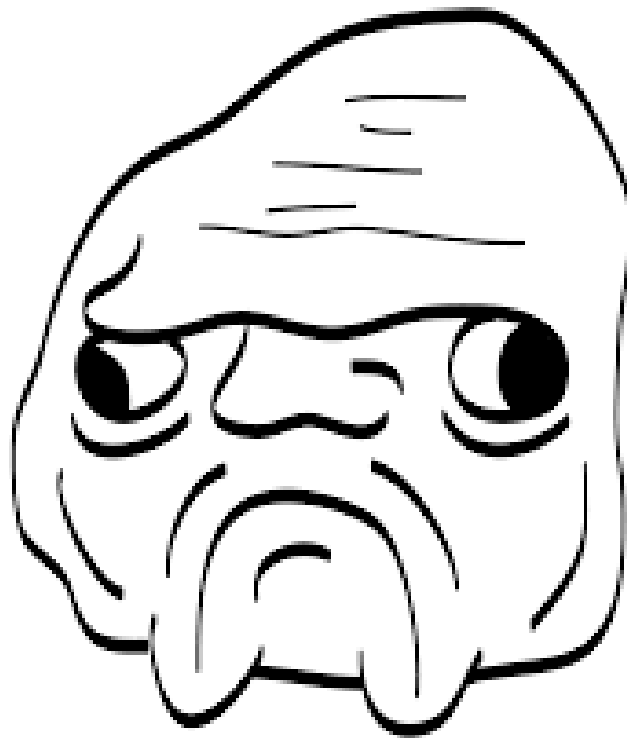


mICrOBiOLoGY
434

Practical



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 Below.

CSF	Patients result	Normal range
appearance	Turbid	Clear
WBC & deferential	1400 mm ³ Mainly PMN (80%) [↑]	Few cells
Protein	5 [↑]	0.1 – 0.4
Glucose	1.3 [↓]	3 - 4.5
chloride	110 [↓]	115 - 130

Q1: What is your diagnosis ?

Acute pyogenic meningitis

Q2: What is the most likely infection responsible? [select one]

Mycobacterium Avium

Fungal infection

Parasitic infection

Viral infection

Bacterial infection

Trepanoma pallidum (Neurosyphilis)

Mycobacterium tuberculosis

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

From the table: Turbid CSF, increased WBC polymorphnuclear leucocytes, increased protein, decreased glucose & decreased chloride

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

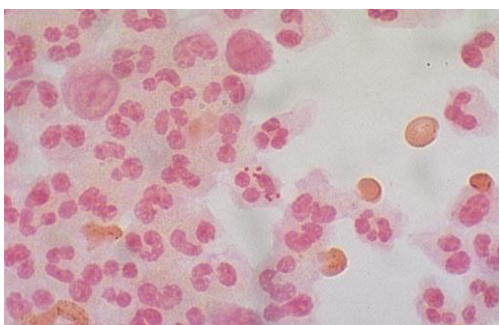
CSF (Gram stain, culture and Latex agglutination) - Blood culture - Complete Blood Count CBC

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

Two theories:

1) He might take the vaccination for 2 serotypes (A &C) and he may be infected by W135.

2) He should take the vaccination before travelling by two weeks at least.



Gram **negative** diplococci + pus cells



Chocolate agar



characteristic of meningococcal septicemia, caused by **Neisseria meningitidis**

CASE 2

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 **lumbar puncture**

CSF	Patients result	Normal range
appearance	Clear	Clear
WBC & deferential	600 mm ³ Mainly Lymphocytes (80%) [↑]	Few cells
Protein	0.5 [↑]	0.1 – 0.4
Glucose	3.7 [N]	3-4.5
chloride	100 [↓]	115-130

Q1: What is your diagnosis ?

