MEDICINE
KING SAUD UNIVERSITY

MICROBIOLOGY436

تمت المراجعة
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LECTURE: Cerebral TB and other chronic Cerebral bacterial infection

Editing File

- Important
- Doctor's notes
- Extra explanation
- **Only F** or **only M**

"لا حول ولا قوة إلا بالله العلي العظيم" وتقال هذه الجملة إذا داهم الإنسان أمر عظيم لا يستطيعه ، أو يصعب عليه القيام به .

OBJECTIVES:

Upon completion of the lecture , students should be able to:

- Etiology
- Identification
- Clinical presentation
- Diagnostic approaches
- Treatment Of chronic cerebral and meningitic infections.

- Symptoms and signs of chronic cerebral and meningetic infection: over long period or can be recurrent

SYMPTOM:	SIGN:
• Chronic headache	• +/-Papilloedema (TB infects base of the skull so it causes papilloedema)
• Neck or back pain	• Brudzinski or Kerning 'positive sign of meningeal irritation
• Change in personality	• Altered mental status, memory loss, etc
• Facial weakness	• Seventh nerve palsy
• Double vision ,visual loss	• 3,4,6 th,Nerve palsy
• Arm and leg weakness	• Ataxia
• clumsiness	• Hydrocephalus

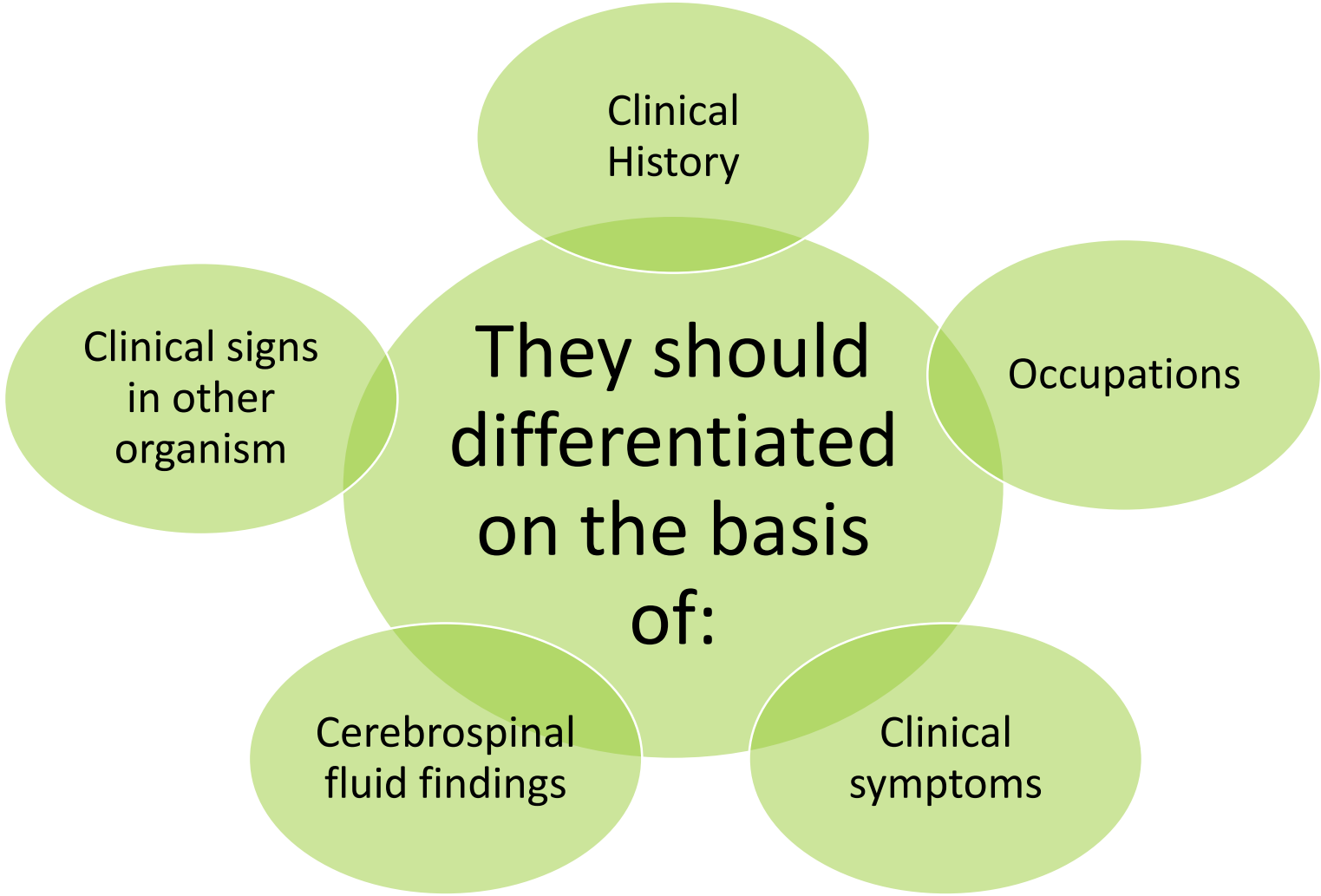
They are similar to symptoms of a brain tumor.

