



MICROBIOLOGY
TEAM 432



Microbiology (Practical)



Color
guide:

- Very important
- Additional information
- Male doctor's notes
- Female doctor's notes

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Case 1:

It is about one week after the Hajj time, Mr. Mohammed Khan, a Pakistan citizen has completed the **Hajj** holy duty and is preparing to go home. A day before his travel he present to the emergency department (A & E) at Al Noor Hospital in Makkah because **of headache, vomiting and high temperature**. On clinical examination he has **a rash** on his body, (see the picture provided). Mr. Khan’s relatives who has brought him to the Hospital mentions that Mr. Kahan received **vaccination required for Hajj, a day before his travel for Hajj**.

The doctor in the emergency department takes a detailed history and conducts a clinical examination. Because of clinical findings, he decided to do **lumber puncture**. The result of the lumber puncture are shown in below:

CSF	Patient’s Result	Normal Range
Appearance	Turbid	Clear
WBC and differential	1400 per mm³ Mainly polymorphnuclear leucocytes (80%)	Few (<5 cells/mm ³)
Protein	5.0	0.1-0.4 g/L
Glucose	1.3	3.0-4.5 mmol/L
chloride	110	115-130 mmol/L

Q1: What is your diagnosis?

Acute **bacterial** or pyogenic meningitis

Q2: What is the most likely infection responsible?(Select only one)

- Bacterial infection (**one of 3 capsulated bacteria either Strep.pneumo,N.menin or H.Flue**)

Q3: What is your justification for your answer to question two?

From the table Turbid CSF, ↑ ↑ ↑ WBC polymorphnuclear leucocytes, ↑ ↑ protein, ↓ ↓ glucose, ↓ chloride.

Q4: What further investigation would you like to do at this stage?

A- CSF 1-Gram stain 2-culture 3-Latex agglutination B- Blood culture C- Complete Blood Count CBC

Q5: Mr. Khan has received the required vaccination before his travel, how would you explain his infection despite vaccination?

He should receive vaccine at least 2 weeks prior to travel, Different serotype ie B or Immun system defect

CASE 1:

- Most likely organism: *Neisseria meningitidis*
- Drug of choice: Initially for all bacterial meningitis ceftriaxone +/- vancomycin Then if confirmed *N.meningitidis* ie after culture identification and sensitivity , then Penicillin

skin rash (purpura)

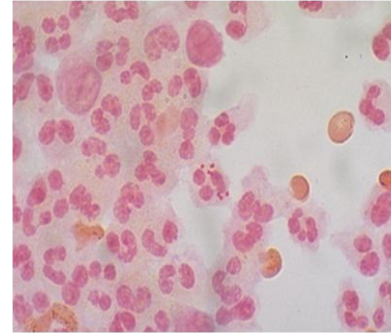


characteristic of meningococcal septicemia, caused by *Neisseria meningitidis*

Normal and turbid CSF



Gram Stain



gram negative diplococci + pus cells

Culture



Chocolate agar

Case2:

A 10-year old boy is brought to the emergency department (A&E) at King Khalid Hospital accompanied by his mother. He has **fever, headache, and vomiting** for the last 2 days. Clinical examination confirmed that he has **meningeal irritation**. The doctor decided to do a **lumber puncture**.

CSF	Patient's Result	Normal Range
Appearance	Clear	Clear
WBC and differential	100 per mm³ Mainly lymphocytes (80%)	Few (<5 cells/mm ³)
Protein	0.5	0.1-0.4 g/L
Glucose	3.7	3.0-4.5 mmol/L
chloride	100	115-130 mmol/L

Q1: What is your most likely diagnosis?

Aseptic or viral meningitis

Q2: What is the most likely infection responsible?(Select only one)

- Mycobacterium Avium
- Fungal infection
- Parasitic infection
- **Viral infection (HSV or Enterovirus)**
- Bacterial infection
- Trepanoma pallidum (Neurosyphilis)
- Mycobacterium tuberculosis

Q3: What is your justification for your answer to question two?

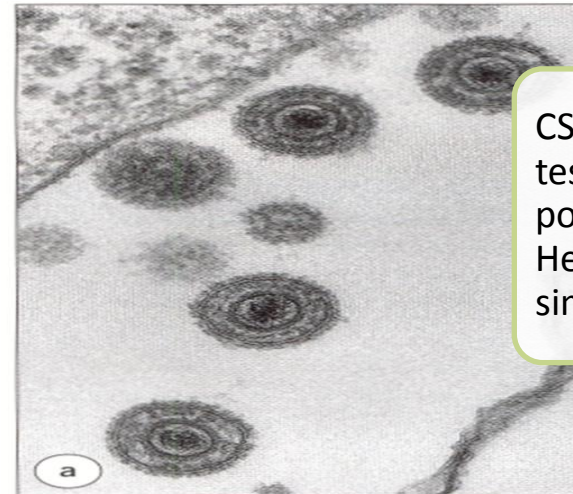
Clear CSF, ↑ WBC lymphocytes, ↑ protein, Normal glucose, ↓ chloride.

