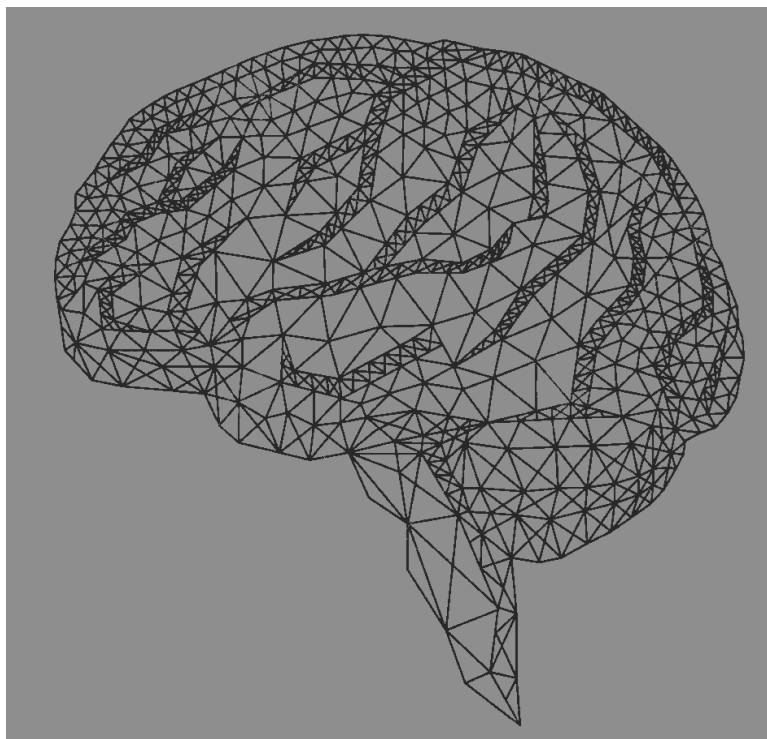
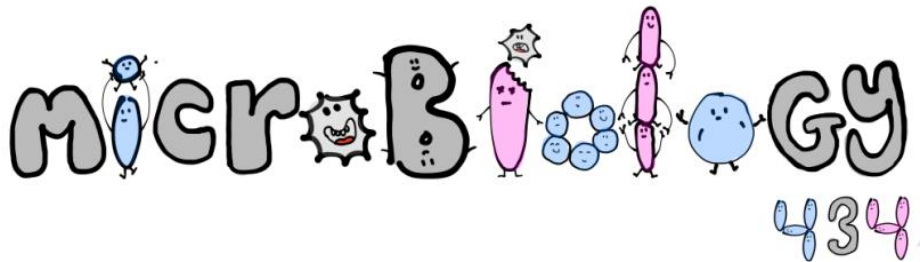


# Cerebral TB & Other Chronic Infections



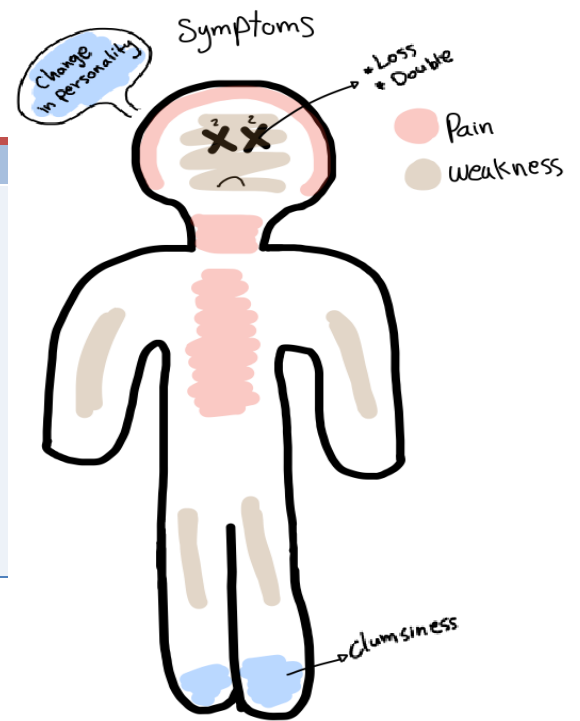
- **Important**
- Extra explanation

## Symptoms

## Signs

[ over a long period or recurrent ]

