Additional considerations for "checklists to guide the supportive and critical care of tuberculous meningitis" [version 1; peer review: awaiting peer review]

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Abstract
Checklists are pivotal in the systematic assessment of critically ill patients, pre-operative assessments and for patients with multisystem involvements. Management of tuberculous meningitis is challenging due to prolonged hospital stay, multiple neurological complications like seizures, stroke, raised intracranial tension, stroke, neurosurgical interventions, multiple invasive procedures, health-care-associated sepsis, and ventilation. All these complications are managed by separate checklists to avoid treatment-related errors. The current manuscript aims to ensure completeness of inpatient care addressing issues addressing diagnostic issues, supportive care, and intensive care related issues.

Keywords
TBM, meningeal tuberculosis, chronic meningitis, reporting guidelines, tuberculosis, tubercular meningitis

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We read the article by Donovan et al. with great interest. We suggest including certain additional details in the checklist and tables provided, as we describe in Table 1–4. These details are vital to ensuring quality supportive care in the daily assessments of patients with tuberculous meningitis.

Recommended additions to Table 1
The assessment of clinical records of contacts of tuberculosis (TB) patients provides valuable details regarding the likelihood of resistance, with 7% of TB patients likely to have an undiagnosed family member with TB. This is particularly vital as isolation rates for acid-fast bacilli (AFB) in tuberculous meningitis are low, and proving resistance is difficult. The undiagnosed contact may provide an early clue to drug sensitivity, as the sensitivity of AFB isolation is higher from sputum samples compared to cerebrospinal fluid. Visual identification of choroidal tubercles may increase the likelihood of tuberculous meningitis in a patient with meningitis (especially if AFB smear is non-contributory).

Another missed clinical detail is whether TB-positive contacts have completed treatment and been declared cured. Often treatment is completed, but confirmation of having been cured is not documented by repeat AFB smears at five months (or end) of treatment. The World Health Organization (WHO) suggests AFB smear testing at diagnosis, two months (or three months if the intensive phase is extended by one month), and five months of treatment. However, simultaneous culture should also be performed, as a sub-group of patients may have only AFB smear positivity (with no clinical progression) and negative cultures due to the presence of non-viable AFB. We suggest

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TB, tuberculosis; TBM, tuberculous meningitis; CSF, cerebrospinal fluid; ATT, anti-tubercular treatment; CT, computed tomography; EEG, electroencephalogram.
References


In daily inpatient review, daily monitoring of head circumference (in infants) provides an early clue for worsening hydrocephalus, and periodic ultrasonography of the head in infants helps in the safe monitoring of hydrocephalus.14

Recommended additions to Table 2

Multiple fixed-dose combinations and various strengths of individual drugs of anti-tuberculous drugs are available. Not uncommonly, in errors in checks carried out by physicians or pharmacists lead to over or under-dosage, especially in children. To reduce prescription errors for dosages, dosing charts based on weights and standard fixed-dose combinations have been suggested by the WHO.15 In an individual situation, one or more drugs need to be given separately to refine the treatment. Therefore, we suggest that the total dose of individual medications be calculated and separately considered in daily inpatient evaluation to prevent drug failure or toxicity. Post-operative cranial tomography is usually done in the post-operative period to assess the position of a ventriculoperitoneal shunt and reduction in the size of the ventricle. We suggest a low radiation protocol (40 mAs, 120 kV) for such imaging procedures, which may reduce radiation exposure by 90%.16

Recommended additions to Table 3

Prolonged immobility due to chronic encephalopathy predisposes patients to pressure sores. Daily assessment of indwelling catheters is vital to prevent health-care-associated infections.17

Recommended additions to Table 4

Treatment-related complications such as drug-induced hepatitis, anti-tuberculous therapy-induced psychosis, and phenytoin toxicity should be excluded as a cause of reduced consciousness.18,19 Anti-tuberculous drugs like isoniazid, rifampicin, ethambutol, and cycloserine may be associated with psychosis.20,21 Isoniazid-associated psychosis may occur as early as three days to as long as several months after initiation of isoniazid. These symptoms may manifest as delirium, delusions, suicidal tendencies, and mood swings. Though complications of tuberculous meningitis, such as infarct, borderzone encephalitis, and hydrocephalus, can lead to encephalopathy, bedside electroencephalography should be done in all such patients to exclude nonconvulsive status epilepticus.22 Acute symptomatic seizures are frequent in tuberculous meningitis, and antiepileptic drug levels such as phenytoin, phenobarbitone, levetiracetam, sodium valproate are commonly used drugs. Anti-tuberculous drugs have complex drug interactions amongst themselves, along with other medications.23 Isoniazid and valproate are drug inhibitors, while rifampin, phenobarbitone phenytoin are drug inducers. The drug levels of isoniazid depend on acetylation status.24 Patients who are slow acetylators have higher isoniazid concentration, lower acetylated-isoniazid, and higher phenytoin concentrations. These patients are at high risk of phenytoin toxicity and encephalopathy.25 The authors observed that one-third of patients with encephalopathy had higher phenytoin drug concentration.26 Though levetiracetam is devoid of drug interactions, it may also cause behavioral abnormalities, including psychosis and suicidal tendencies.27

Data availability

No data are associated with this article.

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