Chlamydia Trachomatis And Its Laboratory Diagnosis

BY;

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OUTLINE

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- EPIDEMIOLOGY
- STRUCTURE
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Introduction

- ✓ *Chlamydia trachomatis* is a gram negative non-motile coccoid bacteria that is obligate intracellular parasite of eukaryotic cells.

- ✓ Chlamydial cells are unable to carry out energy metabolism and lack many biosynthetic pathways; therefore they are entirely dependent on the host cell to supply them with ATP and other intermediates.

Becker *et al.*, (1996).

Epidemiology

- ✓ *C. trachomatis* is one of the most common sexually transmitted bacteria in the world.

  Malhotra *et al.*, (2013)

- ✓ In the united States, in 2009,1,244,180 cases were reported to the Centers for Disease Control and Prevention (CDC), with an incidence of 409.2 per 100,000 population

  CDC, (2010).

Epidemiology con't

- ✓Trachoma which is caused by *C. trachomatis* is endemic in more than 50 countries, especially in rural areas of sub-Saharan Africa, Asia, and South America.

- ✓According to the WHO, there are 1.3 million people in the world who are blind due to trachoma and it remains the leading cause of preventable blindness in developing countries. It is estimated that 15% of all cases of blindness in the world are due to trachoma
- ✓ Solomon *et al.*, (2004)
- ✓

Epidemiology con't

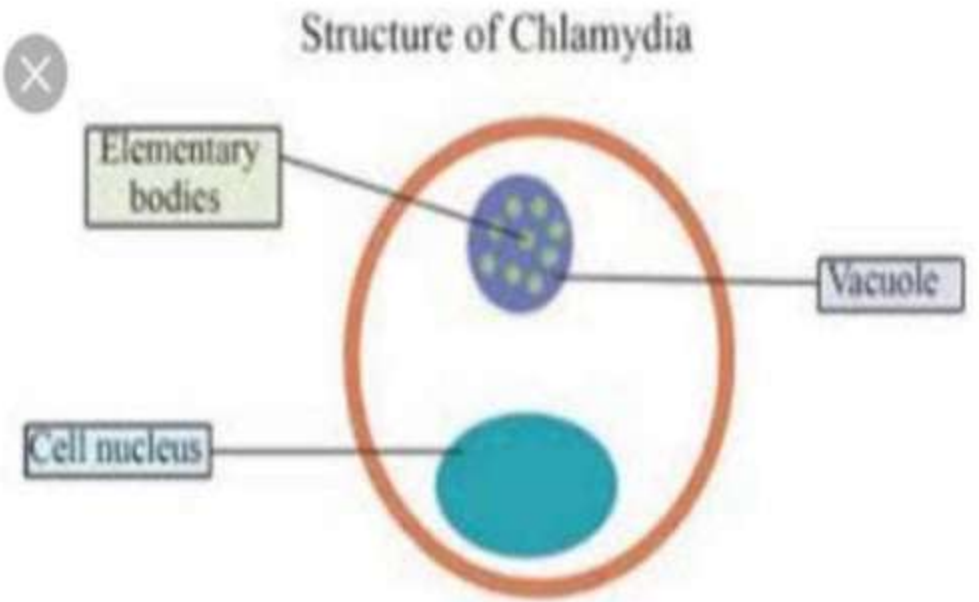
- ✓ *Chlmamydia trachomatis* also causes oculo-genital disease which mainly affects women aged 15–24 years (75% of cases)

  Barbeyrac, (2013)

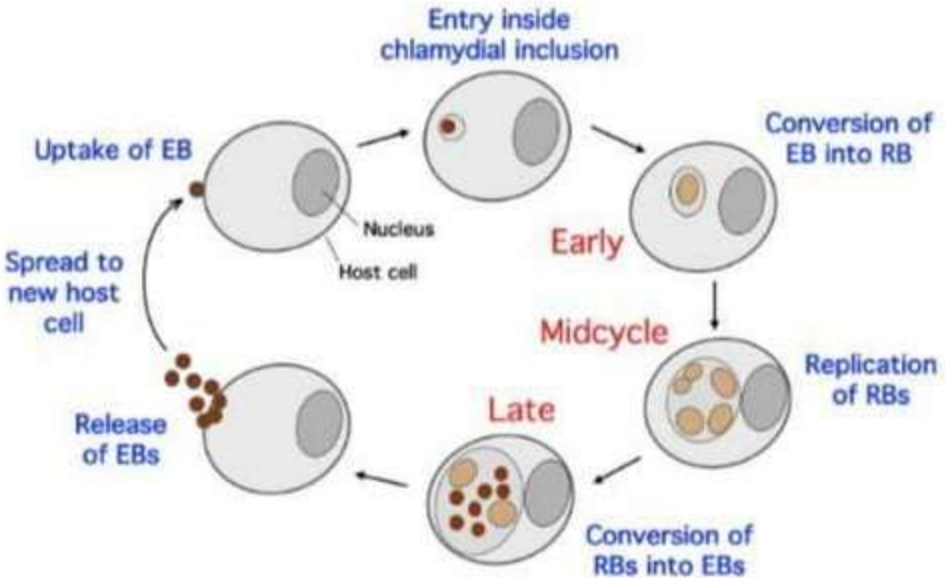
- ✓ Prevalence tends to be higher in females than in males

