CASE REPORT

Acquired Toxoplasmosis Presenting with a Brainstem Granuloma in an Immunocompetent Adolescent

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Background: Toxoplasmosis is an uncommon disease in immunocompetent people. **Case characteristics:** We report an adolescent boy with central nervous system toxoplasmosis who presented with progressive lower cranial nerve palsies and a ring-enhancing lesion on neuroimaging. **Intervention:** Diagnosis of toxoplasmosis was confirmed on histopathology of the excised lesion. **Message:** Toxoplasmosis should be considered in the differential diagnosis of focal brain lesions irrespective of immune status.

Keywords: *Immuno-deficiency, Ring-enhancing lesion, TORCH infection*.

Symptomatic toxoplasmosis is uncommon in immunocompetent children. Presentation is generally with localized or generalized lymphadenopathy [1], and CNS involvement is extremely rare. We report an adolescent boy who presented with lower cranial nerve palsies, and MRI brain showed a heterogeneously enhancing mass lesion in the brain stem, which on histopathological evaluation was suggestive of toxoplasmosis.

CASE REPORT

A 14-year-old boy, who was previously well and developmentally normal with normal nutritional status and no past history of any chronic illness or any medication use was referred to our hospital with a 10-day history of difficulty in closing the right eye, deviation of angle of the mouth to the left, drooling of saliva, nasal regurgitation of feeds, nasal twang to voice and an unsteady wide-based gait. There was no history of convulsions or altered sensorium. There was no history of any preceding febrile illness. On examination, he was hemodynamically stable and conscious with GCS of 15. There was upper motor neuron palsy of the right facial nerve, with involvement of the IX and X cranial nerves. Rest of the neurologic examination was normal. No adenopathy or hepatosplenomegaly was noticed.

Blood counts, Erythrocyte sedimentation rate (ESR), liver and renal functions were normal. Mantoux test was negative and there were no Acid Fast Bacilli seen on Ziehl Neelsen stain of gastric aspirate. MRI brain showed a hypo-intense lesion in the pons extending into the medulla. The lesion was heterogeneously enhancing with contrast with vague ring-enhancement dorsally **(*Fig.* 1)**. The possibility of a tuberculoma was considered. CSF analysis was within normal limits. GeneXpert MTB/RIF (Nucleic Acid Amplification Test) in CSF was negative. He had progressively increasing difficulty in swallowing,

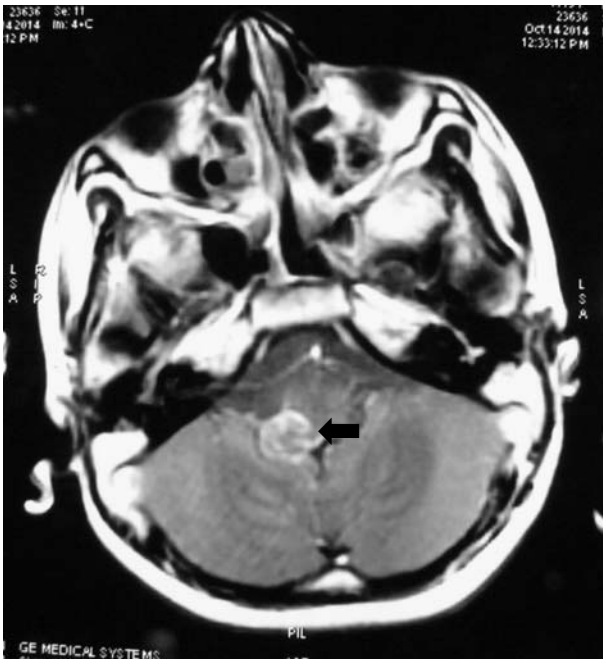

***Fig.* 1** *MRI brain showing heterogeneous ring-enhancing lesion in the brainstem.*

absent gag reflex and also developed right hemiparesis. Due to this inability to maintain his airway, he was intubated and subsequently tracheostomy was done. In view of progression of neurological deficits and lack of diagnosis so far, it was decided to proceed with microsurgical biopsy and decompression of the lesion. Repeat MRI brain prior to surgery showed a slight increase in the size of the lesion.

He underwent a sub-occipital craniotomy with excision of the lesion via a posterior midline approach. Using the right velo-tonsillar route, the lesion was visualized. Lesion was xanthochromic on the surface and avascular with a pseudocapsule. It was excised completely. Tissue was sent for histopathological examination. Intraoperatively, the lesion seemed to be a circumscribed glioma. On histopathology, tissue showed zones of necrosis, thrombosed vessels and aggregates of large, foamy histiocytes with a single bradyzoite. Toxoplasma immunostain highlighted clusters of tachyzoites **(*Fig.* 2)**. The histological features were characteristic of the encephalitic stage of toxoplasma infection.