Aseptic or viral meningitis

Q2: What is the most likely infection responsible? [select one]

Mycobacterium Avium

Fungal infection

Parasitic infection

Viral infection

Bacterial infection

Trepanoma pallidum (Neurosyphilis)

Mycobacterium tuberculosis

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

From the table:

Clear CSF

high WBC lymphocytes

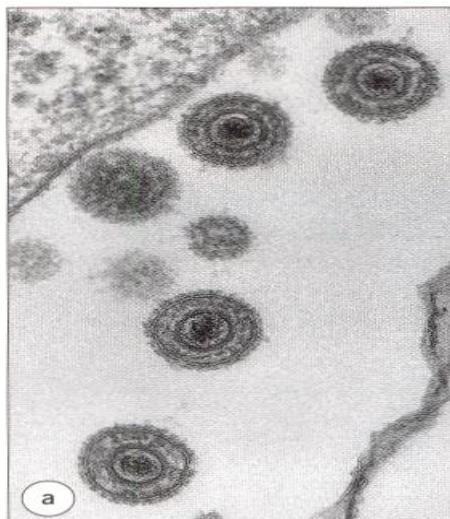
slightly high protein

Normal glucose

low chloride

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

PCR – EM + CSF (Gram stain, culture and Latex agglutination) - Blood culture - Complete Blood Count CBC



CSF Molecular testing is positive
for **Herpes simplex type II**

[treated w/ acyclovir]

CASE 3

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

Peripheral blood count:

*12,800 WBCs/ mm³ [73%] → Neutrophils [12 %] → bands

CSF:

*3520 WBCs/ mm³ [100%] → Neutrophils

*Glucose: <1 mg/deciliter

*Protein: 368 mg/deciliter

Q1: What is your diagnosis ?

Acute pyogenic meningitis

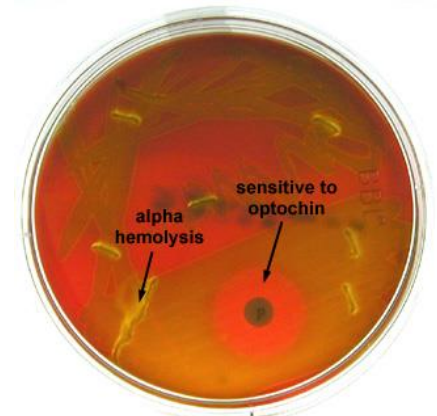
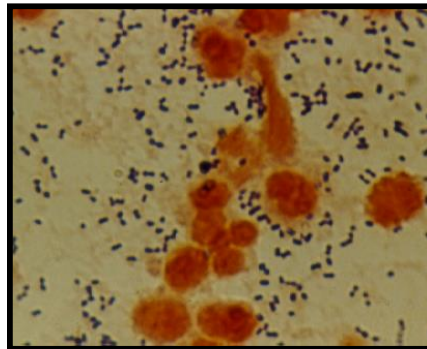
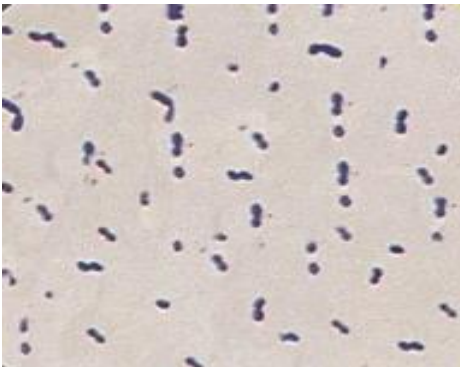
Q2: What is the most likely pathogen isolated ?

Streptococcus pneumoniae

Q3: What is the probable treatment for this case?

Ceftriaxone + Vancomycin

Microbiological finding:



Pneumococci

Gram-**positive** cocci in pairs
lanceolate-shaped

Direct gram stain of a CSF deposits shows
gram-**positive** diplococci with
lanceolate shape and
polymorphonuclear leucocytes

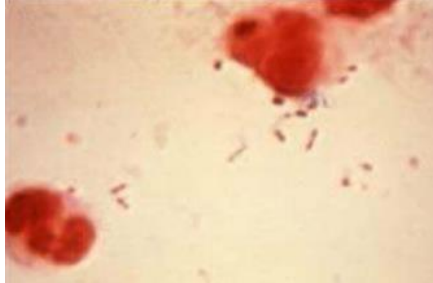
* Gray white, **alpha**-hemolytic colonies
* recovered on sheep **blood agar** with increased CO₂ from spinal fluid
* sediment was **Optochin sensitive**

