Case Report

Cornea Verticillata With Toxic Optic Neuropathy: A Case Report

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Abstract *Corneal verticillata presents with whorl like brown deposits in corneal epithelium. They rarely result in reduced vision. The most important potential side effect of anti-tubercular drugs is optic neuritis and can result in corneal verticillate. We report a case of young male with chief complaint of diminution of vision in both eyes undergoing anti-tubercular treatment for pulmonary tuberculosis with corneal verticillata in both eyes. His visual acuity was 3/60 in both eyes with normal fundus findings. This patient had toxic optic neuropathy due to linezolid. Linezolid and clofazimine were discontinued and rapid improvement of visual acuity was seen. Keywords: Corneal verticillata, toxic optic neuropathy, linezolid and clofazimine.*

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Keywords: *Corneal Verticillata, Toxic Optic Neuropathy, Linezolid And Clofazimine*

Introduction

Cornea verticillata, or vortex keratopathy, manifests as a clockwise whorl-like pattern of golden-brown or grey deposits in the inferior interpalpebral portion of the cornea. A variety of medications bind with the cellular lipids of the basal epithelial layer of the cornea because of their cationic and amphiphilic properties. Ocular medications deposit within the cornea as a result of their concentration within the tear film, limbal vasculature, or aqueous humor or because of their chemical properties i.e., specific affinity to corneal tissue. Certain drugs deposit in a characteristic pattern and in particular corneal layer. It is unusual for these deposits to result in reduced vision. Cessation of the drug often eliminates the symptoms and resolves the drug deposits.[1,2]

Cornea verticillata presents as a characteristic whorl like corneal deposits and it rarely results in diminuition of vision. Eye medications bind with the cellular lipids of the basal epithelial layer of the cornea because of their cationic and amphiphilic properties and gets deposited in particular corneal layer. Stopping the drug usually resolves the drug deposits.[1,2]

Toxic optic neuropathy (TON) is a group of medical disorders characterized by visual impairment due to optic nerve damage by a toxin. The condition often presents as a painless, progressive, bilateral, symmetrical visual decline with variable optic nerve head pallor.[2,3] This can be characterized by papillomacular bundle damage, central or centrocecal scotoma, and reduced color vision. Toxic optic neuropathy [TON] manifests as a painless, progressive, bilateral and symmetrical diminution of vision with variable disc pallor. Variety of toxins can damage optic nerve and can cause TON.Antitubercular drugs such as ethambutol and isoniazid and antibiotics such as linezolid are among the many causes of toxic optic neuropathy.[14,15]

Case Report

A 20-year-old male patient presented to a tertiary eye centre with a chief complaint of painless progressive diminution of vision in both eyes from past 1 month. There was history of an ongoing anti-tubercular treatment for pulmonary tuberculosis.

He was apparently asymptomatic 17 months back when he developed moderate to high grade fever with chest pain. He was diagnosed with pulmonary tuberculosis and was given four drug regimen anti-tubercular treatment. From past 6 months he has received treatment for extremely drug resistant tuberculosis with following drugs bedaquiline (400mg), linezolid (600mg), clofazimine (100mg), cycloserine (750mg), pyrazinamide (1750mg), ethionamide (750mg), pyridoxamine (100mg). He also complained of skin hyperpigmentation throughout the body. Darkening of hand and foot (figure 1A and 1B) was present which was not present earlier as per the patient. There was no significant personal or family history.

Figure 1: *(1A) and (1B) represent darkening of hand and foot*

On examination visual acuity was 3/60 in both eyes which improved to 6/60 with pinhole in both eyes. His pupils were circular and sluggish in response to light. Color vision assessment using Ishihara color plates revealed red green dyschromatopsia. Slit lamp examination showed reddish brown corneal deposits in whorl like pattern involving central to paracentral area at the level of the basal epithelium in both eyes. Using higher magnification (16x) reddish brown pigmentation was well appreciated (figure 2A and 2B). His intraocular pressure was 16mmHg in both eyes and visual field analysis showed central visual field defects in both eyes. Lens and fundus examination (figure 3A and 3B) were within normal limits. His visual field analysis (figure 4A and 4B) showed central visual field defects in both eyes and OCT RNFL showed thinning in superior quadrant in both eyes. Based on above examination findings we diagnosed this case as corneal verticillata with toxic optic neuropathy in the form of retrobulbar optic neuritis in both eyes.