• Microbiological Causes Of Chronic Cerebral Infection And Meningitis:

Bacteria: (most sever) **Most Important.**	Common in saudi :	Brucella-Brucellosis , TB-Tuberculosis
	Partially treated acute meningitis:	*Neisseria Meningitidis , Streptococcus Pneumoniae , Haemophilus influenzae.*
	Others:	Syphilis by Treponema Pallidum, Leptospirosis by L. Ictero haemorrhagica, Lyme Disease by Borrelia burgdorferi - Lyme Disease (not common in Saudi Arabia), Nocardiosis by Nocardia Asteroids e.g. N. Asteroids, Cerebral abscess can also same – preferred as chronic infection.
Fungal:	Cryptococcus neoformans (Aids patients), Candida species (in Saudi Arabia species mainly Candida albicans in immunocompromised patients) , Aspergillus species (cancer patients + very common) , Histoplasma capsulatum. fungal infection doesn't come to normal person, usually has underlying disease.	
Parasitic:	Toxoplasma gonodii (most common , from kittens) , Trypanosoiasis (caused by Trypanosoma brucei gambiense , Trypanosoma brucei rhodesiense , Trypanosoma cruzi Acanthamoeba spp (Rare causes).	
Virus: (less sever)	Some virus can some present as chronic meningitis these include: ✓ Mumps , Herpes simplex , HIV.	

Nocardia is a pyogen which causes brain abscess
Syphilis used to be uncommon, but when HIV arised, with it came back syphilis.

- The most important causes of chronic bacterial cerebral and menigetic infection in Saudi Arabia are :
  - Tuberculosis
  - Brucellosis



- Brucellosis:

Etiology	Brucella Species | Gram -ve Coccobacilli | Brucella Melitensis is the most common in Saudi Arabia
Transmission	Contact with domestic animals or consumption of raw milk and dairy products (camels)
Presentation	● It usually presents with Pyrexia (fever) of unknown organism of intermittent nature. ● The fever is accompanied by night sweating, however, in between the attacks of fever the patient is not very ill. ● Because the symptoms are not specific and flu-like, untreated Brucilla can invade the CNS, causing chronic cerebral infection and meningitis.
Laboratory	CSF culture and Serology.
Treatment	**Two of the following 3 drugs** ● Tetracycline ● Rifampicin ● Cotrimoxazole **Rifampicin and Cotrimoxazole are preferred as they have good penetration power in the BBB.**

• Tuberculosis

Etiology:	Mycobacterium Species (Resist Staining) Mycobacterium tuberculosis which infected 1\3 the human race
Presentation:	• The patient usually presents with fever of long duration You will never have TB without fever. • Symptoms of cough, and coughing blood (Haemoptysis) when the chest is affected. • It can present as meningitis or cerebral infection with chronic neurological symptoms and signs. • Parenchymal CNS involvement can occur in the form of tuberculoma or, more rarely, abscess. • Spinal meningitis,radiculomyelitis, spondylitis, or spinal cord infraction pott's spine and pott's paraplegia

Classification

Intracranial	**spinal**
• Tuberculous meningitis (TBM). • TBM with Miliary Tuberculosis. • Tuberculous Encephalopathy and Vasculopathy. • Single or multiple space-occupying lesions (Tuberculoma). • Tuberculoma with Miliary Tuberculosis. • Tuberculous abscess	• Pott'sspine. • Pott'sparaplegia. • TuberculousArachnoiditis • (myeloradiculopathy). • Non-osseousspinaltuberculoma. • Spinal meningitis.

