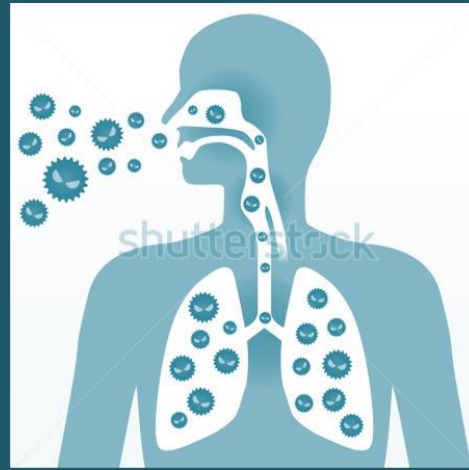
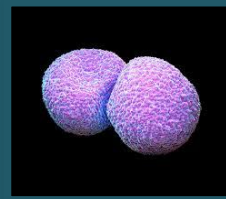
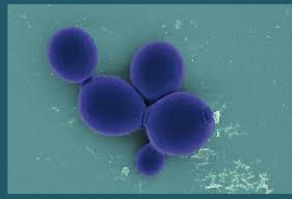


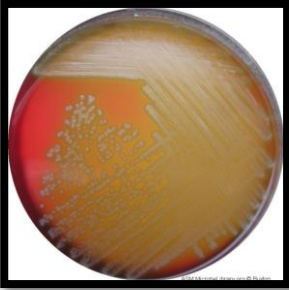

Respiratory Tract Infection Practical







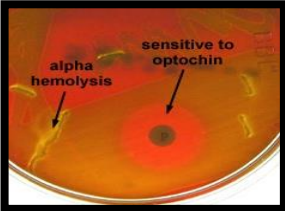
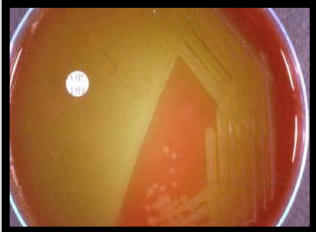
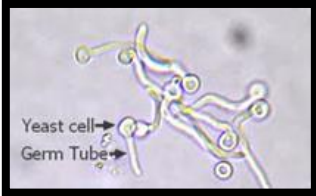
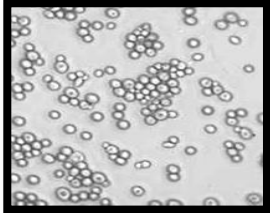
RESPIRATORY BLOCK



Type of Haemolysis on Blood Agar

HAEMOLYSIS TYPE	DESCRIPTION	IMAGE
Alpha haemolysis	colonies surrounded by partial haemolysis with greenish color	 A petri dish containing a bacterial culture on blood agar. The colonies are surrounded by a partial, opaque, greenish-yellow zone of hemolysis, characteristic of alpha-hemolysis.
Beta haemolysis	colonies are surrounded by a clear zone	 A petri dish containing a bacterial culture on blood agar. The colonies are surrounded by a clear, transparent zone of complete hemolysis, characteristic of beta-hemolysis.

Different Test Used in Lab.

Test	Use	Positive	negative
CATALASE TEST	To differentiate between Staphylococcus & Streptococcus	 <p>Staphylococcus</p>	 <p>Streptococcus</p>
BACITRACIN SUSCEPTIBILITY	To differentiate between Streptococcus (gp.A) & any other group	 <p>Group A Streptococcus Beta-hemolytic Sensitive to Bacitracin</p>	 <p>Beta hemolytic Bacitracin resistant Group B Streptococcus</p>
OPTOCHINSUSCEPTIBILITY	To differentiate between Streptococcus pneumoniae & other alpha haemolysis Streptococcus spec.	 <p>alpha hemolysis sensitive to optochin</p>	
GERM TUBE TEST	FOR IDENTIFICATION OF CANDIDA ALBICANS	 <p>Yeast cell Germ Tube</p>	

Case1



A **5 year boy** was brought to KKUH, outpatient department complaining of fever and sore throat. He had regular vaccination history. On examination his **temp. was 38.5°C**, the tonsil area and pharynx were obviously inflamed with some **foci of pus**.