Q4: What further investigation would you like to do at this stage?

PCR, EM (in addition to these 2 mention the investigation of acute bacterial meningitis as well)

Treatment for Herpes: Acyclovir

Microbiological Finding



CSF Molecular testing is positive for Herpes simplex type II

Case3:

A 65-year-old is referred from a general practitioner because of **headache, fever, excessive sweating at night, and weight loss over the last 4-5 months**. He has **lost his appetite** for food. On examination, there is **neck rigidity**. Laboratory tests including blood count, serum and electrolytes, blood urea, creatinine and **blood culture** are all normal. The doctors decides to do a lumber puncture.

The results of the **lumber puncture** are shown below:

CSF	Patient's Result	Normal Range
Appearance	Turbid	Clear
WBC and differential	300 per mm ³ Mainly lymphocytes	Few (<5 cells/mm ³)
Protein	0.8	0.1-0.4 g/L
Glucose	2.0	3.0-4.5 mmol/L
chloride	115	115-130 mmol/L

Q 1:What is your most likely diagnosis?

TB or chronic meningitis

Q 2:What is the most likely infection responsible?(Select only one)

- **Mycobacterium tuberculosis**

Q3:What is your justification for your answer to question two?

Turbid CSF, ↑ WBC lymphocytes, ↑protein, ↓glucose, normal chloride and history

Q4:What further investigation would you like to do at this stage? (State 3)

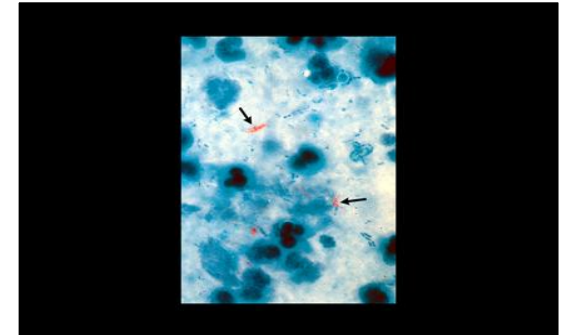
-CSF sample: Gram stain, **Bacterial culture, Blood culture**, Latex agglutination, **AFB stain, TB Culture, -Tuberculin skin test -Chest x-ray (You can say TB PCR optional)**

Q5: what is the treatment?

- 1-Rifampicin
 - 2- Isonized(INH)
 - 3- Ethambutol
 - 4-Pyrazinamide
- } for 2months

- then
- Rifampicin
 - INH
- } for 4-6months
- microbiology team

Acid Fast Smear



TB Culture





Case 4:

A 59 y.o. male farmer with sudden onset of fever, headache, neck stiffness and vomiting.

Peripheral Blood count:

12,800 wbc's/mm³ (73% neutrophils; 12% bands)

Cerebrospinal Fluid:

- 3520 wbc's/mm³ (100% neutrophils)
- Glucose: <1 mg/deciliter
- Protein: 368 mg/deciliter

What is the most probable Pathogen isolated?

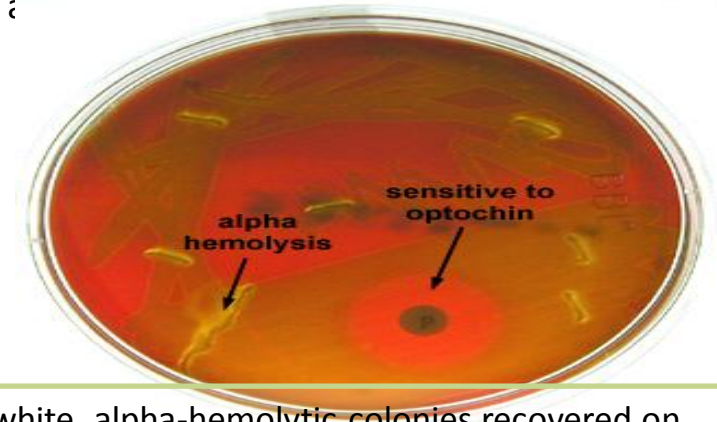
Streptococcus Pneumoniae

What is your most likely diagnosis?