  Mylonas, (2012)

Structure


Structure of Chlamydia
Elementary bodies
Vacuole
Cell nucleus

Life cycle


Entry inside chlamydial inclusion
Uptake of EB
Nucleus
Host cell
Conversion of EB into RB
Early
Spread to new host cell
Midcycle
Replication of RBs
Release of EBs
Late
Conversion of RBs into EBs

Means of transmission

- ✓ *Chlamydia trachomatis* spreads through sexual contact (anal sex, oral sex, or vaginal sex) with an infected sex partner.

- ✓ Around 50–70% of infected pregnant women pass chlamydia to their newborn during birth

Hammerschlag, (2018)

Signs and symptoms

- ✓ Unusual vaginal discharge
- ✓ Painful urination
- ✓ Lower abdominal pain
- ✓ Pain during sexual intercourse
- ✓ Abnormal bleeding- after sex, between menses
- ✓ Painful testicles

(https://dbclinic.com.sg/chlamydia/).

Chlamydia in women

www.moxiber.com

Complications of C. trachomatis infection

- ✓ PID in women
- ✓ Low birth weight
- ✓ Ectopic pregnancy
- ✓ Infertility
- ✓ Infection with *C. trachomatis* increases individual's risk to HIV infection and cervical cancer.
- ✓ Safaeian *etal.*, (2010).

Laboratory Diagnosis

- Types of specimens
- Patient preparation and sample collection
- Sample transportation
- Sample Storage
- Sample processing
- Methods of laboratory diagnosis

Laboratory diagnosis con't

- **Specimen processing :** The method of processing sample depends on the nature of the sample and the diagnostic method

- Methods of laboratory diagnosis

(A) Direct cytological examination

- ✓ Giemsa staining technique
- ✓ Iodine staining technique

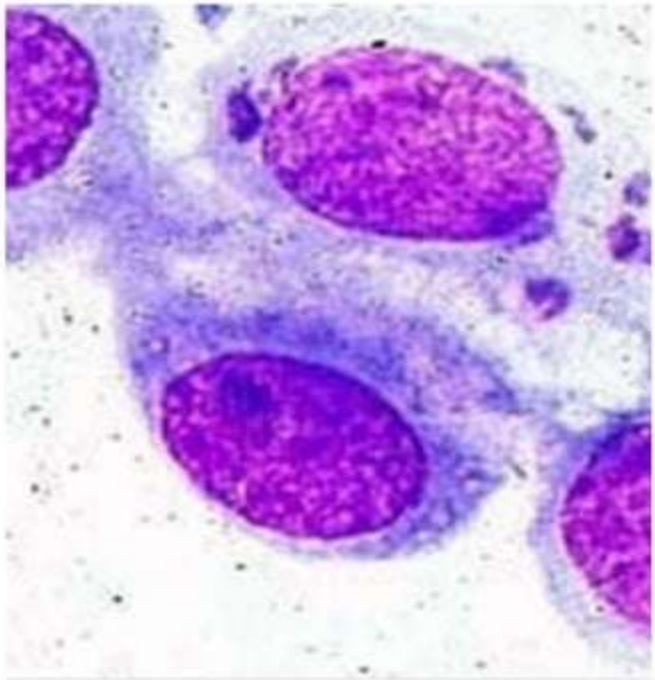
Giemsa staining method

Procedure

- ✓ A smear is made on a clean glass slide and allowed to air dry
- ✓ It is then fixed with absolute methanol for at least 5 min and dried again.
- ✓ It is then covered with the freshly prepared diluted Giemsa stain for at least 1 h.
- ✓ The slide is rapidly rinsed in 95% ethanol to remove excess dye and then dried
- ✓ It is then examined microscopically under 100X objective lens.

Result: The inclusions stain blue or purple.

