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Original Research Paper

General Medicine

UNUSUAL COMPLICATION OF TUBERCULAR MENINGITIS AS BILATERAL VISION LOSS

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KEYWORDS :

INTRODUCTION:

A significant burden of disease throughout the world with 10 million estimated incident cases and 1.5 million estimated deaths in 2018 caused by Tuberculosis [1]. The most severe form of TB is Tuberculous meningitis (TBM) which carries a major risk of death and serious disability [2,3]. Patients surviving from TBM are often left with chronic neurological impairment as a result of complications including hydrocephalus,strokes, and seizures [4–7]. Vision impairment is a particularly deleterious sequelae of TBM that can occur as a consequence of the disease process and/or anti-tuberculosis treatment (ATT) [8]. Here wereport a case of TBM complicated by the rapid onset of binocular blindness (World Health Organization (WHO) definition; presenting visual acuity <3/60 or 20/400 [9]) that was managed medically with a mild outcome. Tubercular meningitis is associated with significant complications of CNS associated with non specific and heterogeneous clinical symptoms . Here we have reported a case of 19 year old female presenting with fever, intractable vomiting, headache ,neck pain, convulsion and vision loss.

Case Report:

A 19 year old female came with complaints of Fever on and off since 15 days , Headache since 15 days ,episodes of projectile vomiting since 8 days ,severe pain in neck since 8 days, convulsions since 3 days and gradual onset loss of vision since 3 days, convulsions since 3 days Patient was apparently alright 15 days back when she developed fever which was acute in onset present throughout the day and was relieved on medication .Fever was not associated with any rash or joint pain or chills .Fever was associated with episodes of severe frontal headache dull aching type and projectile vomiting 2-3 episodes per day since 8 days patient had convulsions 3 episodes each lasting for 5 mins .During the episode patient had uprolling of eyes, deviation of angle of mouth and stiffeness of body associated with incontinence of urine and postictal confusion lasting for 10 min . 1 day later patient gives history of loss of vision. The degree of visual loss increased in the last 2 days till the day of admission where patient has only light perception.She also has past history of episodes fever on and off since 1 yr , generalised weakness, weight loss of 13 kg in last 1 year and history of loss of appetite since 6 months. Patient had history of contact with TB positive patient(grand father of the patient).During this admission, patient was vitally stable. There was 5/5 power in both UL and LL, plantars were bilaterally extensor ,deep Tendon reflexes were diminished and pupils were bilaterally equal and Reactive to light. Sensory and higher mental functions were normal. Fundus examination revealed optic disc edema. Blurring of optic disc margin and pale optic disc .Guarded lumbar puncture was done.CSF analysis had increase in ADA levels ,increase in microprotein levels.MRI revealed exudates in basal cisterns and leptomeningeal enhancement which were suggestive of meningitis.Patient was started on Anti Tubercular Medication and Steroids based on the NTEP guidelines ,anti epileptics , adding high-dose acetazolamide and maintaining the same dose of dexamethasone with an extended tapering course over six months. In addition, we removed ethambutol and substituted moxifloxacin for the two-month intensive phase. Her outcome was favorable with complete vision recovery in the left eye, residual vision impairment in the right eye, and reduced hydrocephalus (figure 1 & 3)

DISCUSSION :

A retrospective cohort study using administrative claims data of 806 patients treated for TBM in the United States reported vision impairment in 17.5% of patients at 6 months [5]. A clinical trial conducted in Vietnam comparing a standard, 9-month ATT regimen with an intensified ATT regimen (higher dose rifampin and levofloxacin for the first 8 weeks) reported a higher frequency of vision impairment (not defined) in the intensified-treatment group (3.4% versus 1.0%) [7]. Vision impairment is a complication of TBM that can occur as a result of multiple processes including compression of the optic chiasm due to hydrocephalus, inflammation and ischemia of the optic chiasm and/or optic nerves due to arachnoiditis , papilledema from increased intracranial pressure, occipital infarction due to vasculitis, and toxic effects of anti-tuberculosis medications [8]. In a prospective study of 101 patients with TBM in India, low vision (visual acuity <6/18 but ≥3/60 in the better eye) and blindness (visual acuity <3/60 in the better eye) were present at baseline in 19.8% and 4% of patients and in 10.4% and 3.1% of patients after 6 months of ATT [9]. Hydrocephalus is one of the earliest and most frequent complications of TBM and is often more severe in children [11–15]. Treatment of hydrocephalus is not standardized and different approaches have been advocated. For patients with presumed communicating hydrocephalus, medical treatment combining furosemide, acetazolamide, and corticosteroids with repeated lumbar puncture pressure measurements has been suggested [15–17]. Optochiasmatic arachnoiditis (OCA) and optochiasmal tuberculoma are severe complications of TBM associated with profound visual impairment or blindness [19–21]. In OCA, visual loss results from ischemia of the optic chiasm and/or optic nerves due to basal inflammatory exudates and vasculitis of the vasa nervosum. Optochiasmatic tuberculomas have been reported to develop paradoxically after commencing ATT [22–24]. Vision impairment due to OCA is typically insidious and slowly progressive but has been reported to occur suddenly and rapidly [21]. MRI findings include enhancement involving the optic chiasm, cisternal segment of optic nerves,

interpeduncular fossa, pontine cistern, and suprasellar region with or without discrete tuberculomas [25]. Treatment of OCA commonly includes ATT and adjunctive intravenous or oral corticosteroids with complete recovery of vision reported in some cases [21]. Additional therapies such as thalidomide and intrathecal hyaluronidase have been utilized with variable success [21,26].

