March/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

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Standard Treatment Workflow (STW) for the Management of
ADULT TUBERCULAR MENINGITIS

ICD-10-17.0

SUSPECT TBM WITH FOLLOWING CLINICAL FEATURES

- Fever (Duration of 5 days or more#†)
- Headache & Vomiting
- Altered sensorium
- Cranial nerve palsy
- Hemiparesis/any limb weakness
- Seizures
- Neck pain and stiffness

ALWAYS ENQUIRE FOR ASSOCIATED FEATURES

- Constitutional symptoms
- Active TB elsewhere
- Past history of TB & ATT
- Contact with TB patient
- HIV seropositivity
- Low socio-economic status
- High endemic area

#This is to increase sensitivity for diagnosis of TBM. The duration could be variable from days to weeks to months.
†Clinical judgement & evaluation of other conditions is also required as fever can be associated with headache in other medical conditions. Delaying work up for meningitis is not recommended.

IF TBM SUSPECTED

Refer to a centre where facility of evaluation (at least Lumbar puncture & CT scan) is available.

EVALUATION AT CENTRE OF CARE

CLINICAL HISTORY & EXAMINATION

- Symptoms type & duration, onset & progression
- Headache, altered sensorium, focal deficits
- Neck rigidity, Kernig's sign
- Cranial nerve palsy
- Fundus examination - papilledema

LABORATORY EVALUATION

- CBC, ESR, CRP
- LFT, RFT, Electrolytes
- Blood sugar, HIV
- Chest X Ray- PA view
- USG whole abdomen
- Mantoux (optional)

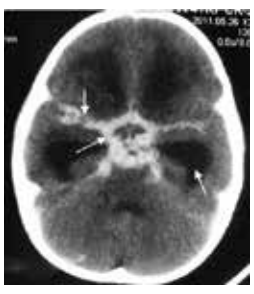
IMAGING

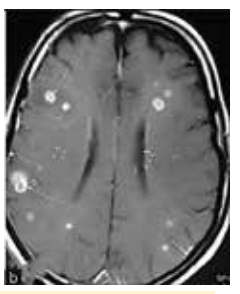
- NCCT/CECT head- Preferred as initial investigation
- MRI brain (and spine if indicated) in selective cases

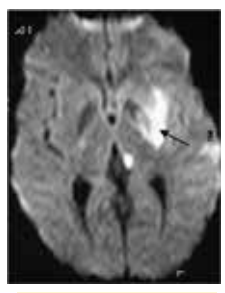
CSF

- Mandatory- Should be sent for essential analysis (Box 1)
- Prudent to perform CT head prior to CSF in presence of papilledema & /or focal deficits

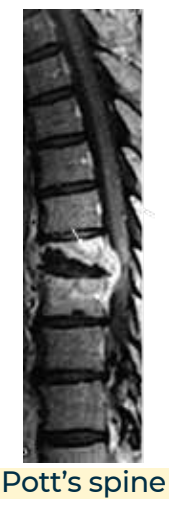
COMMON NEUROIMAGING FINDINGS IN TBM


Basal exudates and Hydrocephalus


Tuberculomas


Infarction


Arachnoiditis


Pott's spine

CSF EVALUATION*

01 ESSENTIAL
- Cell count & type
- Protein
- Sugar (& Correspon-ding blood sugar)
- NAAT
- Grams stain
- Bacterial culture
- AFB stain
- AFB culture/sensitivity
- India Ink**
- Cryptococcal antigen**

02 DESIRABLE
- Fungal smear & culture
- Cytopathology#

03 OPTIONAL
- Wet mount
- VDRL
- Toxoplasma PCR†
- Viral PCR

If some tests are not available at site, store sample in sterile container, keep in refrigerator & transport in icebox to other facility

*CSF samples should be sent to the lab as soon as possible for examination of cells, protein, sugar and cytology.
**Cryptococcal meningitis should be excluded wherever possible as it is a close differential diagnosis of TBM.
#In ideal settings, it may be prudent to exclude a diagnosis of carcinomatous meningitis.
†Especially in patients with HIV.

CSF FINDINGS IN TBM AND OTHER MENINGITIS

MENINGITIS TYPE	CELL COUNT	PREDOMINANT CELL TYPE	PROTEIN	SUGAR	SPECIFIC TESTS FOR CONFIRMATION
Tubercular	Usually <500	Lymphocytic Neutrophilic in some acute cases	High	Low	AFB smear & culture NAAT*ϕ
Pyogenic	In thousands	Neutrophilic	Moderately High	Very low	Gram stain, culture
Fungal	Variable	Lymphocytic	High	Low	India Ink, Fungal Culture, Cryptococcal antigen
Viral	50-500	Lymphocytic	Normal to marginally high	Normal	PCR for specific virus

**A negative NAAT result does not rule out TBM. The decision to give ATT should be based on clinical features and CSF profile.*
ϕNAAT: Xpert/TrueNat

MANAGEMENT

ANTI-TUBERCULAR TREATMENT

- Intensive Phase: 2 months of RHZE or RHZS
- Continuation phase: 3 drugs: RHZ# for at least 10 months*

STEROIDS

- Preferably Dexamethasone 0.4 mg/kg/day intravenously in 3-4 divided doses during hospital stay
- If not feasible, give oral Dexamethasone 0.4 mg/kg/day in divided doses or oral Prednisolone 1 mg/kg/day in single morning dose
- Discharge on oral steroids on tapering doses for a total duration of 8-12 weeks

**treatment duration may be increased in some cases as per the clinician decision*
#This is as per strong recommendations of concerned specialty experts in view of high toxicity of Ethambutol on TBM. These recommendations have been sent to NTEP

FOLLOW UP

- Regular follow up is essential every month for at least first 3 months & can be increased thereafter till treatment is stopped
- Monitor liver function tests & any other features of drug toxicity
- Observe for clinical improvement or any deterioration
- Closely observe for development of any complications

SUSPECT COMMON COMPLICATIONS

Hydrocephalus and raised ICP: Worsening of headache with vomitings and/or altered sensorium
Optico-chiasmatic arachnoiditis: Complaints of vision loss in one or both eyes with or without headache
Myelitis and or arachnoiditis: Development of paraparesis or quadriparesis with/without sensory disturbances, bladder involvement
Epidural abscess/Pott's spine: Complaints of back pain and/or weakness in one/ both lower limbs/ bladder/ bowel disturbances
Tuberculoma: Seizures, new onset focal focal deficits, worsening headache
Seizures: Consider tuberculoma/electrolyte or metabolic imbalance/ cerebral infarction
Cerebral infarction and stroke: Sudden onset weakness of one half of body, new onset confusion, altered mental status, seizures
Hyponatremia, SIADH: Persistent or worsening mental status

ABBREVIATIONS

ATT: Antitubercular therapy
CBC: Complete Blood Count
CECT: Contrast Enhanced CT
CRP: C Reactive Protein
CSF: Cerebrospinal Fluid
E: Ethambutol
ESR: erythrocyte sedimentation rate
H: Isoniazid
ICP: Intracranial pressure
LFT: Liver function tests
MRI: Magnetic resonance imaging
NAAT: Nucleic Acid Amplification Test
NCCT: Non-contrast CT
NTEP: National TB Elimination Programme
PCR: Polymerase Chain Reaction
R: Rfimapicin
RFT: Renal function tests
S: Streptomycin
SIADH: Syndrome of inappropriate antidiuretic hormone
TBM: Tubercular meningitis
Z: Pyrazinamide

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