CEREBRAL TB AND OTHER CHRONIC CEREBRAL BACTERIAL INFECTION

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Symptoms and signs of chronic cerebral and meningetic infection: overlong period or can be recurrent

SYMPTOM

- **Chronic head ache**
- **Neck or back pain**
- **Change in personality**
- **Facial weakness**
- **Double vision ,visual loss**
- **Arm and leg weakness**
- **clumsiness**

SIGN

- **+/-Papilloedema**
- **Brud Zinc or Kerning 'positive sign of meningeal irritation**
- **Altered mental status, memory loss, etc**
- **Seventh nerve palsy**
- **3,4,6 th,Nerve palsy**
- **Ataxia**
- **Hydrocephalus**

Microbiological Causes Of Chronic Cerebral Infection And Meningitis

❖ A –Bacterial, Most important

- **a)Tuberculosis** } **in Saudi Arabia**
- **b)Brucellosis**
- **c) Partially treated acute meningitis**
- **d) Syphilis-caused by *Treponema Pallidium***
- **E) Liptosporosis- caused by *L.Icter haemorraghia***
- **F) Lyme disease-caused by *Borrelia burgdorferi* not common in Saudi Arabia**
- **g)Nocardiosis-caused by Nocardia speciese.g *N. Asteroids***
- **h) Cerebral abscesses can also same -----preferred as chronic infection**

B- *Fungal Causes*

- **a- *Cryptococcus neoformans***
- **b-Candida species in Saudi Arabia species mainly Candida albicans in immunocompromised patients**
- **c- Aspergillus species**
- **d- *Histoplasma capsulatum***

C- Parasitic

- **a- Toxoplasma gonodii(most common)**
- **b- Trypanosoiasis:caused by**

  T.gambiense
- **c- Rare causes Acanthamoeba spp**

D- Virus

Some virus can some present as chronic meningitis these include:

- **a- Mumps**
- **b-Herpes simplex**
- **c- HIV**

The most important causes of chronic bacterial cerebral and meningetic infection in Saudi Arabia are

- **1- Tuberculosis**
- **2- Brucellosis**

They should differentiated on the basis of:

- **a- Clinical History**
- **b- Occupations**
- **c- Clinical symptoms**
- **d- Clinical signs in other organism**
- **e- Cerebrospinal fluid findings**

Brucellosis

- **Is common disease in Saudi Arabia**
- **It affect people who are in contact with domestic animals or those who consume raw milk and milk products**
- **It usually presents with Pyrexia(fever) of unknown organism of intermittent nature**
- **The fever is accompanied by night sweating, in between the attacks of fever the patient is not very ill.**
- **Same reasons it can caused chronic cerebral infection and meningitis**
- **The commonest causes in Saudi Arabia is *Br.melitensis***

Tuberculosis

- **Is caused by *Mycobacterium tuberculosis***
- **Which infect one third of human race**
- **The patient usually presents with fever of long duration**
- **Symptoms of cough and coughing of blood (Haemoptoysis) when the chest is affected**
- **It some cases present as meningitis and cerebral infection presenting 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 infarction**

  Pott's spine and Pott's paraplegia.

Classification of CNS tuberculosis

Intracranial

- tuberculous meningitis (TBM)
- TBM with miliary tuberculosis
- tuberculous encephalopathy
- tuberculous vasculopathy
- space-occupying lesions: tuberculoma
- (single or multiple); multiple small
- tuberculoma with miliary tuberculosis;
- tuberculous abscess

Spinal

- **Pott's spine and Pott's paraplegia**
- tuberculous arachnoiditis (myeloradiculopathy)
- non-osseous spinal tuberculoma
- spinal meningitis

Chronic cerebral and meningeal infection can produce:-

- **a) Neurological disability and, may be**
- **b) Fatal if not treated**

They usually have:-

- **a) Slow insidious on set**
- **b) with progression of signs and symptoms over a period of weeks**