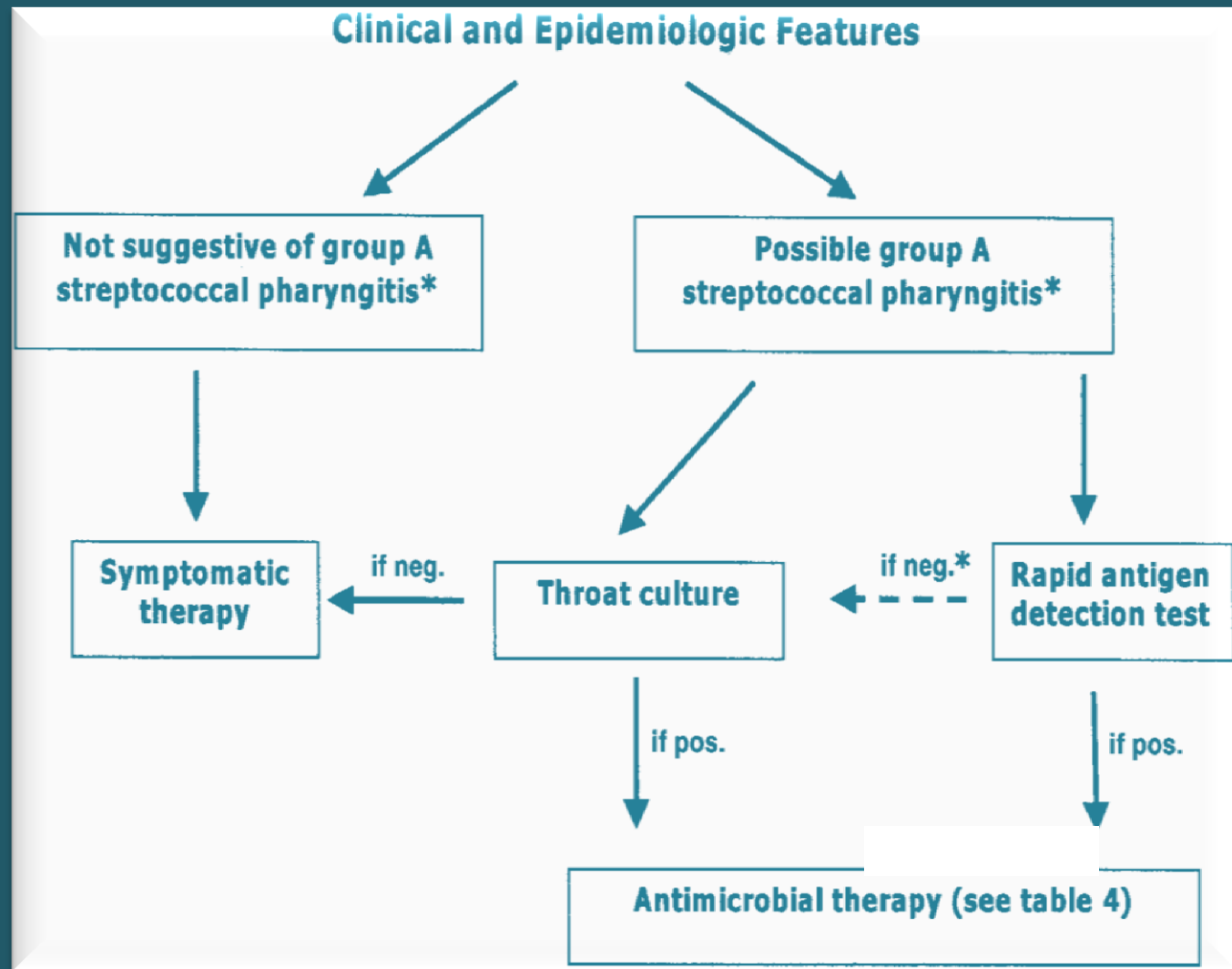
1. What is the differential diagnosis?

2. What investigation should be done?

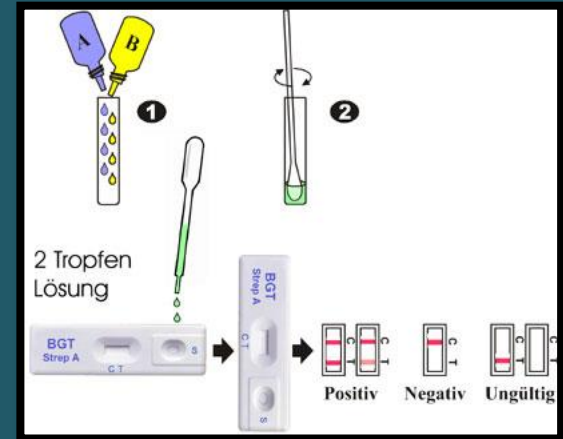
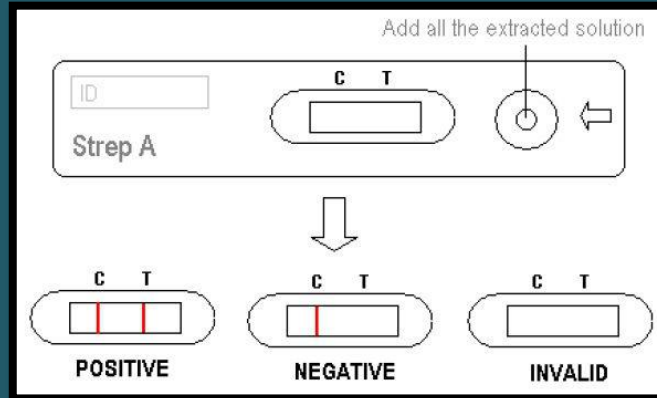
LAB. TESTS

1. (Rapid Antigen Detection Test) RADT
2. CULTURE OF THROAT SWAB ON BLOOD AGAR.
3. CATALASE TEST .
4. GRAM STAIN FROM CULTURE.
5. BACITRACIN SUSCEPTIBILITY TEST.

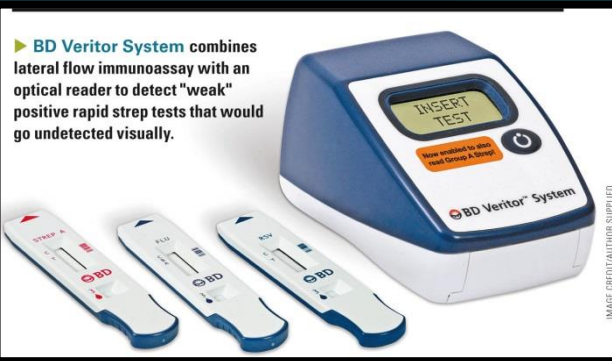
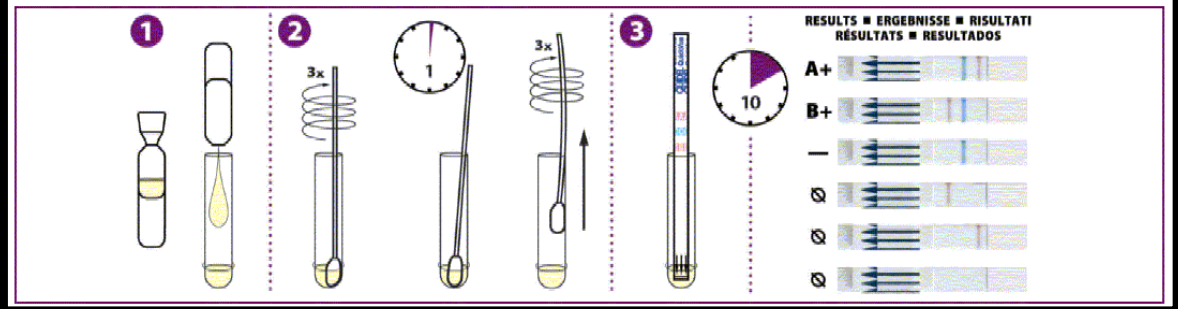
➤ Clinical and Epidemiologic Features



▶▶ RADT



Nasal/Nasopharyngeal swab procedure:



▶ MICROSCOPIC APPEARANCE

Gram stain From culture showed :

Gram positive cocci in Chains



▶ culture

Throat swab culture showed:

Beta haemolysis on blood agar
(colonies are surrounded by a clear zone).