In view of the above diagnosis, he was further worked up with regards to his immune status. HIV ELISA was negative (done twice). Immunoglobulin profile was normal and peripheral blood flow cytometry showed normal B and T cell markers. Toxoplasma IgM was also done retrospectively after the HPE report was available and it was positive. Due to non-availability of Sulfadiazine-Pyrimethamine combination, which is the recommended treatment for this condition, Trimethoprim – sulfamethaxazole (Cotrimoxazole) was started. However, there was no improvement in the neurological status one week after initiation of therapy. and the patient developed signs of brain stem dysfunction in the form of fluctuating heart rates and blood pressure. Two weeks after initiation of therapy, he died of a sudden cardiac arrest.

DISCUSSION

Toxoplasma gondii is transmited to humans usually by ingestion of cysts/oocysts, transplacental or less commonly via blood transfusion, organ transplantation and laboratory accidents [1]. While clinical manifestation is common in immuno-compromised hosts, only about 10-20% of immuno-competent individuals present with symptoms. The most common presentation is asymptomatic cervical lympha-denopathy while meningoencephalitis, polymyositis and myocarditis are less commonly seen [2].

CNS toxoplasmosis is well documented in patients with AIDS and is the commonest cause of focal brain lesions in these patients [3]. Other causes of focal lesions in brain stem which need to be considered, especially in an immunocompetent individual include brain stem glioma, acquired demyelinating disorders (multiple sclerosis, acute disseminated encephalomyelitis, and neuromyelitis optica), infectious brain stem encephalitis, rhombencephalitis, CNS involvement of connective tissue disorders and other vasculitides (systemic lupus erythematosus, Neuro-Behcet disease, and neurosarcoidosis), primary CNS vasculitis, osmotic demyelination syndrome (CPM), brain stem ischemic

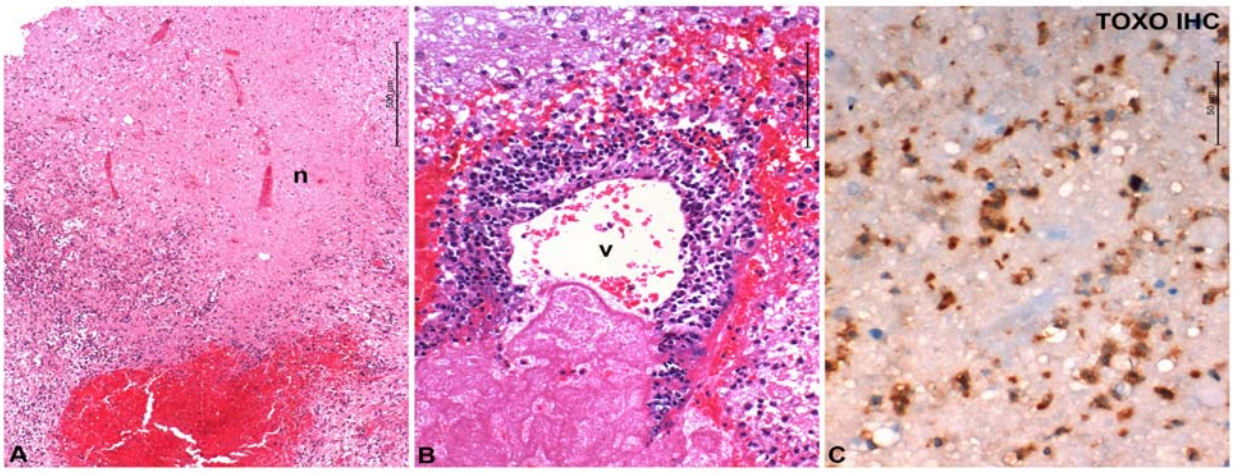

***Fig.* 2** *Biopsy shows large zones of necrosis (n), fresh hemorrhage and dense inflammation (a). Thin walled veins show inflammation and necrosis of wall (b). Several tachyzoite form of Toxoplasma gondii seen in the lesion on immunohistochemistry (c).*

lesions and brain stem vascular anomalies [4]. In immunocompetent individuals, CNS involvement with toxoplasmosis is extremely rare and is generally associated with single or multiple focal lesions [2]. Isolated brain stem toxoplasmosis with no apparent immunodeficiency, as in our patient, has been reported in one other young adult [5].

The diagnosis is made by isolation of the organism, demonstration of tachyzoites histopathology or by positive plasma serology [6]. Neuroimaging features and a response to therapy have also been used as a means of diagnosis in individuals with AIDS [3,7]. On MRI, the lesions typically appear hypointense on T1 weighted images with ring enhancement seen in about 70% of cases. The treatment of choice for toxoplasmosis in an immunocompetent child is a combination of pyrimethamine (1mg/Kg/day) and sulfadiazine (50mg/Kg 12-6 hourly) for four to six weeks or two weeks beyond resolution of symptoms [5]. CNS toxoplasmosis is found to respond well to antiparasitic therapy though relapse is common in immunocompromised children. Immunocompetent adults have shown a good response to both pyremethamine-sulfadiazine and co-trimoxazole.

The reason for a poor response to therapy is unclear in this child. However, as this is an easily treatable condition, toxoplasmosis should be considered in the differential diagnosis of focal brain lesions, even in immune-competent individuals.

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