They differ from those of acute infection which have

- **a) Rapid on set of symptoms and signs**

They are usually diagnosed ,if the neurological syndrome exists for > 4 weeks

Diagnosis of chronic cerebral and meningeal infections

- **History for Brucellosis and Tuberculosis**
- **Clinical examination**
- **Imaging - X- ray or MRI or ultrasound**
- **Laboratory findings**

Diagnostic features of tuberculous meningitis

Clinical

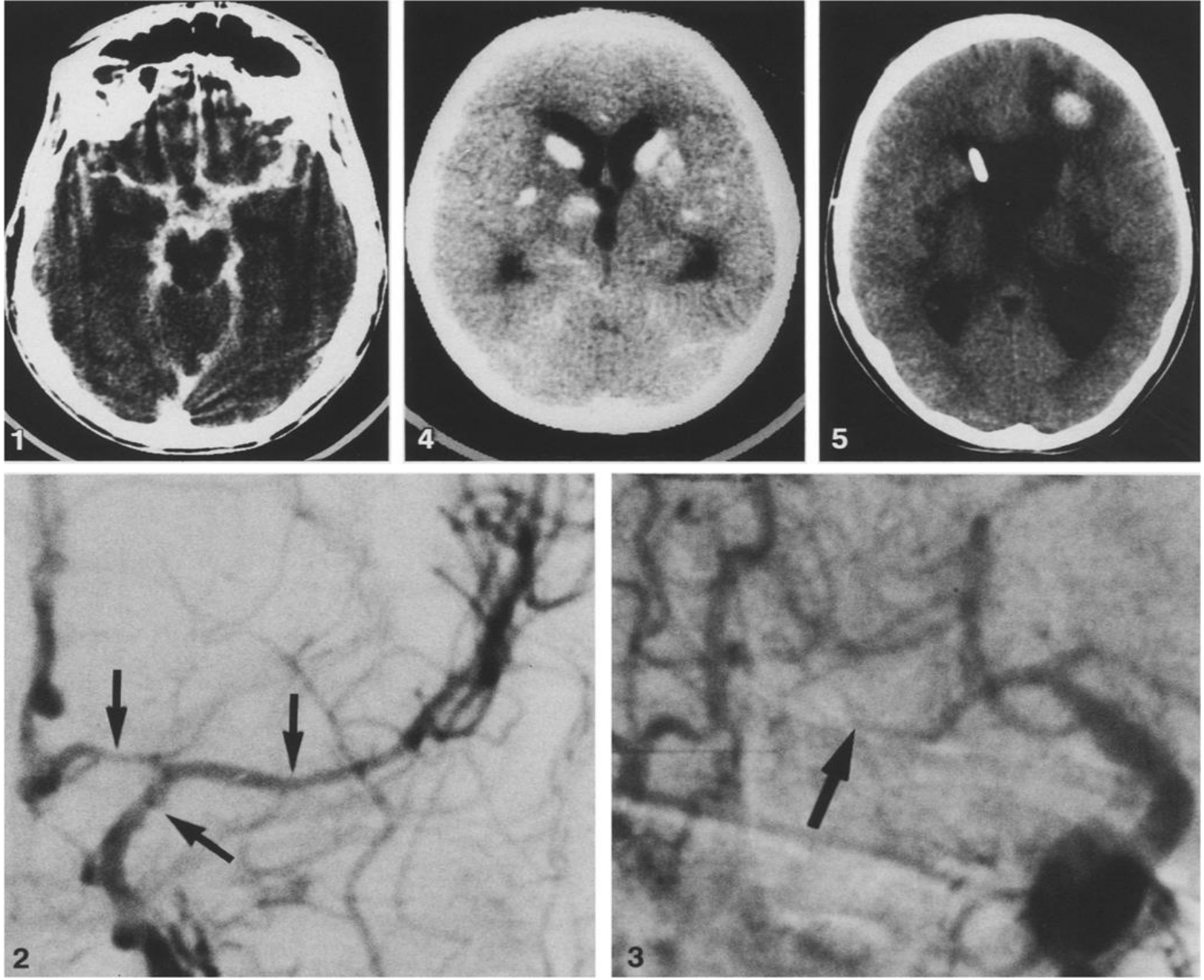
- fever and headache (for more than 14 days)
- vomiting
- altered sensorium or focal neurological deficit