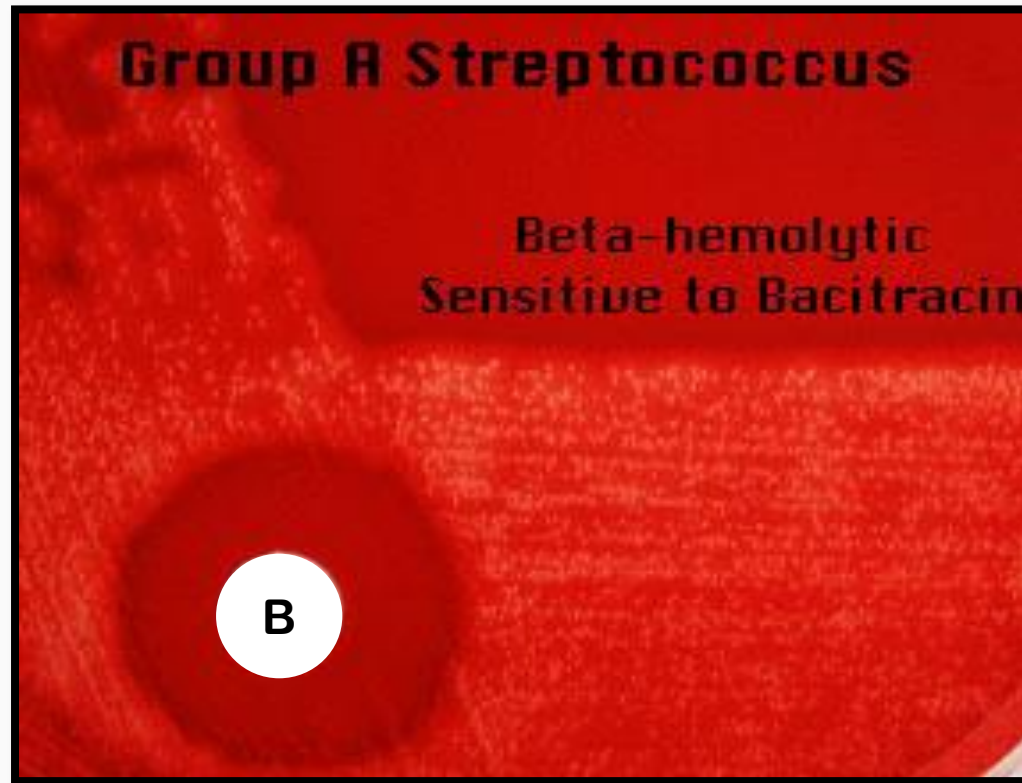
▶▶ CATALASE TEST







Catalase -ve test

▶▶ Bacitracin Susceptibility

Bacitracin susceptible colonies



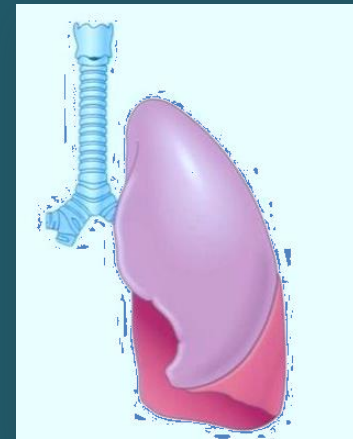
Lab. Tests Results(Summary)

TEST	RESULT	IMAGE
CULTURE ON BLOOD AGAR	Beta haemolysis (colonies surrounded with clear zone of haemolysis)	 A petri dish containing a bacterial culture on blood agar. The colonies are arranged in streaks and are surrounded by a clear, transparent zone of complete hemolysis.
CATALASE TEST	No bubbles → catalase negative	 A close-up of a catalase test. A blue liquid is being added to a bacterial culture in a test tube. No bubbles are visible, indicating a negative result.
GRAM STAIN FROM CULTURE	gram positive cocci in chains	 A micrograph of a Gram stain. The bacteria are stained purple, indicating they are Gram positive. They are arranged in several chains of cocci.
BACITRACIN SUSCEPTIBILITY TEST	Bacitracin Susceptible colonies	 A photograph of a bacitracin susceptibility test. The image shows a red agar surface with a circular well containing a bacterial culture. A clear zone of inhibition is visible around the well, indicating that the bacteria are susceptible to bacitracin. Text on the image reads: "Group A Streptococcus", "Beta-hemolytic", and "Sensitive to Bacitracin".

Streptococcus pyogenes

- 1. What is the likely identity of the organism?**
- 2. What is the best antibiotic therapy for this child?**
- 3. If not treated what complication may this child have after 6 weeks period?**

Case2



A 28 Year Old Female presented to the accident and emergency of KKUH with a sudden onset of fever, right sided chest pain and productive cough of purulent sputum. On examination her temperature was 39 °C. There were Rhonci and dullness on the right side of the chest X-ray showed massive consolidation on the right side of the chest.