A select group of patients may benefit from neurosurgical decompression of the optic chiasm although the evidence is limited [21]. Ethambutol hydrochloride is one of the first-line drugs used in the treatment of TB [27]. It is the least toxic of the first-line agents with a reported incidence of drug-related visual impairment of 22.5 per 1000 persons [28]. Ocular toxicity from ethambutol presents as a retrobulbar optic neuritis involving the axial and/or periaxial fibers [29]. Proposed mechanisms include the metal chelating effects of ethambutol and associated disruption of mitochondrial function and excitotoxic pathways involving glutamate [31,32]. Clinical presentation of ethambutol-related optic neuropathy involves bilateral, progressive, painless blurring of vision and decreased color perception [29–31]. Central vision is commonly affected although other visual field abnormalities like bitemporal defects or peripheral field constriction have been reported [33–35]. Optical coherence tomography (OCT) is a technology for measuring the retinal nerve fiber layer thickness that can detect early damage not visible by direct funduscopic examination [36]. Ethambutol ocular toxicity usually develops after several months of exposure but there are reports of severe visual impairment occurring as early as a few days after commencing treatment [37,38]. The incidence of ocular toxicity secondary to ethambutol appears to be dose-related [28,29] and predictors include poor renal function, which leads to failure to excrete the drug hence its accumulation, aging, prolonged duration of ethambutol use, a higher dose, hypertension, diabetes and concurrent optic neuritis related to tobacco and alcohol consumption [31].

Ethambutol should be stopped immediately when significant vision impairment is detected and other anti-tuberculosis agents should be considered [27,29,39,40]. Toxicity can be reversible with most patients recovering vision months after stopping the medication [28,34]. If vision fails to improve after discontinuing ethambutol, isoniazid should also be stopped [40]. Isoniazid is an anti-tuberculosis drug that rarely causes visual impairment due to optic neuropathy [41]. Our patient developed binocular blindness two weeks after diagnosis of and initiation of treatment for TBM. Although brain CT showed an increase in hydrocephalus, we could not conclude that hydrocephalus was the cause for the severe loss of vision. Optochiasmatic arachnoiditis and ethambutol-related optic neuropathy could have caused or contributed to our patient's vision impairment. She was alert, cognitively intact, and ambulatory at the time of the second CT. She did not have papilledema. Therefore, we decided that the risks of surgical treatment of hydrocephalus with ventriculo-peritoneal shunting outweighed the potential benefits and decided to treat her hydrocephalus medically by adding high-dose acetazolamide and maintaining the same dose of dexamethasone with an extended tapering course over six months. In addition, we removed ethambutol and substituted moxifloxacinfor the two-month intensive phase. Her outcome was favorable with complete vision recovery in the left eye, residual vision impairment in the right eye, and reduced hydrocephalus.

CONCLUSION:

Early assessment and regular monitoring of vision in patients with TBM is recommended. If feasible, a thorough baseline ophthalmologic evaluation should be performed before commencing treatment with ATT that includes ethambutol and/or isoniazid. Significant visual loss in either eye should prompt repeat brain imaging and ophthalmological consultation. Interventions should include optimization of medical treatment for hydrocephalus and meningeal inflammation in addition to immediate withdrawal of ethambutol. Neurosurgical consultation should be obtained for cases with severe hydrocephalus and for cases with new or enlarging tuberculomas affecting the optic chiasm.

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Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

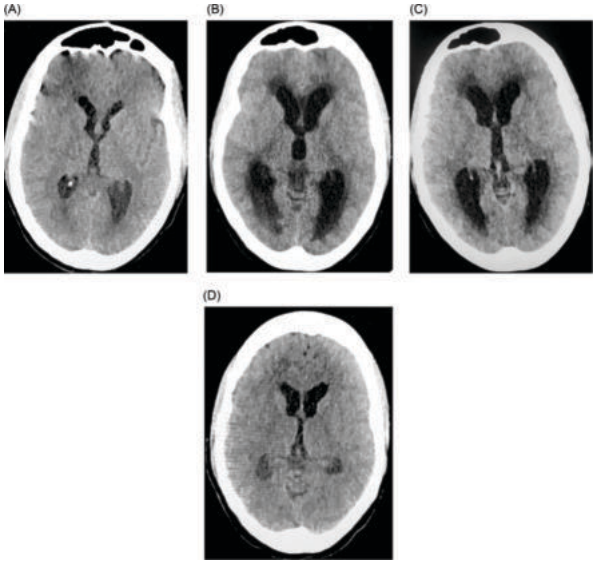

Fig. 1. Non-contrast CT of the brain. (A) admission to hospital; (B) week 2 of ATT; (C) week 6 of ATT; (D) week 11 of ATT. (ATT = anti-tuberculosis treatment).

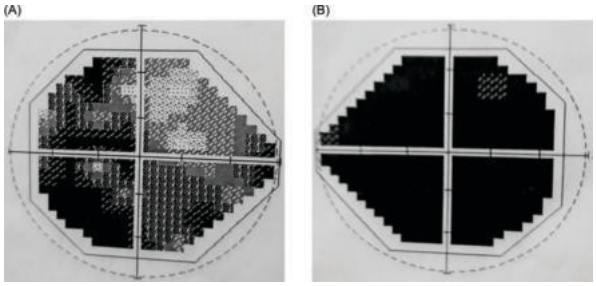

Fig. 3. Automated visual field test (Optopol PTS 1000, Optopol Technology S.A., Zawiercie, Poland). (A) left eye; (B) right eye.

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