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>○ Chronic headache</li> <li>○ Neck or back pain</li> <li>○ Change in personality</li> <li>○ Clumsiness<sup>1</sup>.</li> <li>○ Facial / arm / leg weakness</li> <li>○ Double vision</li> <li>○ visual loss</li> </ul> | <ul style="list-style-type: none"> <li>○ -/+ Papilledema<br/>[ Optic disc swelling → ↑ICP ]</li> <li>○ <b>Brud Zinc or Kerning: [ + ] sign of meningeal irritation</b></li> <li>○ Altered mental status</li> <li>○ memory loss</li> <li>○ [ 3, 4, 6, 7 ] Nerve palsy</li> <li>○ Ataxia</li> <li>○ Hydrocephalus<br/>[ ↑ CSF in the brain ]</li> </ul> |
|--|---|



## Causes Of Chronic Cerebral Infection And Meningitis

Bacterial ( <b>Most important</b> )	Fungal	Parasitic	Viruses
<ul style="list-style-type: none"> <li>• In Saudi Arabia:               <ul style="list-style-type: none"> <li>○ Tuberculosis</li> <li>○ Brucellosis</li> </ul>               [ they are similar – treated by rifampin ]             </li> <li>• Partially treated acute meningitis</li> <li>• <b>Syphilis:</b> <ul style="list-style-type: none"> <li>○ caused by <u>Treponema Pallidum</u></li> </ul> </li> <li>• <b>Lptosporosis:</b> <ul style="list-style-type: none"> <li>○ caused by <u>L.Icter haemorrhagia</u></li> </ul> </li> <li>• <b>Lyme disease :</b> <ul style="list-style-type: none"> <li>○ caused by <u>Borrelia burgdorferi</u> [ not common in KSA ]</li> </ul> </li> <li>• <b>Liptosporosis:</b> <ul style="list-style-type: none"> <li>○ caused by <u>L.Icter haemorrhagia</u></li> </ul> </li> <li>• <b>Nocardiosis:</b> <ul style="list-style-type: none"> <li>○ caused by <u>Nocardia speciese.g N. Asteroids</u></li> </ul> </li> <li>• Cerebral abscesses can also same preferred as chronic infection</li> </ul>	<ul style="list-style-type: none"> <li>• Cryptococcus neoformans</li> <li>• In Saudi arabia:               <ul style="list-style-type: none"> <li>○ Candida albicans in immunocompramised patients</li> </ul> </li> <li>• Aspergillus species</li> <li>• Histoplasma capsulatum</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Toxoplasma gonodii</b> (most common)</li> <li>• <b>Trypanosoiasis:</b> <ul style="list-style-type: none"> <li>○ caused by <u>T.gambiense</u></li> </ul> </li> <li>• <b>Rare causes:</b> <ul style="list-style-type: none"> <li>○ Acanthamoeba spp</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Some present as chronic meningitis:</b> <ul style="list-style-type: none"> <li>○ Mumps</li> <li>○ Herpes simplex</li> <li>○ HIV</li> <li>○ CMV</li> </ul>               [ cytomegalovirus ]             </li> </ul>

The most important causes of chronic bacterial cerebral and menigeitic infection in saudi arabia are :

1- Brucellosis

2- Tuberculosis

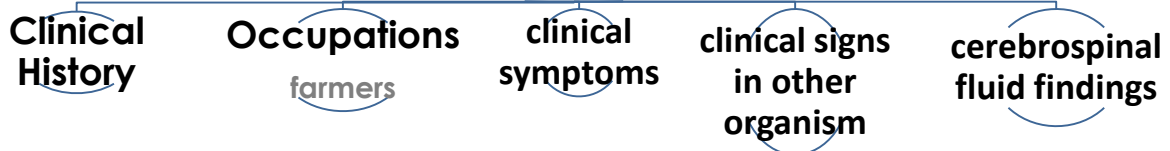
## Brucellosis

- common in Saudi Arabia  
[ **commonest cause in K.S.A is Br.melitensis** ]
- affect people who are in contact with domestic animals or those who consume **raw milk and milk products**
- presents with** : night sweating - pyrexia ( fever) of unknown organism of intermittent nature
- [ **in between the attacks of fever the patient is not very ill** ]
- Same reasons can cause chronic cerebral infection and meningitis