1. What is the differential diagnosis?

2. What investigation should be done?

LAB. TESTS

1. CBC.
2. Gram stain from sputum .
3. Culture of The sputum on blood agar.
4. catalase test.
5. Optochin susceptibility test.
6. Antibiotic susceptibility test

▶▶ X - Ray

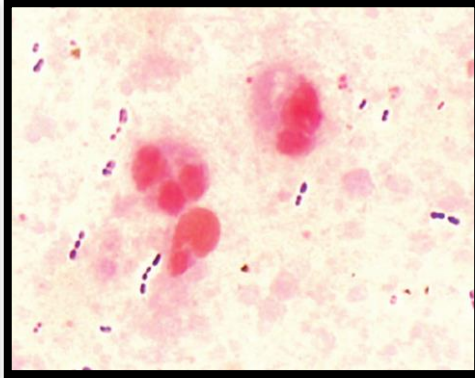
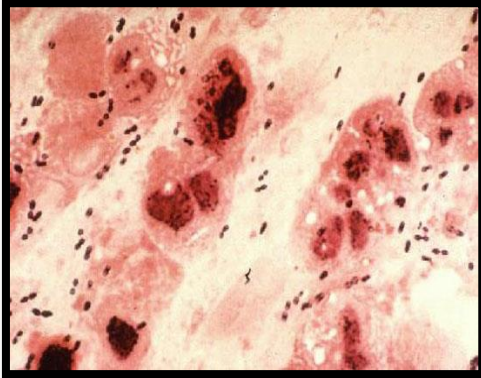
The chest X- ray done showed massive consolidation on the right side of the chest.



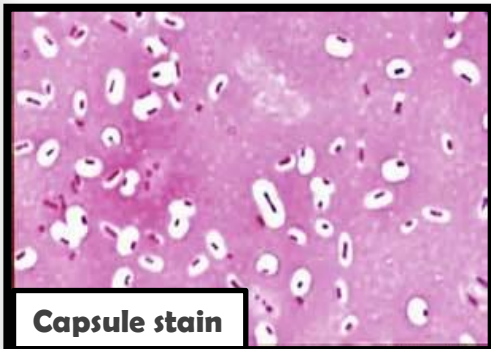
1. What should have been the empirical therapy for this case and why?

▶ MICROSCOPIC APPEARANCE

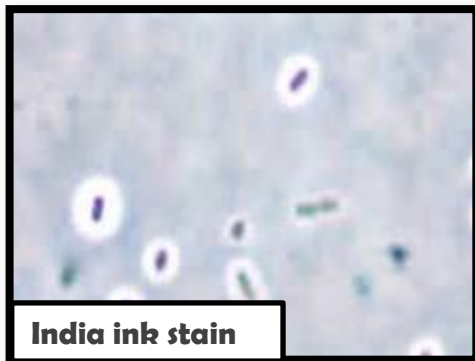
Gram stain From sputum showed :
Gram positive diplococci (arranged in pairs)



Negative Stains showing capsule:



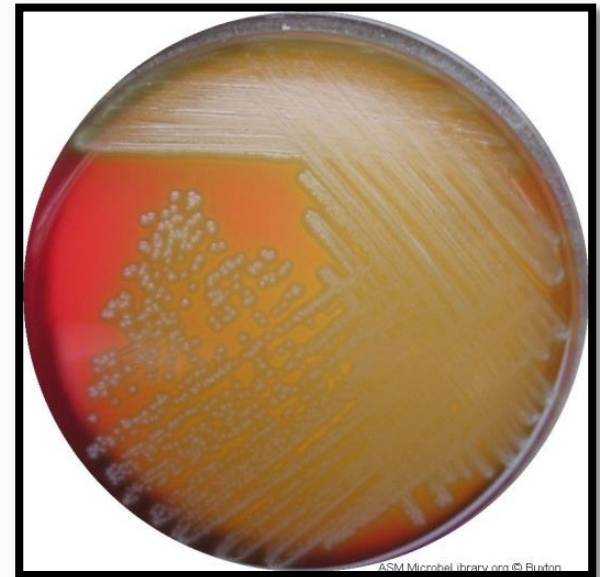
Capsule stain



India ink stain

▶ culture

Sputum culture showed:
Alpha haemolysis on blood agar
(colonies surrounded by partial haemolysis with greenish color).



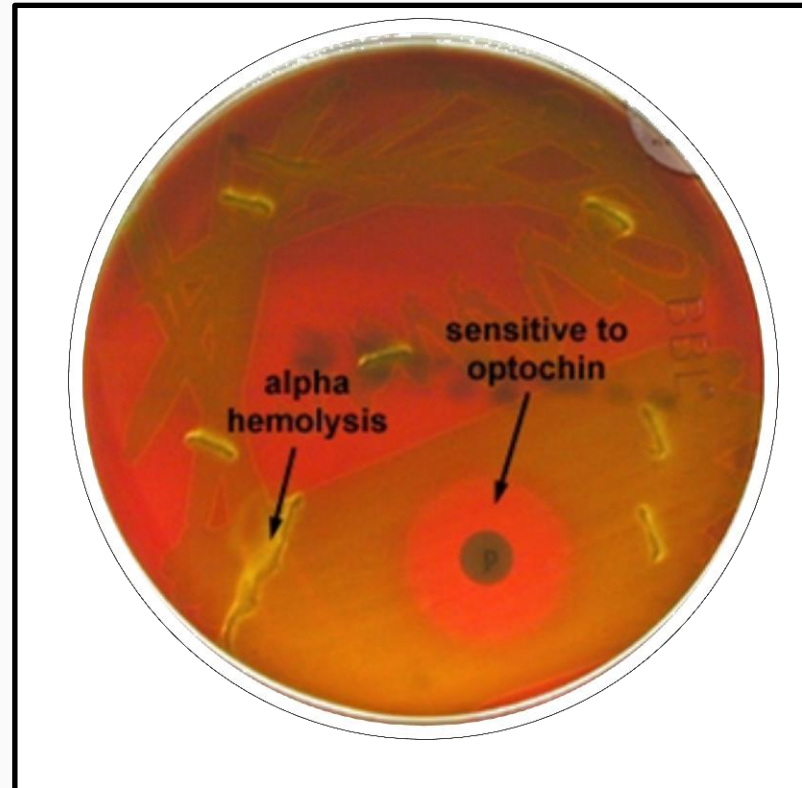
▶▶ CATALASE TEST



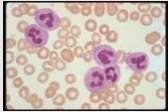


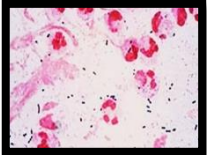
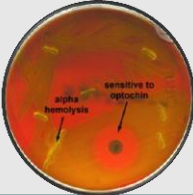
Catalase -ve test

▶▶ Optochin Susceptibility

Optochin susceptible colonies



Lab. Tests Results(Summary)

TEST	Result	
CBC	45,000/ ml 90% of the cells were neutrophils	
CULTURE ON BLOOD AGAR	Alpha haemolysis (colonies surrounded by partial haemolysis with greenish color)	
CATALASE TEST	No bubbles → catalase negative	
GRAM STAIN	gram positive diplococci in pairs	
Optochin SUSCEPTIBILITY TEST	Optochin Susceptible colonies	

Streptococcus pneumoniae (Pneumococcus)

Case3



Abdul Karim is a 45 year old Saudi man who was admitted to KKUH because of 2-3 month history of **loss of appetite, weight loss, and on and off fever** with attacks of **cough**. On examination Abdul Karim looked weak with a temperature 38.6 °C, CVS and Respiratory system examination was unremarkable.

