Cerebral Toxoplasmosis Diagnosed by Stereotactic Brain Biopsy Leading to Detection of HIV Infection

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Abstract

Cerebral toxoplasmosis remains the most common cerebral focal lesion with high morbidity and mortality in HIV-AIDS. A 55-year-old G2P1 female being treated for abnormal uterine bleeding presented with fever, paresthesia, altered sensorium, headache, and progressive loss of vision in both eyes. She was referred for neurocysticercosis on account of multiple intracranial space occupying lesions and was subsequently diagnosed to have cerebral toxoplasmosis through stereotactic brain biopsy and imaging, finally leading to the diagnosis of HIV infection. Such patients with unknown immunocompromised status in low HIV-prevalence developing countries may present late on account of seeking delayed medical attention. Cerebral toxoplasmosis is an asymptomatic latent infection known to lead to the diagnosis of HIV infection.

Keywords: Cerebral toxoplasmosis, toxoplasma, HIV-AIDS, brain biopsy

Introduction

Cerebral toxoplasmosis remains the most common cerebral focal lesion with high morbidity and mortality in HIV-AIDS. Toxoplasmosis is caused by Toxoplasma species which are obligate intracellular parasites seen worldwide. Cats are definitive hosts, while mammals and birds are intermediate hosts. Infection is acquired through cysts from undercooked meat, vegetables, feline feces, soil and water. Bradyzoites or slow replicating forms encyst and undergo endodyogeny releasing asexual infective tachyzoites which are motile active forms causing tissue destruction. Tachyzoites disseminate through macrophages to form cysts in brain and retina where they form tissue cysts containing bradyzoites (1). Cerebral toxoplasmosis may present with features of focal neurological deficit, altered consciousness, seizures, intracranial hypertension and cerebral edema. Cerebral toxoplasmosis was incidentally detected through stereotactic brain biopsy in a patient having undergone total abdominal hysterectomy for abnormal uterine bleeding, which further led to the diagnosis of HIV infection.

Case Report

A 55-year-old G2P1 female under treatment for abnormal uterine bleeding presented with progressive intermittent fever, left sided paresthesia, weakness, altered sensorium, headache and progressive loss of vision in both eyes of five days duration. There was no contributory past history. Immediate work-up revealed multiple intracranial spaces occupying lesions (ICSOL) and the patient was referred to a tertiary care facility with a provisional diagnosis of neurocysticercosis. Subsequently, the patient exhibited progressive worsening of general condition, muscle power and Glasgow coma score along with bilateral scattered lung crepitation requiring mechanical ventilation. ICSOLs in right basal ganglia and thalamus with midline shift and obstructive hydrocephalus were seen on computed tomography (CT). Magnetic resonance imaging (MRI) revealed multiple hyperintense ring enhancing lesions with perilesional edema in right thalamus, cerebellum, frontal, parietal and occipital lobes (Figure 1). Other investigations were within normal limits. The patient was taken for stereotactic brain biopsy following which inflamed areas with lymphoid aggregates were found to have epitheloid histiocytes, neutrophils and few lymphoplasmacytic cells. Basophilic cyst like structures consistent with Toxoplasma bradyzoites were seen (Figure 2). Lymphocytotoxic antibodies in inflammatory component and glial fibrillary acidic protein in glial tissue depicted inflammatory picture on immunohistochemistry. HIV was confirmed by enzyme immunoassay and Anti-Toxoplasma IgG titers were found to be 109 IU/ml (normal values <10 IU/ml) by chemiluminescence. The patient was subjected to seizure and infection prophylaxis under steroid cover along with Sulfamethoxazole 400 mg-Trimethoprim 80 mg thrice a day were but progressive worsening conditions led to a fatal outcome.
edematous and inflamed brain tissue with lymphoid infiltration, for toxoplasmosis may reveal necrotic abscess surrounded by toxoplasmosis may be masked by comorbid infections (7). Biopsy
Toxoplasma do no secretory antigens may aid diagnosis (5). Tit
avidity assays, indirect immunofluorescence and excretory
in blood and CSF, enzyme linked immunosorbent assay (ELISA),
status leading to increase in number of tachyzoites (2). Other than
eection and are relatively resistant to antiprotozoal
fection and are attributable to latency associated with both conditions.
Cerebral toxoplasmosis being an asymptomatic latent infection
may be diagnosed late in low HIV-prevalence (0.4-0.8%)
developing countries on account of seeking delayed medical
attention. Cerebral toxoplasmosis has been reported to lead to the
diagnosis of HIV infection (3). Severe cerebral toxoplasmosis in
HIV-AIDS may have a favorable prognosis in 50% cases, however
patients frequently succumb owing to disseminated infection (11).
A high index of suspicion is required for timely diagnosis in cases
where clinical presentation is not indicative. Patients with
unknown immunocompromised status in the population are more
likely to transmit HIV to uninfected population. Active
surveillance of HIV through population based surveys are
warranted for early diagnosis, treatment and control of HIV-AIDS.

Fig 1. T1W precontrast ring enhancing lesions in right thalamus
(A), basal ganglia (A), midbrain (B), cerebellum (C), frontal (D),
temporal (E) and occipital (F) lobes with pressure effects on third
ventricle.

Fig 2. Minute basophilic structures representing bradyzoites within
a protozoal pseudocyst (Hematoxylin-eosin, x400).

**Discussion**

Cerebral toxoplasmosis has a seroprevalence of 10-30% in
immunocompetent hosts although it may be an AIDS defining
illness in 75% HIV positive cases (2, 3). Bradyzoites lead to
persistent infection and are relatively resistant to antiprotozoal
drugs owing to slow replication. A hitherto latent toxoplasmosis
may be reactivated consequent to deterioration in immunological
status leading to increase in number of tachyzoites (2). Other than
MR, spectroscopy and perfusion can aid in diagnosis (4). IgM/IgG
in blood and CSF, enzyme linked immunosorbent assay (ELISA),
avidity assays, indirect immunofluorescence and excretory-
secretory antigens may aid diagnosis (5). Titors negative for
Toxoplasma do not exclude a positive diagnosis (6). Further,
toxoplasmosis may be masked by comorbid infections (7). Biopsy
for toxoplasmosis may reveal necrotic abscess surrounded by
edematous and inflamed brain tissue with lymphoid infiltration,

thrombosis, fibrinoid necrosis and fibrous obliteration. Tachyzoites
are faintly basophilic, crescentic or lunate, measuring 2X6 µm
while bradyzoites are basophilic, PAS positive, chronic encysted
forms in the brain measuring up to 200 µm (8). Immunohistochemistry distinguishes inflammatory from neoplastic etiology. Molecular identification through various modifications of
polymerase chain reaction (PCR), PCR-ELISA and hybridization
assay can help diagnosis in seronegative cases (9). Oral
sulfamethoxazole-trimethoprim, pyrimethamine plus sulphadiazine
and clindamycin plus pyrimethamine may be used for treatment
(10).

The patient was provisionally diagnosed for
neurocysticercosis as it is the commonest cause of ICSOL in South
Asia. No features of toxoplasmosis or HIV were evident. CT and
MRI of brain lead to the decision of stereotactic biopsy which
helped diagnose cerebral toxoplasmosis and further detection of
HIV infection. Such an invasive procedure could have been
averted if clues to HIV and toxoplasmosis existed. The delayed
detection of both cerebral toxoplasmosis and immunocompromised
status is attributable to latency associated with both conditions.

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**Conflicts of Interest**: None

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