- Chronic cerebral and meningeal infection can produce:-
  - Neurological disability and, may be Fatal if not treated
  - They usually have Slow insidious onset with progression of signs and symptoms over a period of weeks*
  - They differ from those of acute infection which have Rapid on set of symptoms and signs
  - They are usually diagnosed ,if the neurological syndrome exists for > 4 weeks

*which is a good thing because it gives more time to diagnose

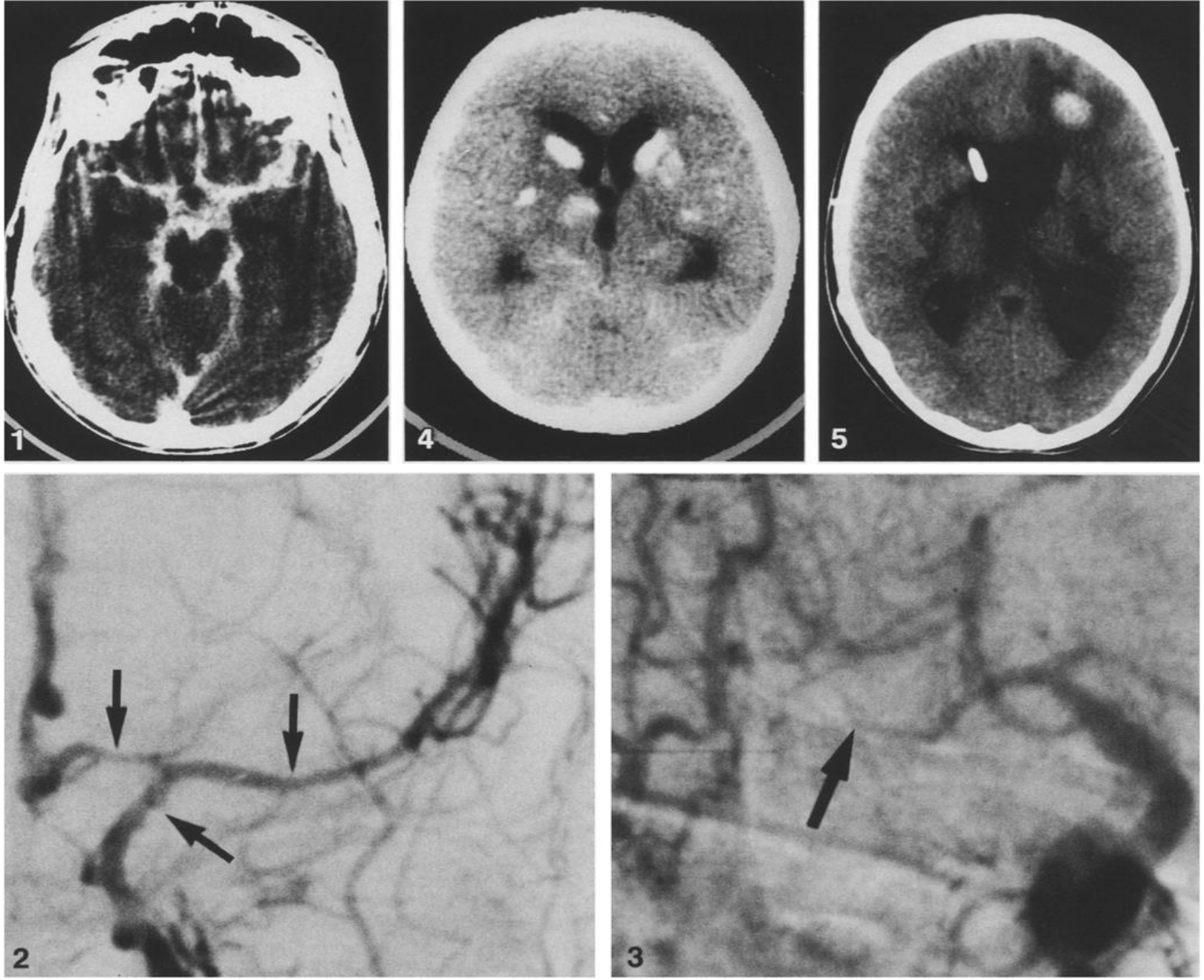
- Diagnosis of chronic cerebral and meningeal infections
  - History for Brucellosis and Tuberculosis
  - Clinical examination
  - Imaging by x- ray or MRI or ultrasound
  - Laboratory findings