Two days before admission **.he coughed blood (haemoptysis)**, Abdul karim is diabetic for the last 5 years. His father died of tuberculosis at the age of 45 yrs.

1. What is the differential diagnosis?

2. What investigation should be done?

X - Ray

The chest X-ray done showed multiple opacities and cavities



Figure 8. Chest x-ray with bilateral upper lobe opacities (white areas) with multiple cavities including a very large cavity in the right upper lobe (arrows).

Mycobacterium tuberculosis

- On examination Abdul Karim looked weak with a temperature 38.6 °C, CVS and Respiratory system examination was unremarkable.
- The chest X- ray done showed multiple opacities and cavities.
- The ESR was increased (85 m /hour).

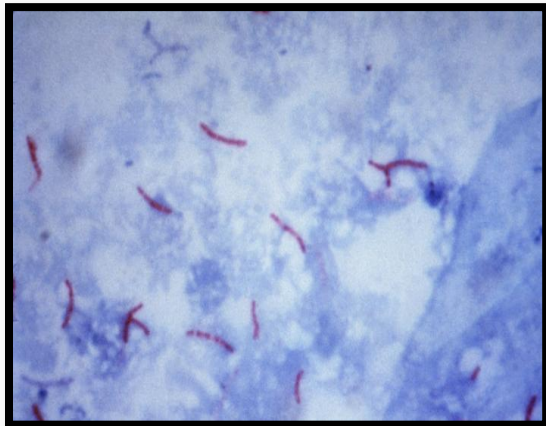
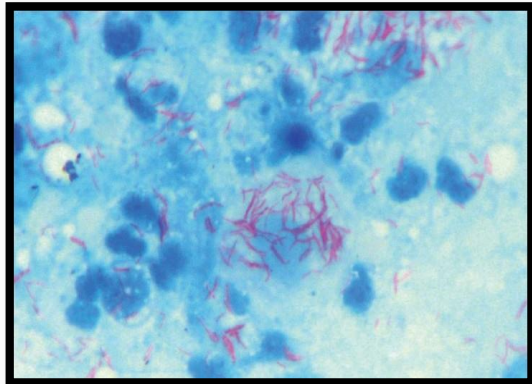
What further tests should be done?

LAB. TESTS

1. Sputum smear showed AFB
2. Culture on L.J medium (selective for mycobacteria.

▶ MICROSCOPIC APPEARANCE

Ziel – Neelsen Stained Smear
From Sputum Showing:
Acid – Fast Bacilli AFB

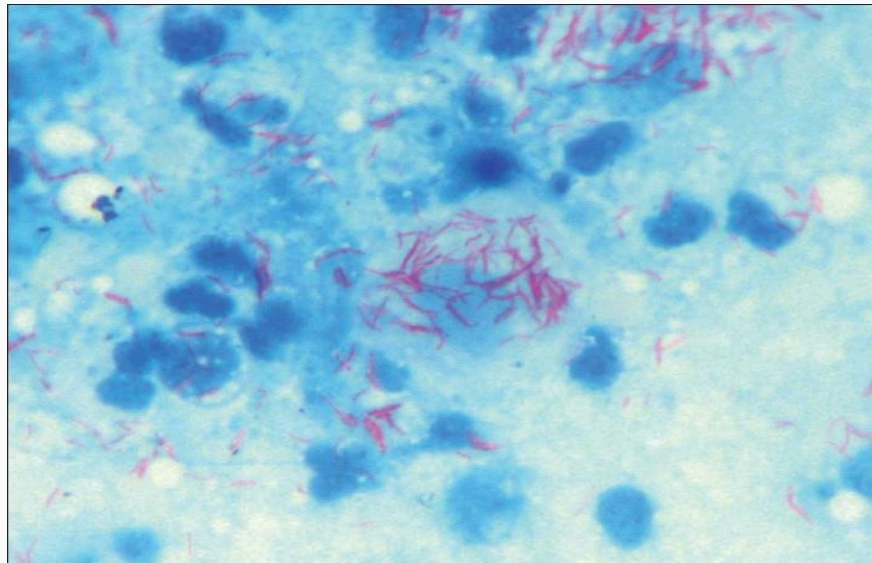


▶ culture

Sputum culture on Lowenstein–Jensen medium (selective for mycobacteria) showed:
showing growth of Rough, Tough and Buff colonies



1. What is the probable diagnosis?
2. How can the diagnosis be confirmed?



Mycobacterium tuberculosis

Case4



A 5 year-old boy attended to the emergency department complaining of **sore throat** , **fever (38.5°C)**, and a noticed **pharyngeal pseudomembrane**

1. What is the differential diagnosis?

2. What investigation should be done?

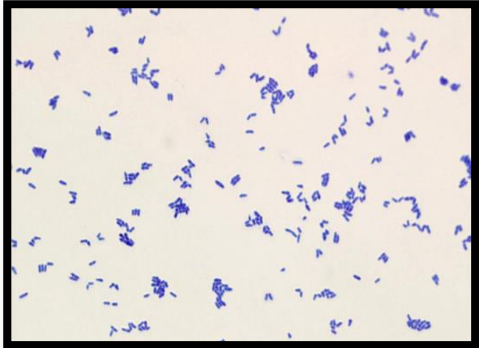
LAB. TESTS

1. Throat swab culture on blood tellurite.
2. Gram stain From culture.
3. ELEK test

▶ MICROSCOPIC APPEARANCE

Gram stain From culture showed :