## Tuberculosis

- Is caused by **Mycobacterium tuberculosis**
- infect **1/3 of human race**
- fever of long duration
- When chest is affected:  
Cough - Hemoptysis [ **coughing of blood** ]
- some cases present as meningitis and cerebral infection presenting chronic neurological symptoms and signs
- parynchymal involmtn can occur in the form of tuberculoma or rarley abcess
- spinal meningitis - radiculomyelitis - spondylitis or S.C infarction Pott's spine and Pott's paraplegia

differentiated between them is on the basis of:



### Classification of CNS tuberculosis

Intracranial	Spinal
<ul style="list-style-type: none"> <li>• tuberculous meningitis (TBM)</li> <li>• TBM with miliary tuberculosis</li> <li>• tuberculous encephalopathy</li> <li>• tuberculous vasculopathy</li> <li>• space-occupying lesions: <b>tuberculoma</b> (single or multiple); multiple small</li> <li>• tuberculoma with miliary tuberculosis</li> <li>• tuberculous abscess</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Pott's spine and Pott's paraplegia</b></li> <li>• tuberculous arachnoiditis (myeloradiculopathy)</li> <li>• non-osseous spinal tuberculoma</li> <li>• spinal meningitis</li> </ul>

### Chronic cerebral and meningeal infection can produce:-

- Neurological disability [ may be Fatal if not treated ]
- They usually have:
  - **Slow** insidious onset. [ many symptoms → difficult to diagnose ]
  - **Progression** of signs and symptoms over a period of **weeks**.
- **Differ from acute** infection which have **Rapid** onset of symptoms and signs
- They are usually diagnosed ,if the neurological syndrome exists for > 4 weeks

**Diagnosis methods:**

- **History** especially for Tuberculosis and Brucellosis.
- Clinical **Examination**
- **Imaging** [ x- ray - **MRI** - ultrasound]
- **Laboratory findings** [ using CSF mainly ]
  - collect **2-5** ml of CSF.
  - check the pressure.
  - conduct biochemical and microscopic investigation.

Biochemical	Microscopic
<ul style="list-style-type: none"> <li>• <b>↑ in the CSF pressure</b></li> <li>• <b>↑ in protein level due to inflammation – dead substance – protein - WBC</b></li> <li>• <b>↓ glucose levels [ 2/3 serum level ]</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>↑ WBC count:</b> <ul style="list-style-type: none"> <li>○ <b>acute</b> → neutrophils [ polymorphic cells ]</li> <li>○ <b>chronic</b> → lymphocytes.</li> </ul> </li> <li>• Presense of organism</li> <li>• Differential count for : <b><u>Polymorphic – lymphocytes</u></b></li> <li>• Gram stain rarely show organism → <b>Z-N</b> used instead [ shows Acid Fast bacillus (AFB) of Tb ] [ Modified <b>Z-N</b> show Nocardia ]</li> <li>• India ink stain is used for <b>Cryptococcus neoforman</b></li> </ul>

**Other investigations:**

- **Culture CSF** for [ Brucella ,T.B, , Leplospira ]
- **Culture CSF** on solid medium L.J of Fluid medium
- **Syphilis screening tests** (VDRL).
- **Mantoux test – Tuberculin skin test** [ TST ] for **TB**
- Chest X-ray for primary foci
- **PCR** or other molecular test for bacterial identification.
- **Serology** for **brucella**
- **Wet** preparation of CSF for [ **fungal – parasite** ]

**Diagnostic features of tuberculous meningitis:**

Clinical	CSF	Imaging
<ul style="list-style-type: none"> <li>• fever and headache (for more than 14 days)</li> <li>• vomiting</li> <li>• altered sensorium or focal neurological deficit</li> </ul>	<ul style="list-style-type: none"> <li>• <b>pleocytosis</b> (more than 20 cells, more than 60% lymphocytes)</li> <li>• <b>↑ proteins</b> (more than 100 mg/dl)</li> <li>• <b>↓ sugar</b> (less than 60% of corresponding blood sugar)</li> <li>• <b>India ink</b> studies and microscopy for <u>Cryptococcus neoformans</u></li> <li>• malignant cells should be <b>negative</b></li> </ul>	<ul style="list-style-type: none"> <li>• exudates in <u>basal cisterns</u> or in <u>sylvian fissure</u> hydrocephalus</li> <li>• <u>infarcts</u> (basal ganglionic)</li> <li>• gyral <u>enhancement</u></li> <li>• <u>tuberculoma</u> formation</li> </ul>