Bacterial meningitis: [*Hinfluenza Meningitis*]

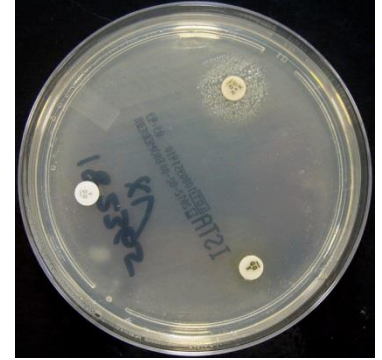
- * caused mainly by hemophilus influenzae **type b**
- * Gram **negative** coccobacilli
- * Requires **X & V** growth factors for growth
- * The optimum growth temperature is **35°C - 37°C** in 5% CO₂



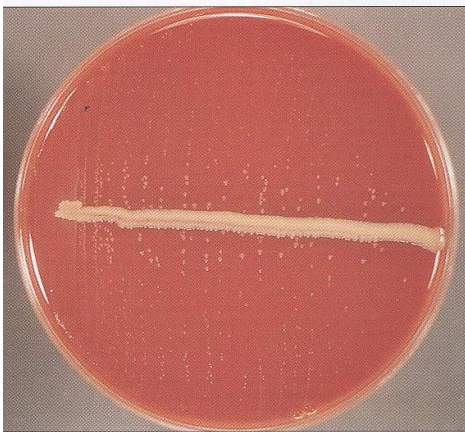
Culture: *H. influenzae*
Grow well on **chocolate agar**
at **35°C - 37°C** in 5% CO₂, colonies are
convex, smooth, pale, **grey** or
transparent



Gram stain :CSF Deposit
Gram-**Negative** coccobacilli with
many polymorphneuclear
leucocyte



H. influenzae :
Growth around **X&V factors**
[requires both factors XV → **no**
growth around X or V alone]

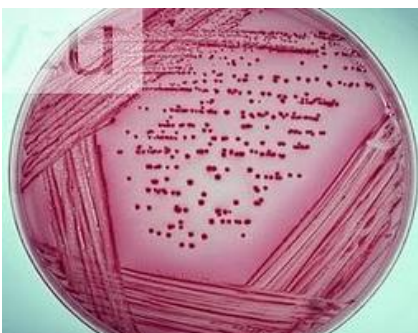


Stellatism:

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 **negative**
bacilli

CASE 4

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	Patients result	Normal range
appearance	Turbid	Clear
WBC & deferential	300 mm ³ Mainly Lymphocytes [↑]	Few cells
Protein	0.8 [↑]	0.1 – 0.4
Glucose	2.0 [↓]	3-4.5
chloride	115 [N]	115-130

Q1: What is your diagnosis ?

TB or Chronic meningitis

Q2: What is the most likely infection responsible? [select one]

Mycobacterium Avium

Fungal infection

Parasitic infection

Viral infection

Bacterial infection

Trepanoma pallidum (Neurosyphilis)

Mycobacterium tuberculosis

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

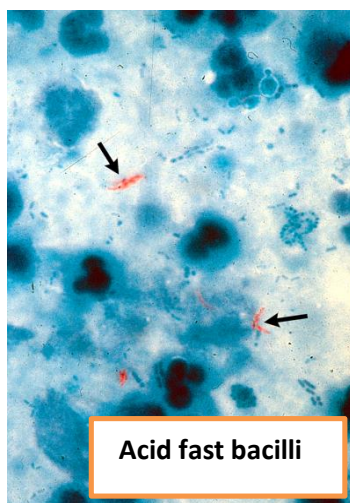
From the table: Turbid CSF, high WBC lymphocytes, high protein, low glucose, normal chloride

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

***CSF sample: Gram stain, Bacterial culture, Blood culture, Latex agglutination, AFB stain, TB Culture**

***Tuberculin skin test**

***Chest x-ray**



Hanan Mohamed Abdulmonem

Good luck <3