Gram positive bacilli (chains' litter appearance)



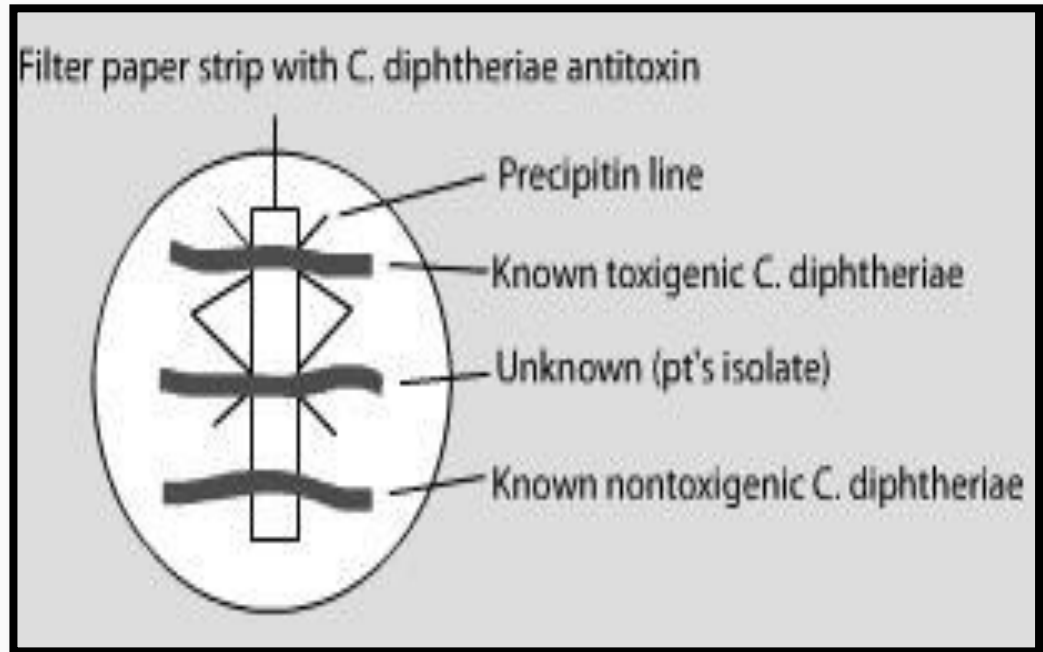
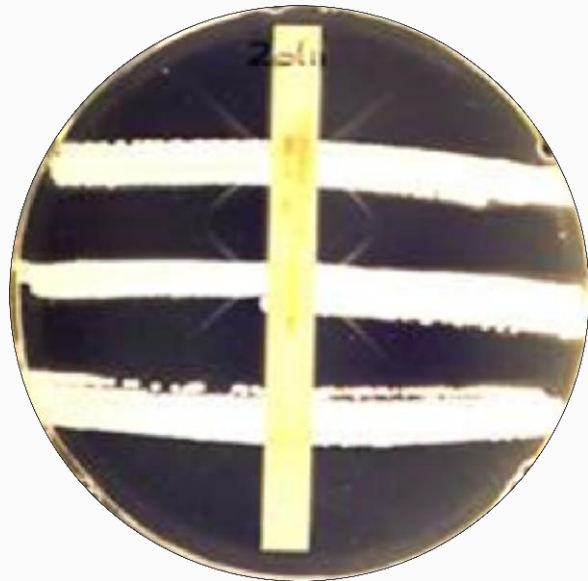
▶ culture

Throat swab culture on blood tellurite showed: Black color colonies



Corynebacterium diphtheriae

▶▶ ELEK TEST

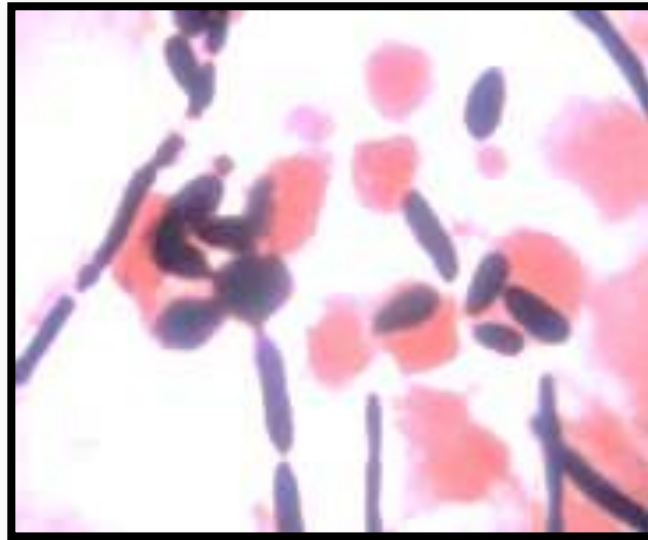


Toxin from culture of *C. diphtheriae* diffused and react with the diphtheria antitoxin diffused from strip and produce precipitation lines → which demonstrate positive test (Diphtheria exotoxin production)

- 1. What is the likely identity of the organism?**
- 2. What is the best antibiotic therapy for this child?**
- 3. what complication may this child develop?**

Case 5

A 45-year old women who underwent bilateral lung transplant developed fever and respiratory failure 4 days post-operatively. She received immunosuppressive therapy. Gram stain of lung tissue biopsy shown below figer:



