Strategic infarct dementia in a patient with tuberculous meningitis –
a case report

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Abstract:
Ischemic strokes secondary to tuberculous arteritis is a common complication of tuberculous meningitis. However strategic cerebral infarcts presenting with a dementia in patients with tuberculous meningitis is uncommon. We report a case of a 59 year old priest with tuberculous meningitis presenting with dementia secondary to strategic infarcts in the right thalamus and medial temporal lobe. The patient was treated with of corticosteroids and aspirin along with the regular anti-tubercular therapy and had a good clinical response.

Keyword: Tuberculous meningitis, Strategic infarct dementia, Thalamic dementia, Aspirin

Introduction:
Tuberculous meningitis (TBM) still remains as an important challenge in the developing world, with significant morbidity and mortality despite the improvement in medical care and the advent of combination chemotherapy(1)(2)(3). Complications of TBM include hydrocephalus, cranial neuropathies, cognitive impairment, ischemic strokes and arachnoiditis(4). Cognitive impairment in TBM can be due to tuberculous encephalopathy, tuberculous encephalitis, multiple tuberculomas or tuberculous arteritis resulting in ischemic strokes. Though cognitive impairment can be seen in up to half the patients with TBM, strategic cerebral infarction presenting with a rapidly progressive dementia is uncommon(5)(6)(7)(8). In this case report we report a case of TBM with disseminated tuberculosis presenting with a rapidly progressive dementia secondary to strategic infarcts in the thalamus and medial temporal lobe.

Case report:
A 59-year-old right-handed priest was admitted to another hospital with complaints of low grade intermittent fever and holocranial headache since three weeks; and disorientation and impairment of memory for recent events, since one week. He presented to our hospital five weeks into the illness after initiation of
anti-tuberculous therapy with persistent disorientation, memory impairment and worsening of his headache and new onset diplopia. Except for chronic cough there was no other systemic symptoms. There was no past history of tuberculosis in the patient or his contacts. There was history of recent travel to Israel where he had visited the ruins of an ancient cave. His general physical examination was normal but his neurological examination revealed right abducens palsy and neck rigidity. His mini mental status examination (MMSE) score was 12/30. On neuropsychological testing he was found to be disoriented to time and place, with impaired attention and recent memory. The initial laboratory workup revealed a hemoglobin of 12.5 gm/dl and leukocyte count of 5400 cells/mm³ with a normal differential count. His ESR was 14 mm and HIV Elisa was negative. HbsAg, HCV antibody and VDRL were negative. His liver function and renal functions were normal. His chest radiograph was normal. Gadolinium enhanced magnetic resonance imaging (MRI) of the brain showed a mild communicating hydrocephalus, acute infarct involving the right thalamus (fig:1 C; white arrow) and multiple small foci of restricted diffusion in the left cerebellar hemisphere, midbrain, capsuloganglionic region and periventricular white matter in the right temporal lobe. There were extensive exudates with irregular enhancement along the basal cisterns (fig:1 D; black arrow). His CSF analysis revealed 220 cells (98% lymphocytes), high protein (209 mg/dl), and low sugar (17 mg/dl; corresponding blood sugar: 110 mg/dl). Positron emission tomography (PET-CT) of the whole body revealed a right apical pulmonary cavity with mediastinal, para-aortic and para-iliac lymphadenopathy. Sputum was not obtainable for Zeil-Neillson staining despite induction with hypertonic saline nebulisations. In view of the persistence of symptoms on antituberculous therapy, and travel history a possibility of an fungal or atypical mycobacterial infection was considered and a leptomeningeal and brain biopsy was planned. The biopsy from the right temporal lobe and the leptomeninges from the basal regions revealed granulomatous inflammation consistent with tuberculosis. Culture from the biopsy specimen was negative for acid fast bacilli, fungi and bacteria. There was no evidence of atypical mycobacterial or fungal infection. The patient was treated as disseminated tuberculosis and antituberculous therapy was continued with oral Rifampicin (600 mg/day), Isoniazid (300 mg/day), Pyrazinamide (1000 mg/day), Ethambutol (800 mg/day) daily for the first 2 months along with oral steroids (Dexamethasone 16 mg/day in three divided doses for the first 4 weeks). Aspirin was added in view of the tuberculous arteritis with ischemic strokes. This was followed by a maintenance phase therapy with oral Rifampicin and Isoniazid and Pyrazinamide (planned for a period of 18 months). A tapering schedule of intermittent pulses of weekly IV methylprednisolone (500 mg to 125 mg) was initiated at review after one month for evolving optochiasmatic arachnoiditis detected on repeat Gadolinium enhanced-MRI of the brain. His neurological symptoms gradually improved over the first three months of initiation of the combination therapy. There was complete resolution of the fever, headache and right abducens palsy. A repeat neuropsychological assessment done after 4 months of antituberculous therapy revealed an MMSE score of 22/30 with significant improvement in the domains of attention, recent memory and executive function.
Discussion:
Ischemic strokes secondary to tuberculous arteritis is a common complication of TBM. Its frequency varies from 6% to 57% of TBM patients(9)(10). Most of the strokes in TBM are multiple and located in the ‘tubercular zone’ which comprises of the caudate, anterior thalamus, anterior limb and genu of the internal capsule. This is due to the involvement of medial lenticulostriate, thalamotuberal and thalamostriate arteries which lie in the basal meningeal exudates(11). Our patient had a strategic infarct dementia secondary to arteritic infarcts in the right thalamus and right medial temporal lobe. Thalamic dementia is commonly seen in bilateral thalamic lesions, but has been described in unilateral lesions of either thalamus as in the case of our patient (12)(6). Though thalamic dementia is more common with left sided thalamic lesions there are reports of the same following isolated right thalamic infarction(13). The two important components of the memory networks that can be involved in thalamic infarcts are the Papez and Mishkin circuits(14). The Papez circuit arises from the subiculum and via the fornix connects to the mammillary bodies; and though the mammillothalamic tract (MTT), to the anterior thalamic nuclei and from here it projects to the anterior cingulated cortex (15). The paralimbic circuit of Mishkin, originates from the basolateral amygdala and goes through the inferior thalamic peduncle to the dorso-medial nucleus of the thalamus via internal medullary lamina (IML), then project to the prefrontal cortex, dorsolateral and orbitofrontal cortices (14). Infarcts involving the anterior nucleus of the thalamus and the associated mammillo-thalamic tract can result in recent memory impairment. Anterograde amnesia may result from injury of the intrathalamic segment of MTT and the retrograde component from the injury of to intrathalamic bundle IML(15). In volvement of the ventral-anterior and the dorso-median nuclei can interrupt the thalamic-prefrontal pathways and can leads to executive dysfunction(16). Inflammatory cytokines such as tumour necrosis factor (TNF), vascular endothelial growth factor (VEGF) and matrix metalloproteinases (MMPs) have a major role in the pathogenesis of tuberculous arteritis(11). Addition of corticosteroids is known to improve mortality in TBM; however the role in reduction of strokes in tuberculous arteritis is not proven. Also there is preliminary evidence that aspirin may reduce mortality and reduces the occurrence of strokes in patients with tuberculous arteritis(17)(18). Our patient was managed with the addition of corticosteroids and aspirin along with the antitubercular therapy and had a good clinical response.

References:


Figure 1: Gadolinium enhanced MRI of the brain at the time of initial presentation