## Treatment:

- **Tuberculosis:**

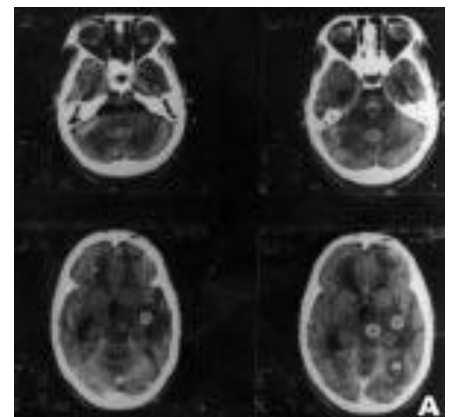
- Rifampicin, Isoniazid [ INH ] , Ethambutol, And Pyrazinamide → first 2 months
- Then rifampicin – isoniazid [ INH ] → next 4-6 months.

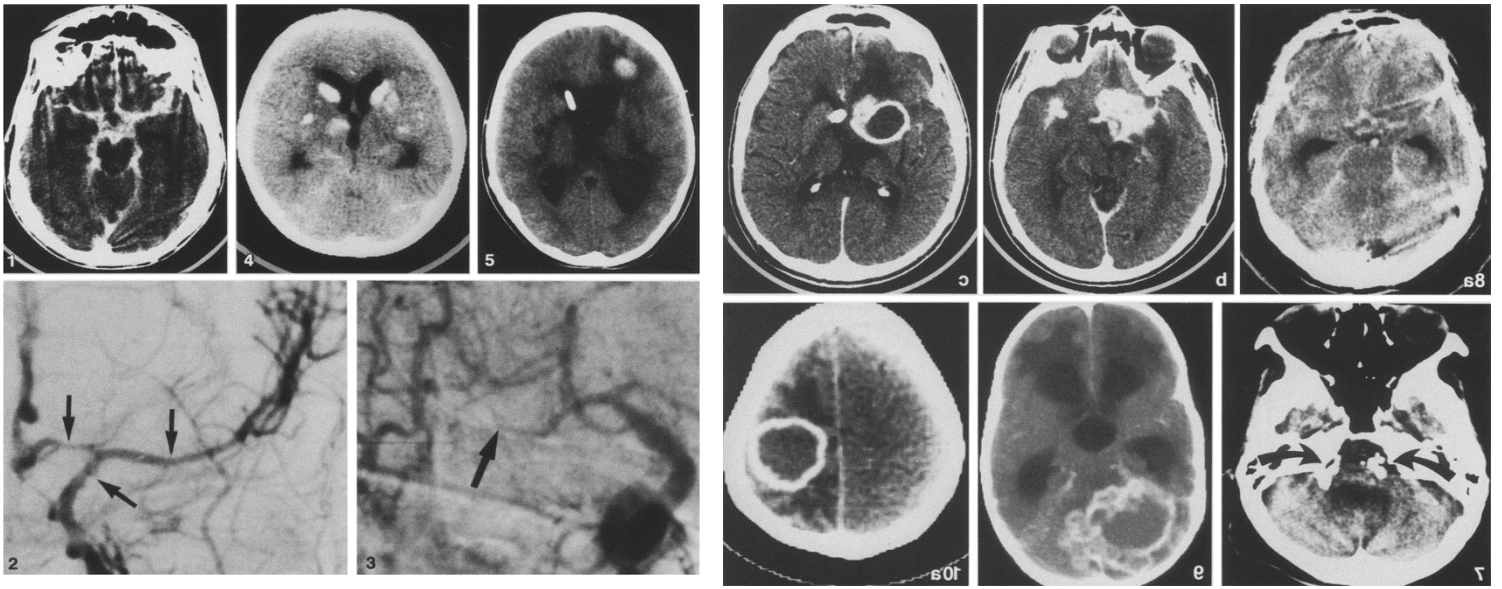
- **Brucellosis:**

- Tetracycline
- Rifampicin
- Cotrimoxazole
- Rifampicin and Cotrimoxazole are used mostly because they penetrate the blood brain barrier (BBB)