1. What is the differential diagnosis?

2. What investigation should be done?

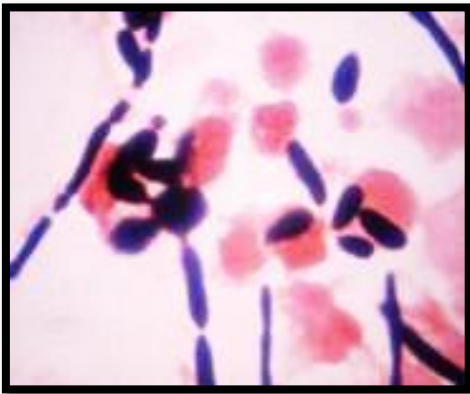
LAB. TESTS

1. Gram stained of lung tissue.
2. Culture from sputum on SDA.
3. Germ tube test.
4. chlamydospore test.

▶ MICROSCOPIC APPEARANCE

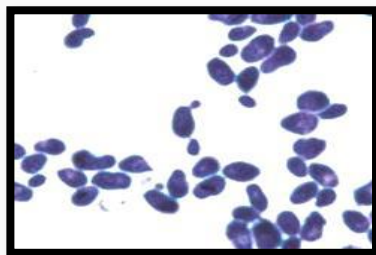
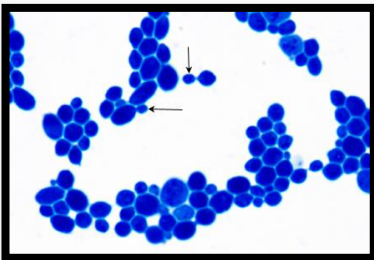
1- Gram stained of lung tissue showed :

Budding yeast cells & pseudohyphae.



2- Gram stain From culture showed :

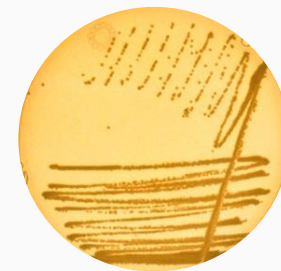
Gram positive oval budding yeast cells.



▶ culture

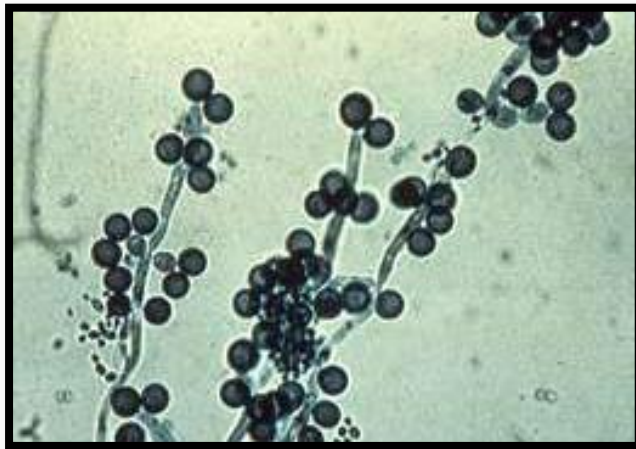
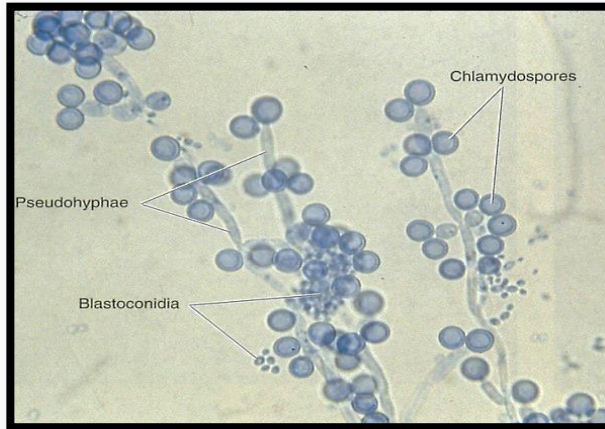
Culture from sputum on SDA (Sabouraud's Dextrose Agar) showed:

Cream color colonies.



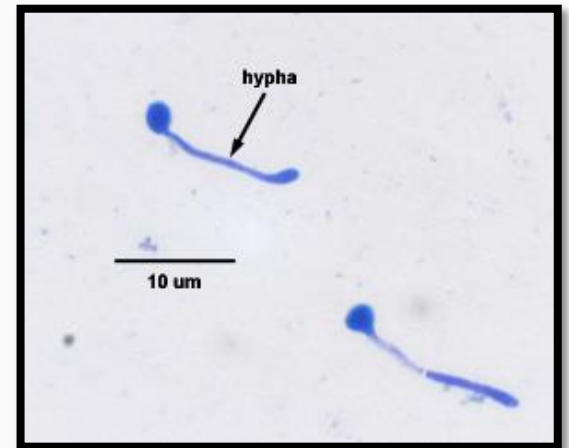
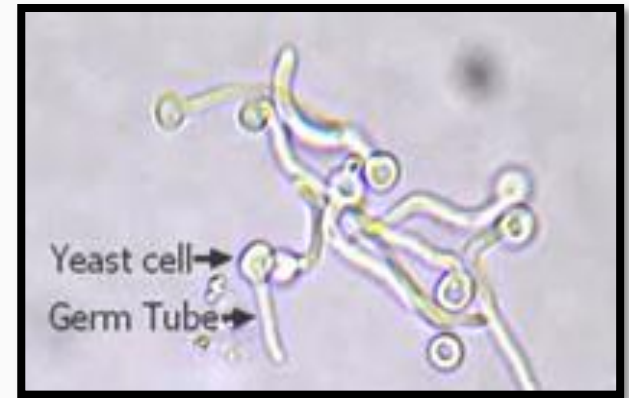
▶ CHLAMEDOSPORE TEST

