Tachyzoites of Toxoplasma Gondii in Cerebrospinal Fluid: A Rare Finding

Congenital toxoplasmosis is caused by a zoonotic protozoa Toxoplasma gondii (T. gondii) acquired transplacentally. Infection is acquired mainly by the ingestion of food or water that is contaminated with the oocysts that are shed by cats. It can also occur as a result of eating undercooked raw meat containing tissue cysts. The diagnosis of cerebral toxoplasmosis is a combination of clinical, radiological, pathological, and microbiological investigations. Various indirect methods are used for the diagnosis of toxoplasmic encephalitis like serological tests, and DNA polymerase chain reaction (PCR). Antitoxoplasma antibody lacks specificity and sensitivity, especially in immunocompromised patients. Direct identification of T. gondii in cerebrospinal fluid (CSF) is extremely rare and their absence does not exclude the diagnosis. The chances of finding tachyzoites in ventricular samples is higher than in lumbar samples. The literature search shows very scarce information of such structures seen on CSF. We present interesting and rare images of tachyzoites of T. gondii in CSF.

We received 3cc CSF sample obtained by ventricular tap of a 3-day-old neonate for a routine examination. The CSF was clear and colorless. The biochemical examination revealed a protein content of 3 g/dL and glucose of 20 mg/dL. Cell count was done on Neubauers chamber. Microscopy revealed a total count of 30 cells/cumm with polymorphs of 20% and mononuclear cells of 80%. Air-dried smears were made from the cytocentrifuged sample and stained with Wrights stain. The smear showed an increase in mononuclear cells including lymphocytes and macrophages. Numerous tachyzoites were seen in these smears. These organisms were small, crescent shaped with a pointed anterior end, and a rounded posterior end [Figure 1].

Further investigations revealed the mother to be immunocompetent. Primary infection by toxoplasma is usually subclinical in immunocompetent individuals and causes devastating disease in the immunocompromised. The baby underwent qualitative glucose-6-phosphate dehydrogenase (G6PD) deficiency detection test (Span diagnostics) as a part of the workup for neonatal hyperbilirubinemia that revealed a deficiency. Studies show the increased risk of toxoplasma infection by 2.5 folds in persons with G-6-PD deficiency as compared to G-6-PD normal individuals. This occurs as a result of both direct destruction of the reticuloendothelial system by toxoplasma organisms and decreased killing effect of the phagocytic cells. Serological tests done by ELISA showed a raised serum IgG toxoplasma of 1972.7 (normal value- <1.6 IU/mL). This commercial test had relative sensitivities between 93.33% and 100% and relative specificities between 96.87% and 100% and did not show cross-reactions with other parasitic infections. Computed tomography (CT) scan of the brain detected moderate hydrocephalus with widespread intracranial calcifications and chorioretinitis. Repeated CT scan brain showed severe raised intracranial tension and increasing hydrocephalus, requiring repeated ventricular taps. In spite of V P shunt insertion the child finally succumbed to raised intracranial tension and sepsis.

Fetal infection can result in visual loss, hearing loss, mental and psychomotor retardation, seizures, hematological defects, hepatosplenomegaly and/or death. Hence early diagnosis is essential to prevent permanent disability or defects in the fetus. The central nervous system toxoplasmosis must be ruled out in a patient with hydrocephalus of unknown origin. The diagnosis of congenital toxoplasmosis involves a battery of tests as no single test is reliable. Prenatal diagnosis is possible by identifying the organism in amniotic fluid. PCR test using placental tissue is useful for the rapid diagnosis of congenital toxoplasmosis. Cytologic detection of tachyzoites is very rare (0.03%).

To the best of our knowledge, this is the first article in Indian literature describing the finding of tachyzoites of T. gondii in cytolgy of CSF. The chances of finding tachyzoites in ventricular samples is higher than in lumbar samples, an observation made by others in their studies was seen in the present case too. Samuel H et al. in their study observed that samples that were cytocentrifuge d and stained with Wrights...
stain was superior to routine millipore filter Papanicolaou stain for the identification of free tachyzoites.[7]

To conclude we wish to emphasize the importance of the diligent search for tachyzoites in CSF samples, which would help in saving time and effective management of these patients. Also one must be familiar with the morphology of tachyzoites while examining CSF more so in a setting with limited diagnostic amenities.

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Conflicts of interest
There are no conflicts of interest.

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