CSF

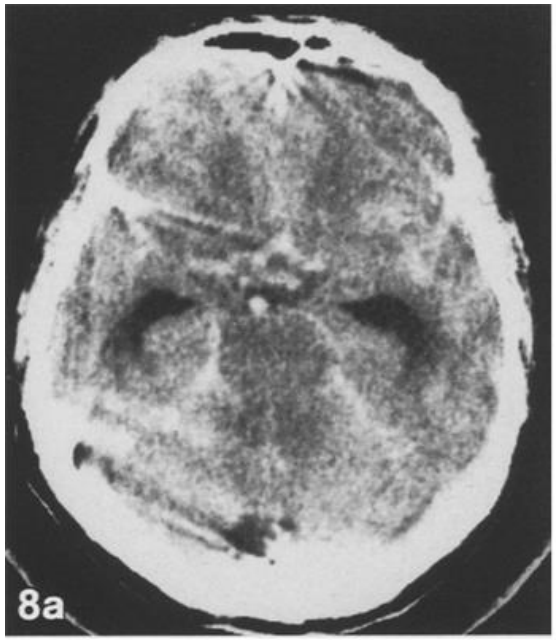
- pleocytosis (more than 20 cells, more than 60% lymphocytes)
- increased proteins (more than 100 mg/dl)
- low sugar (less than 60% of corresponding blood sugar)
- India ink studies and microscopy for Cryptococcus neoformans
- malignant cells should be negative

Imaging

- exudates in basal cisterns or in sylvian fissure hydrocephalus
- infarcts (basal ganglionic)
- gyral enhancement
- tuberculoma formation