Bacterial meningitis

Drug of choice?

Ceftriaxone + Vancomycin



Gray white, alpha-hemolytic colonies recovered on blood agar with increased CO₂ from spinal fluid sediment was Optochin sensitive

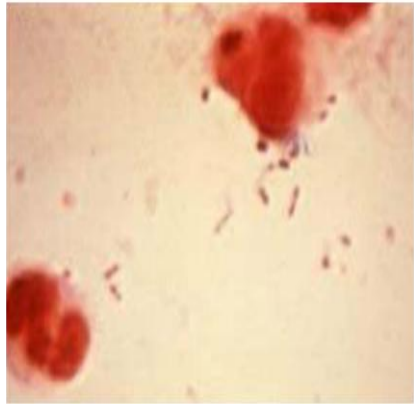
Bacterial meningitis: Pneumococcal Meningitis



Direct gram stain of a CSF deposit shows gram-positive diplococci with lanceolate shape and polymorphneoclear leucocytes

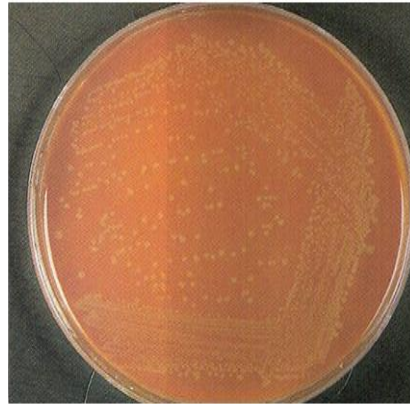
Bacterial meningitis: H. influenzae Meningitis:

- is caused mainly by hemophilus influenzae type b
- Gram negative coccobacilli
- Requires X & V growth factors for growth
- The optimum growth temperature is 35°C - 37°C in 5% CO₂



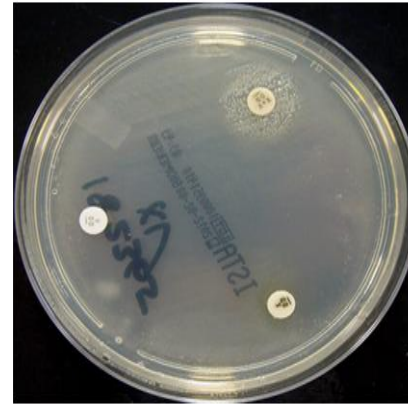
Gram stain :CSF Deposit

Gram-Negative coccobacilli with many polymorphonuclear leucocytes



Culture: H.influenzae on chocolate agar

colonies are convex, smooth, pale, grey or transparent



X , V, and X+V factors

H.influenzae Growth around XV factors requires both factors XV



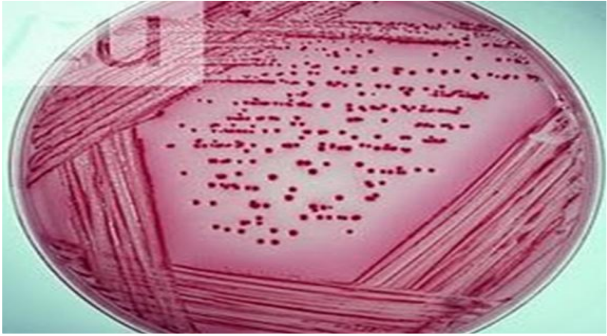
Satellitism

Growth on blood agar showing satellitism adjacent to a streak of S.aureus. S.aureus producing surplus factor increasing growth of adjacent H.influenzae



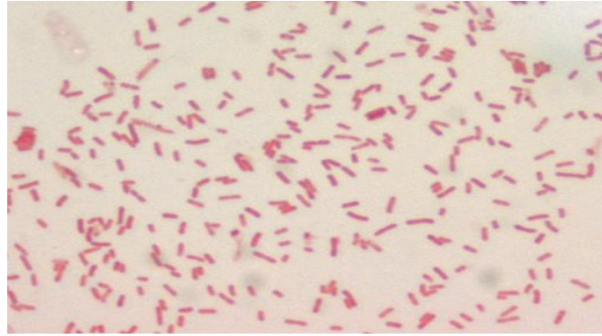
Bacterial meningitis: *E. coli*

Neonatal meningitis is most common due to Colonization of infants with *E. coli* at delivery



Escherichia coli on MacConkey agar plate

appear pink as they ferment lactose



Gram stain

gram negative bacilli



For any problems and suggestions please contact:

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Thank you