- As in acute pyogenic infections, in chronic cerebral and meningeal infections the following CSF finding will be as follows:

CSF Findings
• Increased CSF pressure indicating increased intra cranial pressure. • Increased protein level due to presence of inflammatory substance, dead organism, protein and WBC. • Reduced glucose level (Normally it is 2/3 of serum glucose level). • Increased local white cell count but in chronic infection the differential shows lymphocytosis while in acute infections there is increased % of polymorphonuclear leukocytes. • Gram stain can sometimes show the causative organism. • Z-N Stain (Ziehl-Neelsen stain) can show AFB (acid-fast bacilli) of T.B while modified Z-N can show Nocardia

Diagnosis		
Clinical	**CSF**	**Imaging**
• Fever and headache for >14 days. • Vomiting. • Altered sensorium or • focal neurological deficit. • Mantoux test (Tuberculin skin test) • occupying lesions (Tuberculoma). • Tuberculoma with Miliary Tuberculosis. • Tuberculous abscess	• Microscopy: Z.N. Stain. • Culture: on L.J. or Fluid Medium. • PCR. • Pleocytosis : >20 cells, >60% lymphocytes. • Increased proteins : >100 mg/dl. • Low sugar: <60%. • Malignant cells: should be -ve. (because tb formation a granuloma which a mass so it be confuse with tumor)	• Exudates in basal cisterns or in sylvian fissure hydrocephalus. • Infarcts (basal ganglionic). • Gyral enhancement. If it is meningitis, we would find vascular enhancement • Tuberculoma formation.
Treatment:		
For the first 2 months: Rifampicin + Isoniazid (INH) + Ethambutol + Pyrazinamide **Then, for 4-6 months:** Rifampicin + Isoniazid (INH)		

Extra

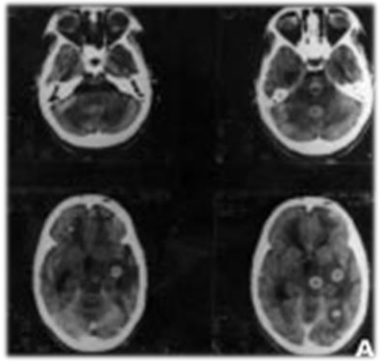


intense enhancement of the basal subarachnoid cisterns in acute/subacute TB meningitis

Case report: disseminated tuberculosis

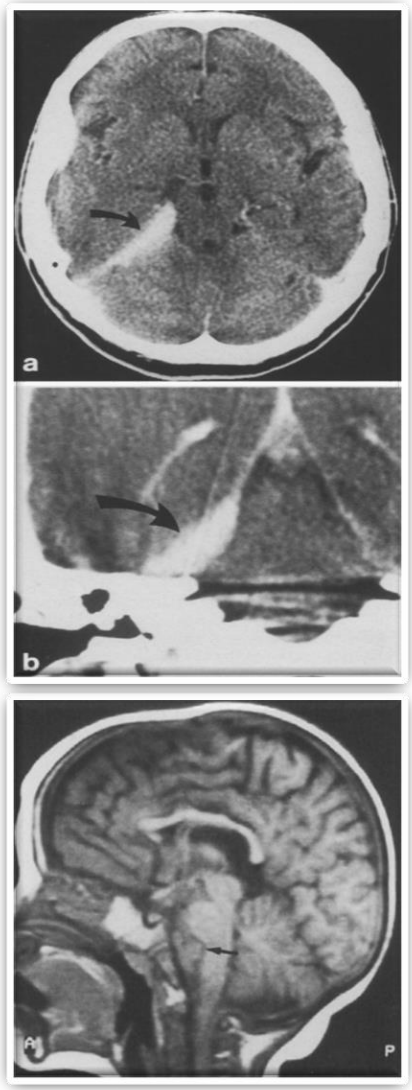
1

2



A 30-year-old woman presented with headache, vomiting and fever (104°F), and feeling disoriented and inattentive for 6 days duration. She was conscious, had lateral rectus palsy along with bilateral papilledema[1]. Left plantar was extended. Neck rigidity and Kernig's sign were present. Other systemic and general examinations were normal. All hematological and serum biochemical parameters, including liver function tests, were normal. Chest X-ray showed miliary[2] shadows in both lungs (figure1). CSF revealed elevated opening pressure, proteins 248 mg/dl, sugar 34 mg/dl (corresponding blood sugar was 98 mg/dl); 204 cells/ml, 15% polymorph, the rest was lymphocytes (85%). CT of the head showed multiple small enhancing lesions in brain parenchyma (figure2). The patient was given antituberculous treatment and corticosteroids[3]. She showed significant improvement in all her symptoms after 15 days.