(https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5095010/)



Iodine staining method

☐ Iodine staining method

Procedure

✓ A smear is made and allowed to air dry

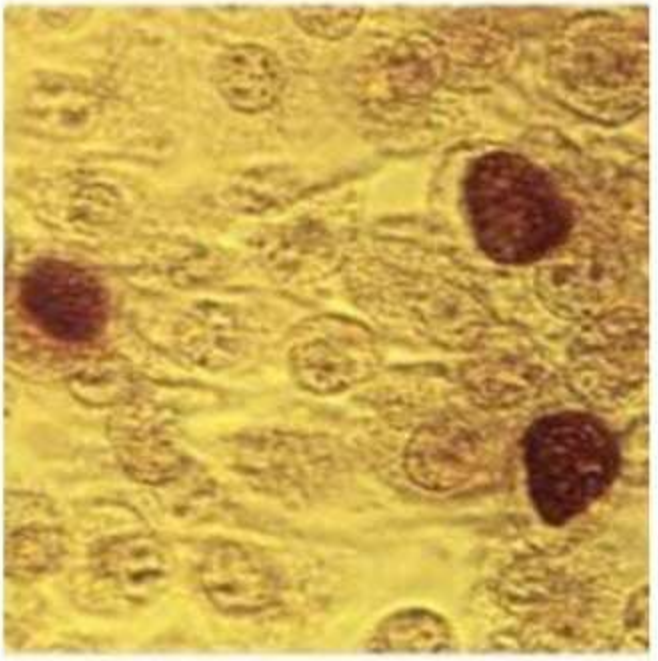
✓ The smear is then fixed in absolute alcohol

✓The smear is then covered with Lugol's iodine for 3-5 min

✓ A cover slip is then placed over the slide and examined as a wet mount

Result:The glycogen content of the inclusion body appears brown.

(Ochei and Kolhatkar, 2007)



Cell culture method

- Cell culture technique

✓ The Clinical specimen is inoculated onto cycloheximide-treated monolayer cultures (McCoy cells).

✓ Inoculation involves centrifugation of the specimen onto the cell monolayer followed by incubation for 48 h to 72 h and staining for intracytoplasmic inclusions.

Ripa and Mardh, (1977)

Direct Fluorescence Antibody method

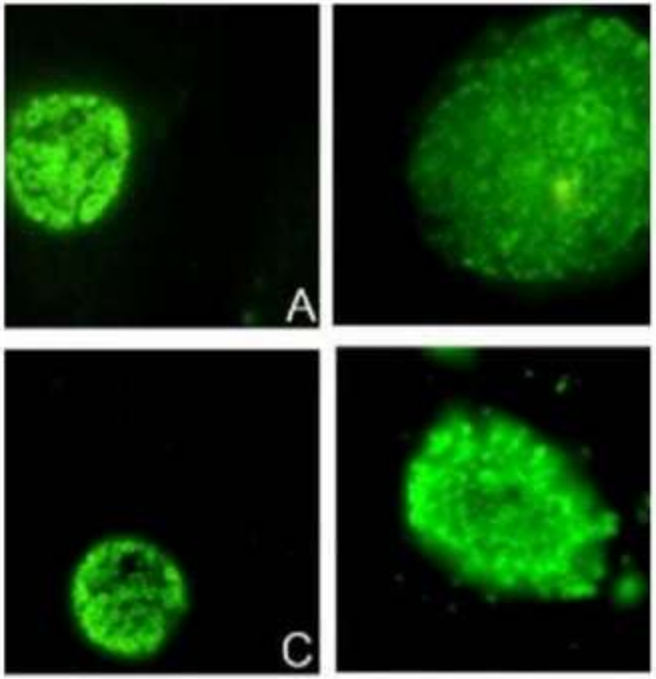
■Antigen detection

☐ Direct Fluorescence Antibody Method

✓This method involves centrifugation of the transport medium containig the sample

✓ Preparation of a slide from the sediment

✓ And staining with the fluorescent labelled antibody reagents. This is often used as a confirmatory test for positives results in other tests.



Chernesky, (2005)

Conclusion

- ✓*Chlamydia trachomatis* is an obligate intracellular gram negative coccoid bacteria which cannot reproduce out side the host cell and also depends on the host for its energy source.
- ✓ It is one of the fastest sexually transmitted bactria world wide.
- ✓It cannot be isolated in the lab using the routineM/C/S method.
- ✓The dangers associated with this bacteria include infertility, HIV infection,cervical cancer among others. Despite the bacteria being hard to isolate, still it can be diagnosed in the lab using some techniques which are sipmple,cheap and readily available.

Recommendation

- ✓ Diagnosis for *Chlamydia trachomatis* should be included among the routine samples processed here in our medical microbiology laboratory here at FMC especially because patients negative for other infectious or sexually transmitted bacteria, may have infection with this strange organism.

- ✓ I would also like to recommend that a research on this bacteria should be carried out especially here at FMC or Kebbi state at large so that we can have a published data on the prevalence of this bacteria in this region.

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