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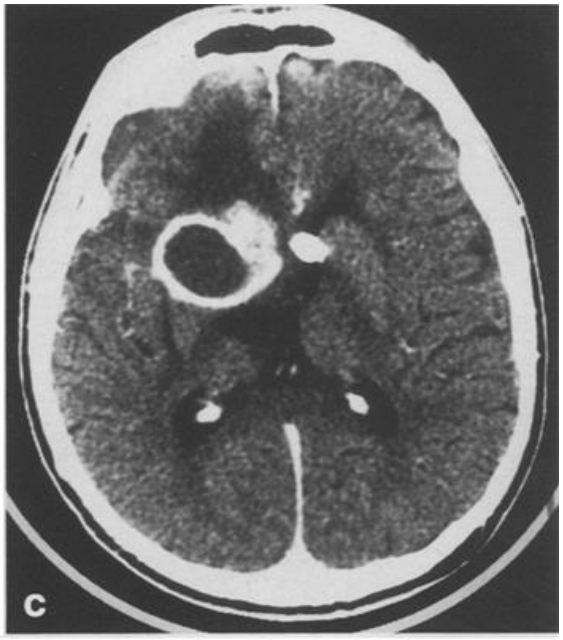
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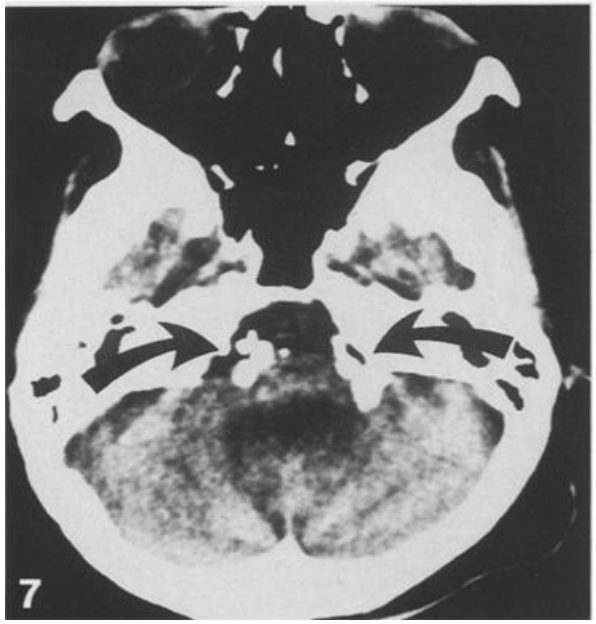
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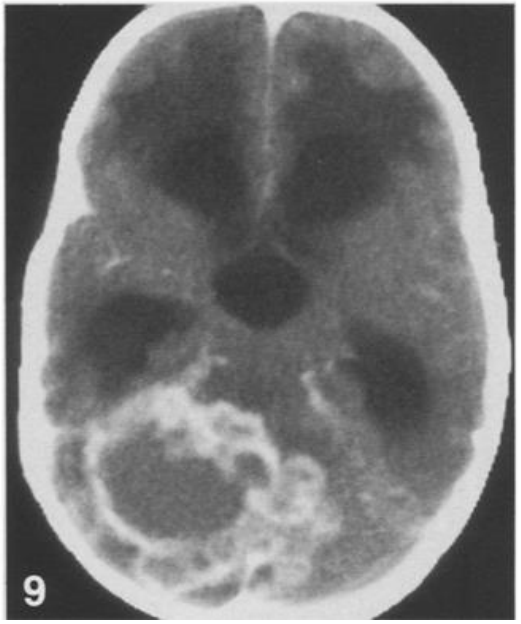
