthritis involving large joints. Petechial, maculopapular rash. Metastatic infection such as **Endocarditis** , **Meningitis** & Perihepatitis may develop. **Very rare**

\*STD: sexually transmitted disease.

\*\*proctitis: inflammation of the anus and the lining of the rectum.

# EPIDEMIOLOGY OF GONORRHEA:



- Rates among adolescents are high, about 10% increase per year in USA .
- Inability to detect asymptomatic cases such as women and patient fail to seek medical care hampers control .
- Major reservoir for continued spread are **asymptomatic** cases.
- Nonsexual transmission is rare.

## DIAGNOSIS:

- Transport media required unless transfer to the lab. is immediate.
- Direct smear for Gram stain of urethra and cervical specimens to see **Gram negative intracellular diplococci.**
- Culture on (**Thayer-Martin**) or other selective medium.
- Isolates identified by sugar fermentation of **glucose** only ( *does not ferment maltose or sucrose*) or **Coagglutination test.**

## TREATMENT:

- **Penicillin** and if resistance → we should use **Ceftriaxone** or **Ciprofloxacin.**
- counseling



# SYPHILIS



- A chronic **systemic** infection , sexually transmitted , caused by a spiral organism called *Treponema pallidum* subsp. *Pallidum*.
- **NOT stained by Gram stain** but readily seen only by immunofluorescence (IF), dark field microscopy or silver impregnation histology technique.

## EPIDEMIOLOGY OF SYPHILIS:

- An exclusively human pathogen.
- Transmission by **contact with mucosal surfaces** or **blood**, less commonly by non-genital contacts with a lesion, sharing needles by IV drug users, or transplacental transmission to fetus.
- **Early disease is infectious → Late disease is NOT infectious .**

## PATHOGENESIS:

- Bacteria access through in-apparent skin or mucosal breaks.
- Slow multiplication produces **endarteritis & granulomas**.
- Ulcer heals but spirochete disseminate.
- Latent periods may be due to surface binding of host components.
- Injury is due to delayed hypersensitivity responses to the persistence of the spirochetes.

# CLINICAL MANIFESTATIONS

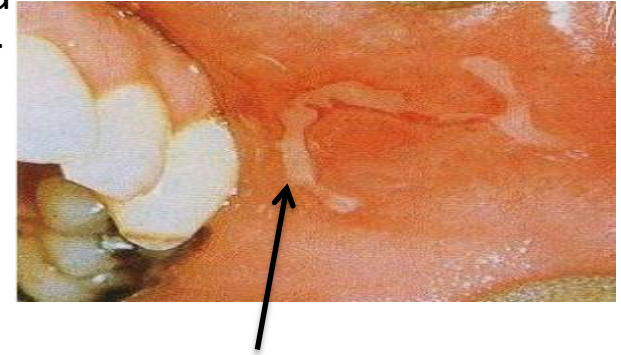
## STAGES OF SYPHILIS:



### ➤ Primary syphilis (chancre):

**chancre** is a painless, indurated ulcer with firm base and raised margins on external genitalia or cervix, anal or oral site appear after an IP of about 2-6 weeks.

- Enlarged inguinal lymph nodes may persist for months.
- Lesion heals spontaneously after 4-6 weeks.



### ➤ Secondary syphilis:

Develops 2-8 weeks after primary lesion healed.

- Characterized by symmetric mucoctaneous rash, mouth lesions (snail track ulcers) and generalized non-tender lymph nodes enlargement (full of spirochete) with bacteremia causing fever, malaise and other systemic manifestations.
- Skin lesion distributed on trunk and extremities often palms, soles and face.
- 1/3 develop condylomata lata: which are painless mucosal warty erosions on genital area and perineum.

- 2ndry syphilis continue in 1/3 of patients. Disease enter into a latent state.

➤ Latent syphilis: a stage where there is no clinical manifestations but infection evident by serologic tests. Relapse cease.

**Risk of blood-borne transmission or from relapsing infection or mother to fetus continue.**

# CLINICAL MANIFESTATIONS STAGES OF SYPHILIS CONT...



## ➤ Tertiary syphilis:

- in 1/3 of untreated cases. Manifestations may appear after 15-20 years or may be asymptomatic but serological tests **positive**.

### ▪ Neurosyphilis:

chronic meningitis, with increased cells and protein in CSF, leads to degenerative changes and psychosis. Demyelination causes peripheral neuropathies. Most advanced cases result in **paresis**, due to the effect on the brain parenchyma and posterior columns "**tabes dorsalis**" of spinal cord and dorsal roots. *PT present with abnormal gait.*

### ▪ Cardiovascular syphilis:

- Due to **arteritis** leads to aneurysm of aorta and aortic valve ring.
- Localized granulomatous reaction called **gumma** on skin, bones, joints or other organs leads to local destruction .

### ▪ Congenital syphilis :

develop if the mother not treated , fetus susceptible **after 4<sup>th</sup> month** of gestation. Fetal loss or congenital syphilis result. Rhinitis ,rash and bone changes ( saddle nose, saber shine ) ,anemia thrombocytopenia, and liver failure.

