

Distribution of tuberculomas and vasculitic lesions in microbiologically confirmed central nervous system tuberculosis

Derya Ozturk-Engin¹, Hakan Erdem², Gamze Kilicoglu³, Hulya Tireli⁴, Seniha Senbayrak¹, Umit Savasci², and ID-IRI study group

¹Department of Infectious Diseases and Clinical Microbiology, Haydarpaşa Numune Education and Research Hospital, Istanbul, Turkey

²Department of Infectious Diseases and Clinical Microbiology, Gulhane Medical Academy, Ankara, Turkey

³Department of Radiology, Haydarpaşa Numune Training and Research Hospital, Istanbul, Turkey

⁴Department of Neurology, Haydarpaşa Numune Training and Research Hospital, Istanbul, Turkey

Background

Tuberculosis is the leading cause of death and remains a major global health problem. Central nervous system (CNS) tuberculosis is known as the most devastating form of tuberculosis. This study aims to review the radiological findings in patients with microbiologically proven CNS tuberculosis.

Methods

This study uses CNS tuberculosis patient database provided by the Haydarpaşa retrospective multicenter cohort study from 43 centers in 14 countries. Microbiological confirmation necessitated positivity in at least one of the following tests: Ehrlich-Ziehl-Neelsen (EZN) stain, *Mycobacterium tuberculosis* culture or *M. tuberculosis*-PCR testing. In this study tuberculoma and abscess formation were considered as a single group under the name tuberculomas. Accordingly, vasculitis and infarction were considered as a single group under the name vasculitis.

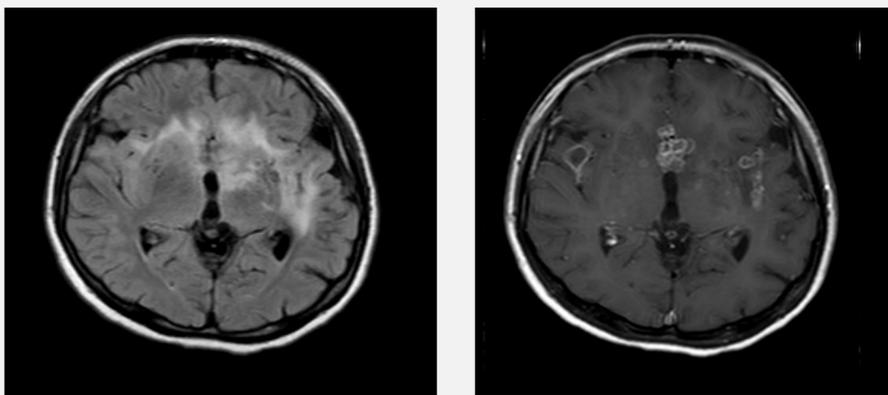


Figure 1-2: FLAIR sequence demonstrates edema in the white matter in frontal lobe, left thalamus and lentiform nucleus. There is a tiny T2-hypointense lesion in the anterior portion of the left lentiform nucleus. Contrast-enhanced T1 sequence of the same patient shows ring-enhancing lesions in the fornix, in both of the subcortical white matter of the insula and the right caudate nucleus.

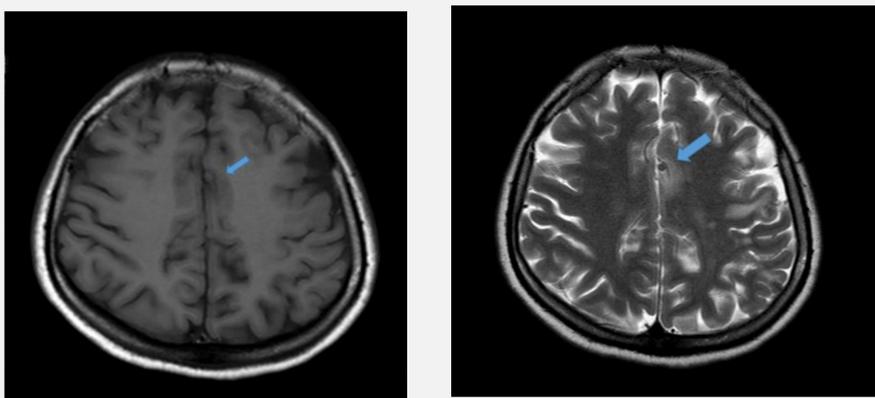


Figure 3-4: T1 and T2 weighted images show a minute lesion in the left frontal vertex, located in the cortex and surrounded by white matter edema. There are also numerous subcortical areas of edema in the left hemisphere. The lesion is hypointense on T2 and mildly hyperintense on T1 sequences.

Results

Out of 507 patients in the database, 444 had CNS imaging at diagnosis. 392 patients were imaged with cranial CT, 284 patients with cranial MRI and 232 patients with both methods. Patients' mean age was 39.72 ± 18.64 years. There were 230 males (51.8%). CNS imaging was normal in 124 patients (27.9%). Meningeal involvement was noted in 198 patients (44.6%), which included 98 basal meningitis patients (22%), hydrocephalus in 118 patients (26.6%), edema in 96 patients (21%), and vasculitis in 72 patients (16%), tuberculoma in 123 patients (27%), and cerebritis in 17 patients (3%). Only seven patients (1%) had spinal tuberculosis.

Localization of tuberculomas was reported in 115 patients out of 123 patients. Tuberculomas were detected in cerebral hemispheres in 64 patients (55.6%), cerebellum in 35 patients (30.4%), basal ganglia in 20 patients (17.3%), brainstem in 14 patients (12.1%), and deep white matter in seven patients (6%). Multiple localization were observed in 69 patients (60%).

The localization of vasculitis was reported in 68 out of 72 patients. Vasculitis was observed in the basal ganglia in 19 patients (27.9%), middle cerebral artery (MCA) zone in 14 patients (20.5%), cerebellum in two patients (2.9%), posterior cerebral artery (PCA) zone in two patients (2.9%), brainstem in one patient (1.4%), basilar artery zone in one (1.4%). Four patients (5.8%) demonstrated lacunae while four patients (5.8%) had venous infarctions. There were multiple vasculitic lesions in 21 patients (30.8%).

Conclusion

Meningeal involvement was seen in about half of patients (44.6%). Both tuberculomas and vasculitic lesions were generally observed as multiple lesions at multiple sites. Cerebral hemispheres and basal ganglia were the most common localizations for tuberculomas and vasculitides, respectively.

CNS tuberculosis may manifest with various radiological appearances. Knowledge of these various manifestations will aid in early diagnosis of the disease, which requires timely treatment.