CULTURE ON CORN MEAL AGAR



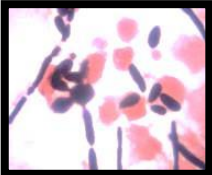


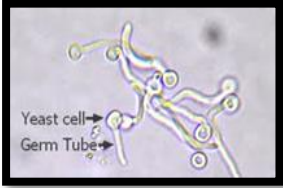
+Ve Test

▶ GERM TUBE TEST



+Ve Test

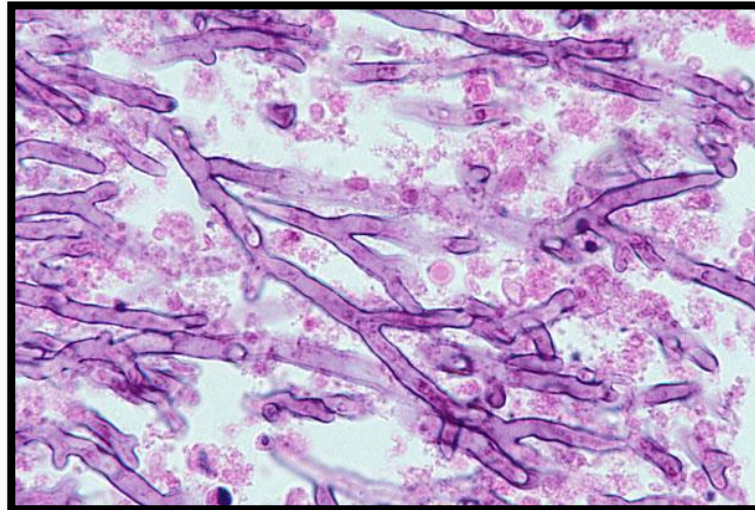
Lab. Tests Results(Summary)

TEST	Result	
Gram stained of lung tissue	Budding yeast cells & pseudohyphae.	
CULTURE ON SDA	Cream color colonies	
CHLAMEDOSPORE TEST	Chlamydospores, blastosconidia and pseudohyphae	
GERM TUBE TEST	Germination of tube	

Candida albicans

Case 6

A 15-year-old girl who recently diagnosed as acute leukemia developed prolonged granulocytopenia (less than 100/ μ L) and refractory fever for 14 days and pulmonary signs or symptoms of pneumonia. Lung biopsy showed the below figure:



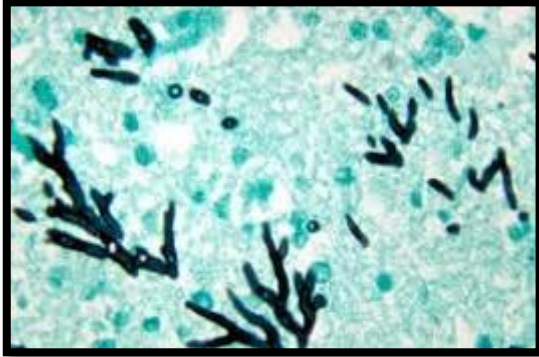
LAB. TESTS

1. Methenamine silver (GMS).
2. H&E Stain.
3. Culture from sputum on SDA.
4. LPCB preparation from culture

▶ MICROSCOPIC APPEARANCE

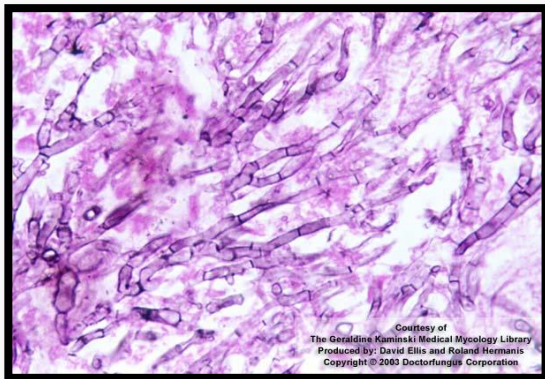
1- Methenamine silver (GMS) stained tissue section of lung showing:

Dichotomously branching fungal element.



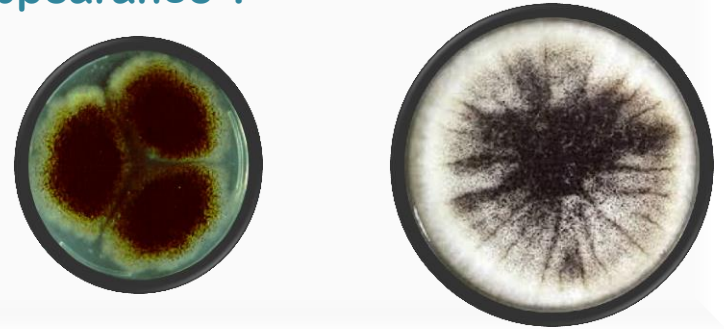
2- Methenamine silver (GMS) stained tissue section of lung showing:

Dichotomously branching fungal element.

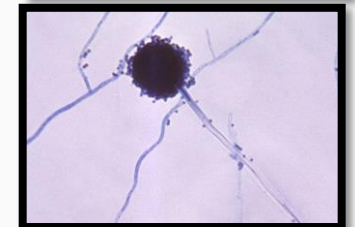
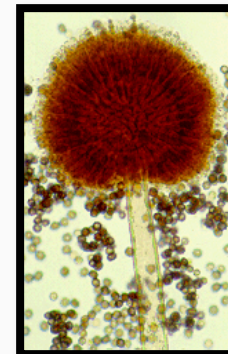


▶ culture

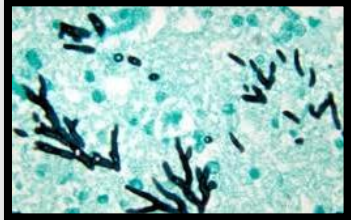
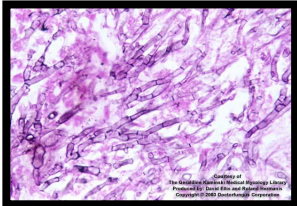
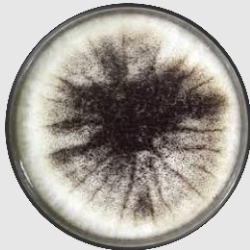

Culture from sputum on SDA
(Sabouraud's Dextrose Agar)
showed: “salt and pepper appearance”.



LPCB preparation from culture showed :



Lab. Tests Results(Summary)

TEST	Result	Images
Methenamine silver (GMS) tissue stain	Dichotomously branching fungal element	
H&E tissue Stain	Dichotomously branching fungal element	
Culture	Salt and pepper appearance	
LPCB preparation from culture	Dark brown conidial heads and true hyphae	

Aspergillus niger