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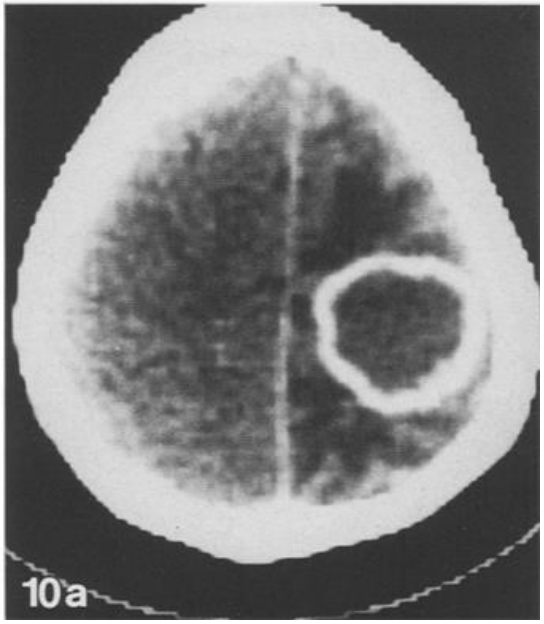
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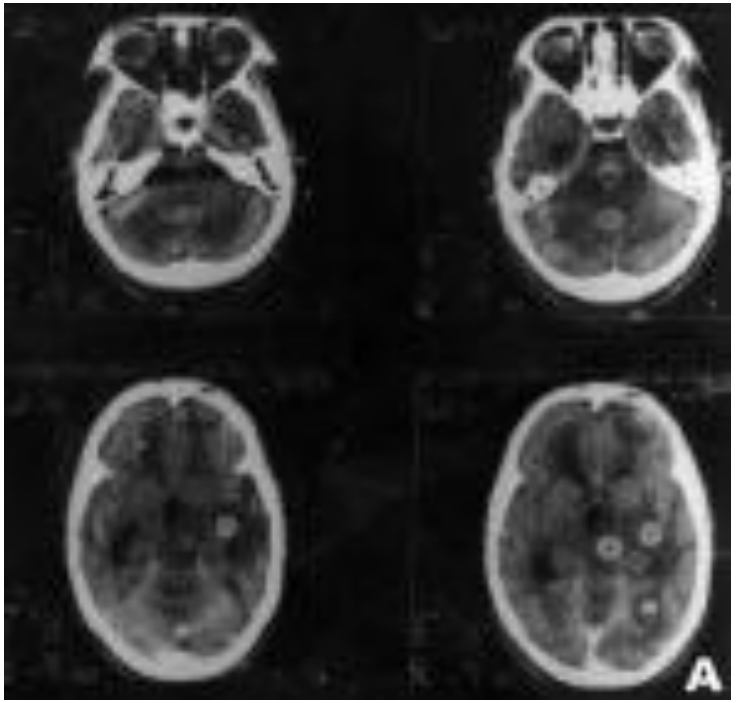
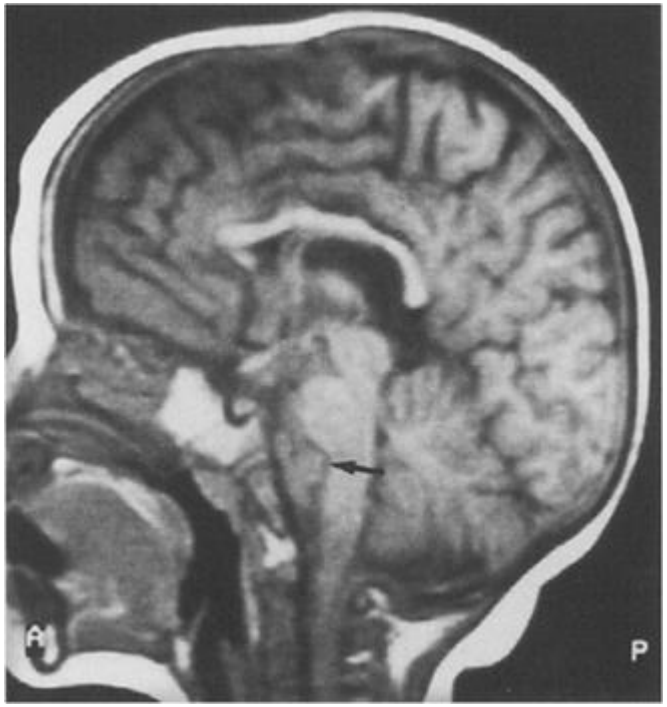
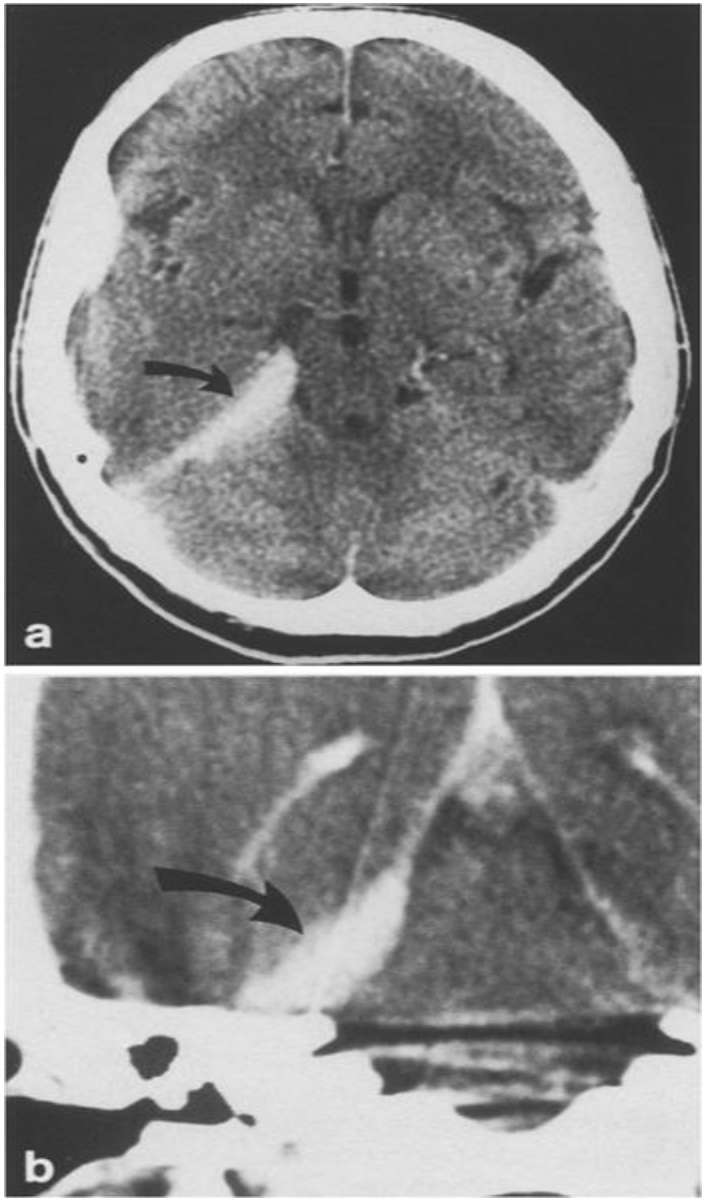