### Case report: disseminated tuberculosis

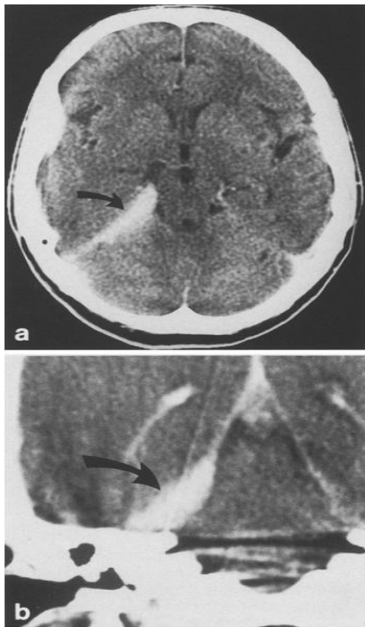
A 30-year-old woman presented with headache, vomiting and fever (104°F) and of not oriented and attentive, for 6 days duration. She was conscious, had lateral rectus palsy along with bilateral papilloedema. Left plantar was extensor. Neck rigidity and Kernig's sign were present. Other systemic and general examinations were normal. All haematological and serum biochemical parameters, including liver function tests, were normal. Chest X-ray showed **miliary shadows in both lungs** (figure B) CSF revealed **elevated opening pressure**, proteins 248 mg/dl, sugar 34 mg/dl (corresponding blood sugar was 98 mg/dl); 204 cells/ml, 15% polymorphs , 85 % **lymphocytes**. CT head showed multiple small enhancing lesions in brain parenchyma (figure A). The patient was given **antituberculous** treatment and **corticosteroids**. She showed significant improvement in all her symptoms after 15 days.



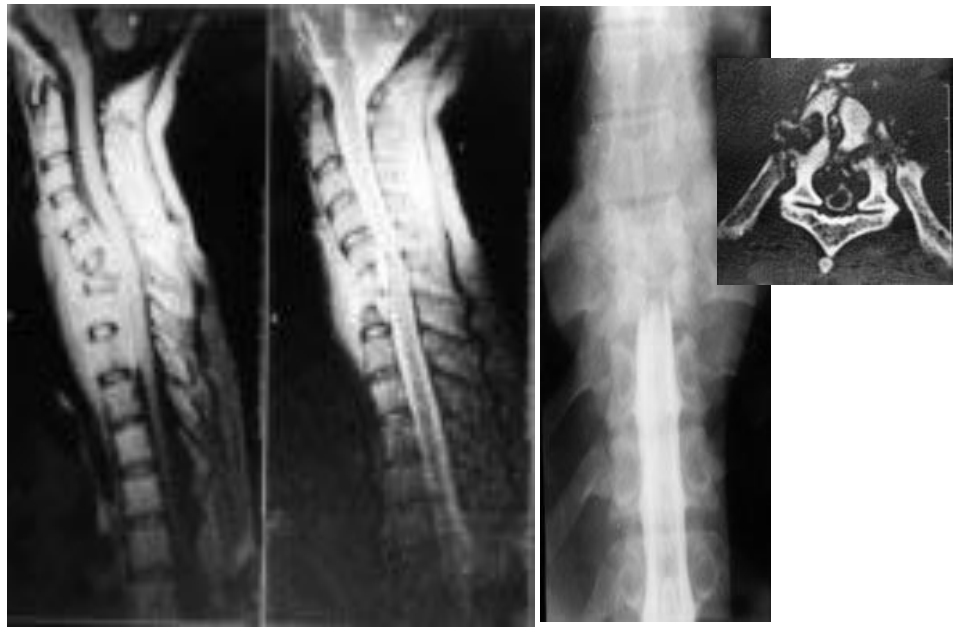


intense enhancement of the basal subarachnoid cisterns in acute/subacute TB meningitis

Ring enhancement



CT of a tuberculoma



A lumbar myelogram showing  
 A paraspinal abscess producing spinal block at the level of T9 vertebra,  
 → S.C compression

# MCQ's :

**1. the commonest parasitic cause of chronic cerebral infarction and meningitis is:**

- a) Gambines
- b) acanthamoeba
- c) toxoplasma gondii
- 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) T.B + E. Coli
- c) brucellosis + S.Pneumonia
- d) pseudomonas aeruginosa

**Answers :**

**1-C 2-D 3-C 4-B 5-C 6-A**

حنان محمد

توفيق الانديجاني

مشاعل حسين