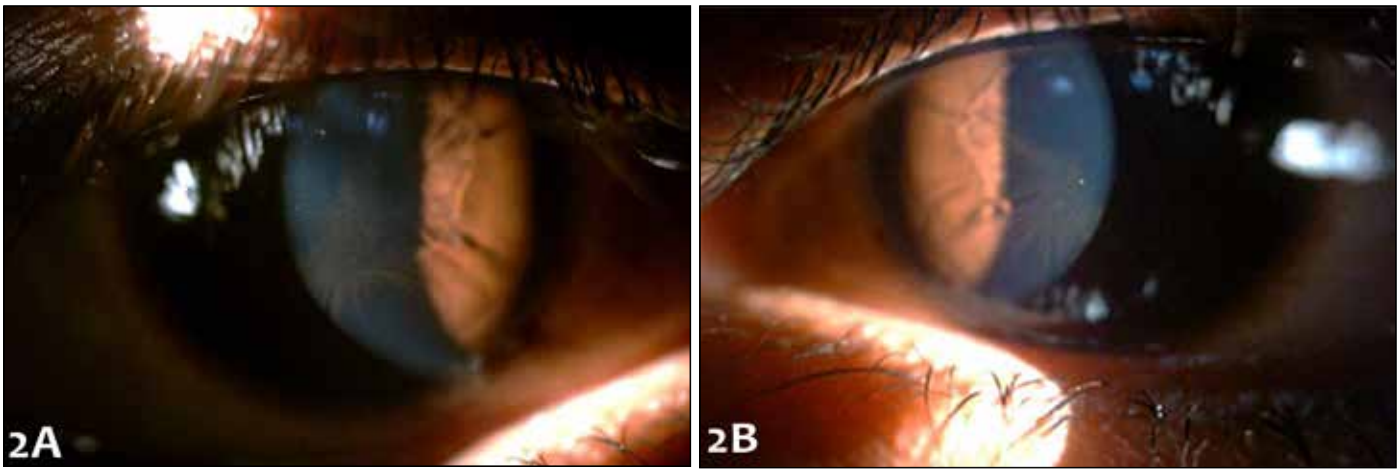

Figure 2: *(2A) and (2B) represent slit lamp picture of corneal verticillata in both eyes.*