Case report: disseminated tuberculosis

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) 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 B). The patient was given antituberculous treatment and corticosteroids. She showed significant improvement in all her symptoms after 15 days.





CT demonstrating tuberculoma

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

Laboratory Findings

Mainly related to the laboratory examination of cerebrospinal fluid including:-

- **a-Collect of 2-5 ml of CSF and checking for the pressure**
- **b- Bio chemical investigation for :**

  1- Total protein

  2- Glucose level in comparison to the serum glucose level

- **c- Microscopy:**

  1- Presence of organism

  2- Total white cell count

  3- Differential count mainly for:-

  a- Polymorphic

  b- Lymphocytes

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

- **a- Increased CSF pressure indicating increased intra cranial pressure**
- **b- Increased protein level due to presence of inflammatory substance, dead organism, protein and WBC**
- **c- Reduced glucose level (Normally is 2/3 of serum glucose level)**
- **d- Increased local white cell count but in chronic infection the differential shows *lymphocytosis* while in acute infections there is increased % of polymorph**
- **e- Gram stain can same time rarely shows causative organism**
- **f- Z-N Stain can show AFB of T.B while modified Z-N can show Nocardia**

Diagnosis continued

- **g- VDRL and other serological causes for syphilis**
- **h- Wet preparation of CSF for fungal and parasite**
- **i- India ink for Cryptococcus neoforman**
- **j- Culture for CSF for *Brucella*,T.B *Mycobacterium tuberculosis, Leplospira* other Bacteria**

Laboratory diagnosis of cerebral and meningetic Tuberculosis and Brucellosis

- **a) Mantoux test, Tuberculin skin test(TST)**
- **b)Chest x-ray for primary focus**
- **c) CSF microscopy for AFB**
- **d) CSF culture an solid medium L.J or fluid medium**
- **e) PCR or other molecular biopsy test for presence of bacterial element**
- **f) Culture of CSF for Brucella**
- **g) Serology for Brucella**

Combination of these finding with clinical history and examination finding

Treatment for cerebral and meningeal Tuberculosis and Brucellosis

Tuberculosis

4 Drugs are used there are:-

- **1- Rifampicin**
- **2- Isonized(INH)**
- **3- Ethambutol**
- **4-Pyrazinamide**

for 2 month

Then,

- **Rifampicin**
- **INH**

for 4-6 month

Brucellosis Treatment

Two of the following 3 drugs

- a- Tetracycline
- b- Rifampicin
- c- Cotrimoxazole

Usually Rifampicin and Cotrimoxazole are preferred as they have good penetration power in the blood brain- barrier