[1]This means that there is increased intracranial pressure. Possible diagnosis of Acute Pyogenic Meningitis.
[2]Miliary indicates a hematogenous spread, you will notice small spots in the lungs.
[3]When you give steroids to a patient and he/she gets better, this proves the involvement of the immune system as a cause of disease. TB uses the immune system to cause a disease, so to obtain a better result in treatment the anti TB is given with the steroids.



CT demonstrating Tuberculoma

A lumbar myelogram showing spinal block at the level of T9 vertebra, a paraspinal abscess producing spinal block, paraspinal abscess compressing the spinal cord.

EXTRA

A sign indicating the presence of meningitis (inflammation of the meninges covering the brain and spinal cord). The test for Kernig sign is done by having the person lie flat on the back, flex the thigh so that it is at a right angle to the trunk, and completely extend the leg at the knee joint.

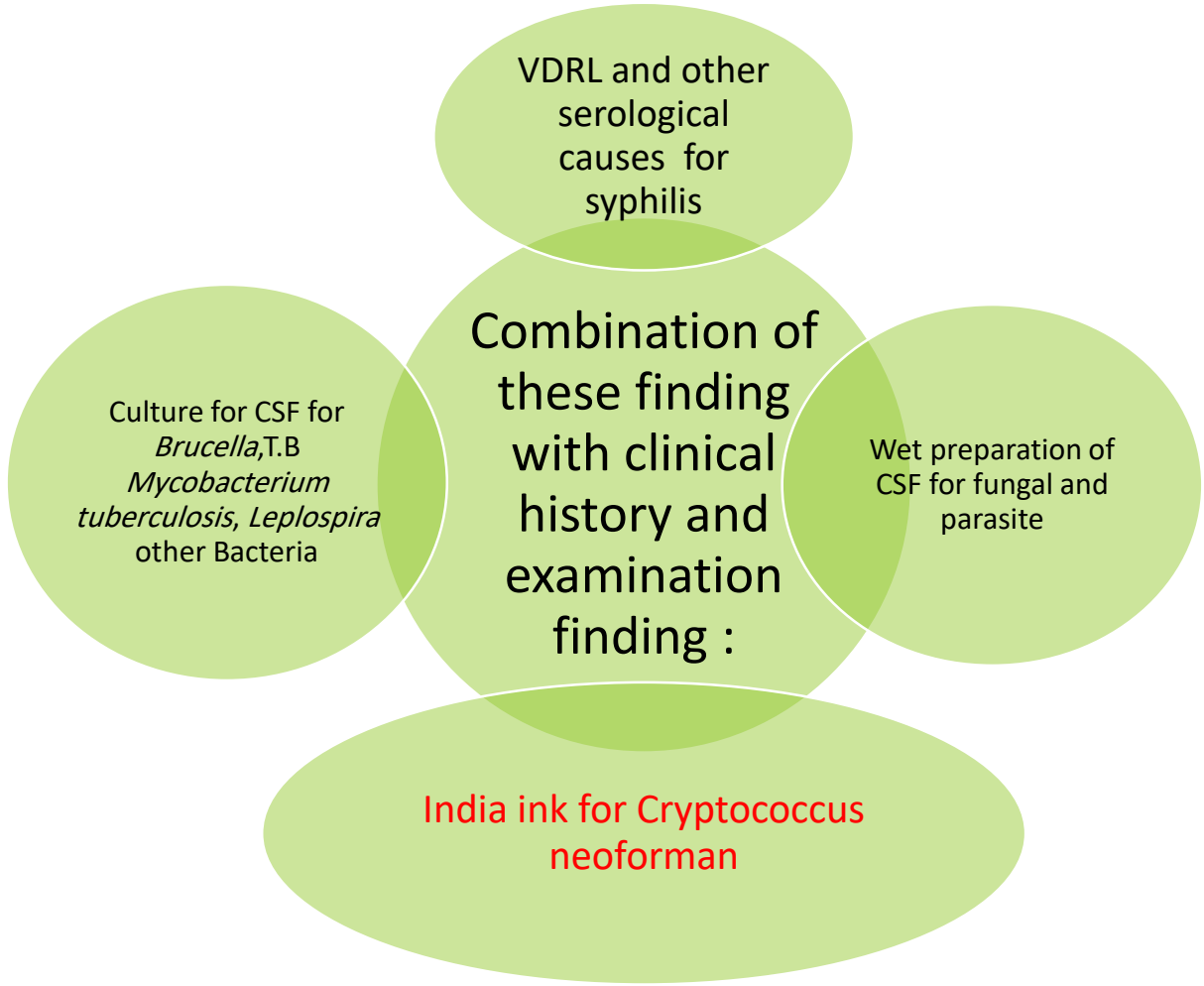
- ## Laboratory Findings:

This is mainly related to the laboratory examination of cerebrospinal fluid including:-

a) Collect of 2-5 ml of CSF and checking for the pressure
b) Biochemical investigation for :
    1. Total protein
    2. Glucose level in comparison to the serum glucose level
a) Microscopy:
    1. Presence of organism
    2. Total white cell count
    3. Differential count mainly for:-
        a) Polymorphic
        b) Lymphocytes

Laboratory diagnosis of cerebral and meningetic Tuberculosis and Brucellosis

- Mantoux test, Tuberculin skin test(TST)
- Chest x-ray for primary focus
- CSF microscopy for AFB
- CSF culture an solid medium L.J or fluid medium.
- PCR or other molecular biopsy test for presence of bacterial element (it is fast but sometimes gives false negative)
- Culture of CSF for Brucella
- Serology for Brucella



SUMMARY:

- **TB and Brucellosis are the most common cause for chronic cerebral infections.**
- **Brain is involved so sensory and motor symptoms will appear .**
- **Its important to take a good clinical history to differentiate between TB and Brucellosis.**
- **Brucellosis is gram (-) bacteria coccobacilli , transmission from Contact with domestic animals or consumption of raw milk and dairy products (camels and gouts).**
- **Treatment of brucellosis is combination of two antibiotics usually Rifampicin and Cotrimoxazole .**
- **TB Mycobacterium Species (Resist Staining) so we use Z-N stain .**
- **TB patient usually presents with fever of long duration.**
- **CSF findings shows high protein , low glucose , high CSF pressure , lymphocytosis .**

QUIZ:

1. the commonest parasitic cause of chronic cerebral infarction an meningitis is:
a) Gambines
b) acanthamoeba
c) toxoplasma gonodii
d) borlaexaust

2. between the attacks of fever the patient isn't very ill, it indicate which one of the following micro organism:
a) T.B
b) Pneumonia
c) Candida
d) Brucellosis

3. Which of the following drugs is contraindicated when treating a child with brucellosis:
a) Refanpicin
b) Cotrimoxazole
c) Tetracyclin
d) pyrazinamide

4.which one of the following is a major risk factor of T.B in Saudi Arabia:
a) AIDS
b) diabetes mellitus
c) U.R.T.I
d) myocardial infarction

5.which one of the following should be excluded before diagnosing a patient with T.B
a) Pneumonia
b) Angina pectoris
c) Brucellosis
d) L.R.T.I

6. the commonest bacterial cause of chronic cerebral infarction and meningitis is:
a) T.B + brucellosis
b) brucellosis + S.Pneumonia
c) T.B + E. Coli
d) pseudomonas aeruginosa

Answers :
1-C 2-D 3-C 4-B 5-C 6-A

Case:

Khalid , a 35 -year-old male went to see a neurologist in KKHU because of chronic headache. He reported that he has been suffering from unresolved severe headache with fever and night sweats , between fever he doesn't’t feel sick. he told the doctor that he loves drinking camel milk.

Q1) What is your diagnose ?

Ans) Brucellosis

Q2) regarding your diagnose , what is the proper treatment ?

Ans) Rifampicin and Cotrimoxazole .

THANK YOU FOR CHECKING OUR WORK, BEST OF LUCK!

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Doctors slides