Paresis: (**p**ersonality, **a**ffect , **r**eflexes, **e**yes, **s**enorium, **i**ntellect, **s**peech)

# DIAGNOSIS OF SYPHILIS:



- **Serologic tests** is the **MOST IMPORTANT** diagnostic method.
- Dark field microscopy of smear from primary or secondary lesions. May be negative

## ➤ **Nontreponemal tests:**

antibody to cardiolipin (lipid complex extracted from beef heart) called reagin.

The tests are called: 1. **rapid plasma reagin (RPR)** 2. **venereal disease research laboratory (VDRL)**.

- Become positive during the primary stage (possible exception HIV), **antibody peak in secondary syphilis**. Slowly wane in later stages.
- Used for screening and titer used to follow up therapy.

## ➤ **Treponemal tests:** treponemal antigen used.

- Detects specific antibody to *T.pallidum* eg:
  1. Microhemagglutination test (**MHA-TP**) (antigen attached to erythrocytes)
  2. Fluorescent treponemal antibody (**FTA-ABS**).
- **NOT** used for following up the patient after treatment.

**Positive results confirm RPR and VDRL.**

- ❖ **IgM** used to diagnose congenital syphilis.

# TREATMENT & PREVENTION :

- Treponema is sensitive to **Penicillin**.
- Hypersensitive patients treated with **Tetracycline**, **Erythromycin** or **Cephalosporins**
- **Prevention:** counselling

# SUMMARY



- Chlamydia **DON'T have a rigid cell wall**. Therefore, Beta lactam antibiotics **cannot** be used to treat it.
- chlamydiae have a unique life cycle, an extracellular infectious form → **the elementary body** then an intracytoplasmic active form → **inclusion bodies**, which can be stained with Geimsa or Iodine stain.
- *C.trachomatis* is a common cause of **sexually transmitted disease**. Which best diagnosed by PCR and treated by tetracycline.
- Gonorrhoea symptoms are similar to chlamydia infections. Pharyngitis may occur in addition to PID & DGI.
- DGI infections Due to spread of the bacteria to the bloodstream, involving large joints (arthritis). **Endocarditis, Meningitis** & Perihepatitis may develop.
- In N.gonorrhoea we Direct smear for Gram stain of urethra and cervical specimens to see **Gram negative intracellular diplococci**.
- N.gonorrhoea are **Gram negative diplococci** grows on **chocolate agar** and on selective enriched media and CO2 required.
- we treat it by **Penicillin** and if its resistance → we should use **Ceftriaxone** or **Ciprofloxacin**.
- N. gonorrhoea & chlamydia can be transmitted to the fetus vertically while syphilis is transmitted transplacentally

# SUMMARY



- **Primary syphilis:** is painless, undurated ulcer appear after IP of 4-6 weeks.
- **Secondary syphilis:** Develops 2-8 weeks after primary lesion, Characterized by symmetric **muocutaneous rash** , mouth lesions (**snail track ulcers**).
- **latent syphilis:** a stage where there is **no clinical manifestations** but infection evident by **serologic tests**.
- **Tertiary syphilis:** in 1/3 of untreated cases. Manifestations may appear after 15-20 years or may be asymptomatic but **serological tests +ve**. Present with CVS and CNS symptoms.
- **Tests used for syphilis:**

TEST	STAGE
Nontreponemal tests ( <b>RPR &amp; VDRL</b> )	<b>POSITIVE</b> during <b><u>primary stage</u></b> ,_used for screening, follow up therapy
Treponemal tests ( <b>FTA-ABS</b> )&( <b>MHA-TP</b> )	<b>POSITIVE</b> at <b><u>all stages</u></b> , used to confirm RPR & VDRL
<b>IgM</b> antibody	<b><u>Congenital syphilis</u></b>

- **Teatment for syphilis:** we use **Penicillin**, Hypersensitive patients treated with **Tetracycline**, **Erythromycin** or **Cephalosporins**

**1-18 year old male present with pus urethral discharge, doctor confirm N.gonorrhoea infection so he gave him penicillin. 4 days later he become better but complaining from watery discharge. What is the causative organism that infected him later on?**

- A. Syphilis
- B. N.gonorrhoea
- C. Chlamydia
- D. HIV

**2- which one of the following is the most sensitive method to diagnose chlamydia genital infectious**

- A. Tissue culture
- B. Searching for AB
- C. PCR
- D. Direct smear for Gram stain

3- 27 year old male came to the clinic with urethral discharge on culture we found Gram negative intracellular diplococci he was resistance to penicillin which one of the following drugs will treat him in such a case

- A. Ceftriaxone
- B. Erythromycin
- C. Amoxicillin
- D. Tetracycline

4- In which one of the following stages of syphilis CVS AND CNS symptoms will appears

- A. Primary syphilis
- B. Secondary syphilis
- C. Latent syphilis
- D. Tertiary syphilis

Qs	1	2	3	4
answer	C	C	A	D

FOR ANY SUGGESTIONS OR PROBLEMS PLEASE CONTACT  
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THANK YOU