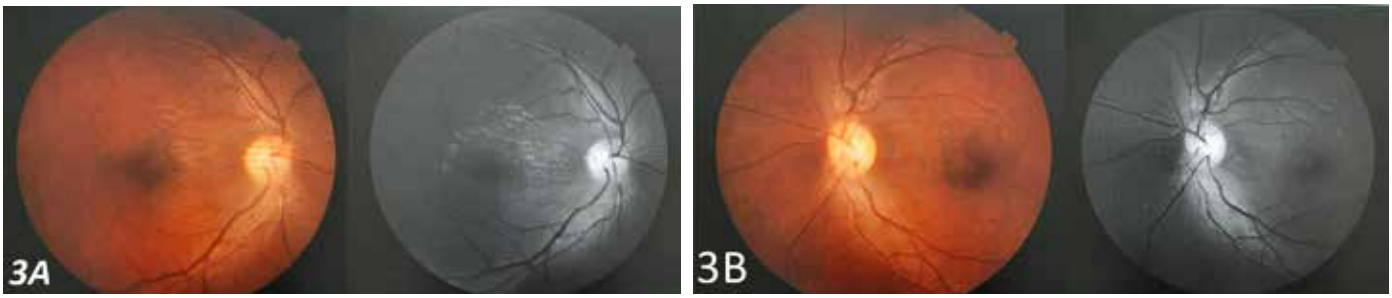

Figure 3: *(3A) and (3B) represent normal fundus findings in both eyes.*

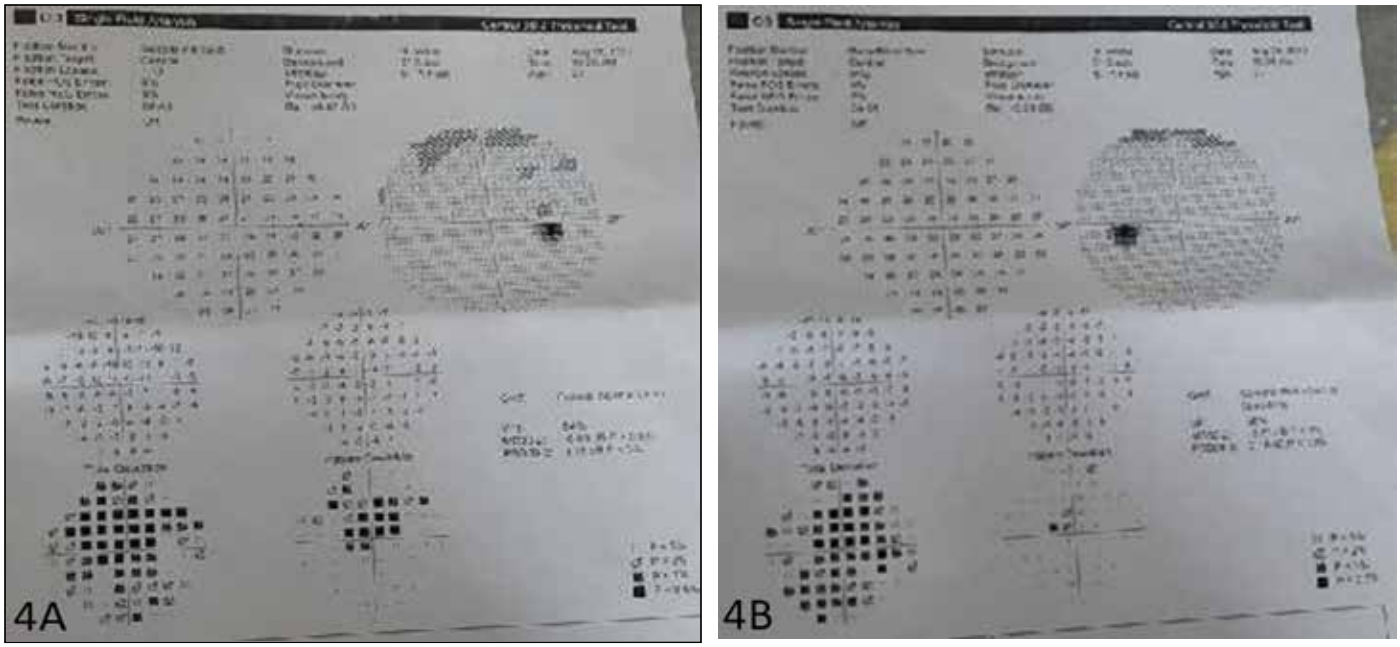

Figure 4: *(3A) and (3B) represent normal fundus findings in both eyes.*

In consultation with pulmonologist, he was advised to stop tablet linezolid for 1 week and tablet clofazimine for 5 days. Tablet linezolid was restarted in lower dose (½ tablet for 3days/week for 2 weeks then ½ tablet daily) and tablet clofazimine was restarted in full dose after 1 week and 5 days respectively. At 2 months of follow up visit his visual acuity was 6/6 in both eyes and color vision was restored to normal though the corneal verticillata was still visible faintly.

Discussion

Corneal verticillata is characterized by whorl-like corneal epithelial deposits. It is unusual for these deposits to result in reduced vision, but if there is reduced vision the possibility of optic neuropathy among other causes should be considered. The deposits typically resolve with discontinuation of the responsible drugs.

Our patient had diminution of vision with BCVA 6/36 in both eyes with whorl like brown pigment deposits in corneal epithelium of both eyes with normal fundus findings in both eyes. We attribute clofazimine to be the cause of corneal verticillate in our patient. Clofazimine produces pink to brownish skin pigmentation in 75-100% of patients within a few weeks, as well as similar discoloration of most bodily fluids and secretions. These discolorations are reversible but may take months to years to disappear.[4]

Toxic optic neuropathies are characterized by painless, bilaterally symmetric diminution of vision due to optic nerve damage causing central or centrocecal scotoma. Linezolid is a protein synthesis inhibitor and prevents formation of ribosome complex and binds to 23S ribosomal RNA of 50S subunit. Linezolid is an effective treatment against infections caused by multidrug-resistant Gram-positive bacteria. Linezolid is one of the core drug according to WHO criteria for treatment of multidrug resistant mycobacterium tuberculosis. Linezolid acts by inhibiting protein synthesis by binding to 23S rRNA and stopping ribosomal complex formation.Various drugs can cause TON and result in central or centrocecal scotoma.Various case reports established optic and peripheral neuropathy in linezolid treated patients for more than 28 days.[5,6,7] Ethambutol toxicity has been identified as dose-related, with a reported incidence of 18% in patients receiving >35 mg/kg/day, 5-6% with 25 mg/kg/day, and <1% with 15 mg/kg/day of ethambutol, for more than two months.[6,7]

Ethambutol induced toxic optic neuropathy was less likely in our patient because he did not have any vision related complaint for the initial 11 month of treatment and it was only after he had received linezolid (600mg/day) for 6 months, visual decline occurred. We attribute toxic optic neuropathy to linezolid in this patient because visual improvement started after discontinuation of linezolid. Other than stopping the drug, no specific treatment is available for the optic neuropathy caused by the responsible drug. It is imperative to know the importance of monitoring visual function in patients on long-term linezolid therapy because early recognition of toxicity and discontinuation of drug results in complete visual recovery.

Conclusion

Pulmonologists must advise for a complete ophthalmological examination before starting anti-tubercular treatment. Patients should be counselled for potential side effects of the treatment and the importance of regular eye check-ups during the course of treatment.

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