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Optic Neuritis Induced By Ethambutol

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Abstract:
Ethambutol (EMB) is one of the drugs in primary treatment of tuberculosis. EMB rarely induces ocular toxicity which is either dose-dependent or duration-dependent effect and is often reversible on therapy discontinuation. The toxicity has been reported at 4 to 12 months of the initiation of the therapy.[1] Here we report a case of 44year old female patient presented with the diminution of vision in both the eyes after 11 months of initiation of treatment. Following a series of eye examinations, the patient was diagnosed with EMB induced ocular toxicity and hence the drug was discontinued. The patient started recovering after the medicine was discontinued. This case study helps people comprehend the clinical presentation and treatment of ethambutol induced optic neuritis.

Keywords: *Ethambutol, Optic neuritis, Tuberculosis*

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I. Introduction

Tuberculosis is one of the major global health burdens. It is more prevalent in India, about 316 per 1 lakh population.[5] The primary anti-tubercular treatment for extra pulmonary tuberculosis includes rifampin, isoniazid, pyrazinamide and ethambutol.

Ethambutol is a bacteriostatic antimicrobial used as primary treatment against tuberculosis. However, it can cause adverse effects such as visual disturbances, liver problems, and allergies. Ethambutol-induced optic neuropathy (EON) is a well-known consequence of ethambutol use, the severity of which varies with dose. EON is characterized clinically by painless loss of central vision and cecocentral scotomas in the visual field. The prevalence of EON in various nations is close to 1%.[2]

The precise mechanism of action of ethambutol is unknown; however, it has been proposed that it acts as a chelating agent, disrupting one of several metal-containing enzyme systems in mycobacteria nucleic acid structures.[3] Ethambutol caused lesions in the optic chiasm and optic nerves in early animal trials.[4] Reversibility of optic neuritis has been regarded as dose- and duration-related, and reversible upon therapeutic withdrawal.

Unfortunately, patient education and quick drug discontinuation may not always improve the final vision outcome. Because the toxicity appears to be unpredictable, the medicine is to be used with caution.

II. Case Presentation

A 44-year-old female weighing 67kg was diagnosed with extra pulmonary tuberculosis. She presented to our centre 11 months back complaining of swelling in the right side of the neck which was diagnosed to be cervical lymphadenopathy due to extrapulmonary tuberculosis. After performing necessary investigations, she was started on anti-tubercular treatment with 5 tablets fixed dose combination (FDC) comprising total of isoniazid(375mg), rifampicin (750mg), pyrazinamide(2000mg) and ethambutol(1375mg) in a day.

The recommended dosages of the drugs in the FDC according to the weight of the patient include isoniazid(335mg), rifampicin (670mg), pyrazinamide(1340mg), ethambutol (1005mg).

After 11 months of treatment the patient presented with blurring of vision for both far and near, the onset of which was a month ago. On examination her visual acuity was counting fingers (CF) at 3m and improved with pinhole to 6/60 in both the eyes, intraocular pressure (IOP) was 18mm of Hg.

On follow-up after 20 days, the visual acuity was CF 3m in the right eye and CF 1m in the left eye with no improvement with pinhole in both the eyes. Color vision was impaired in both the eyes. Visual field test shows subtotal visual field loss. On distant direct ophthalmoscopy, the optic disc of both eyes was pale. Considering the possibility of EMB-induced optic neuritis, the patient was advised for cessation of ethambutol and given individual drugs of the continuation phase that includes isoniazid 300mg and rifampicin 650mg. She was started

with steroids along with Tablet methylprednisolone 50mg and pantoprazole 40mg. The patient was then lost to follow up and presented after 2 months. Her visual acuity was tested and found to be 6/60 in the right eye and CF at 3m in the left eye that improved with pinhole to 6/60.Near vision was N12 in the right eye and N18 in the left eye. Color vision was 1/17 in both eyes. Optical Coherence Tomography (OCT) was advised. The results showed pale optic disc and the rest was within normal limits. Visual field test shows subtotal visual field loss. Prescribed Tablet Neurobion forte along with steroids. Her vision was gradually improving as seen in figure 1a and 1b to 2a and 2b.

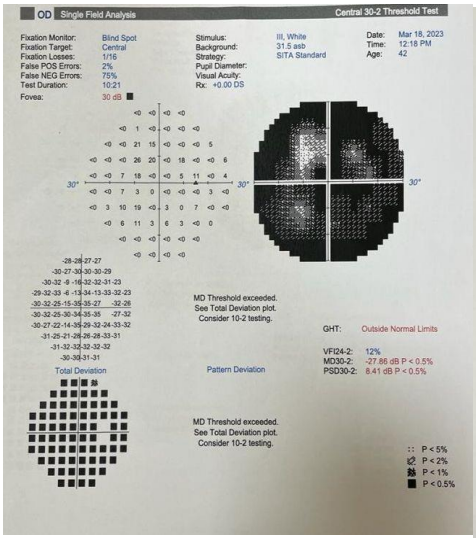

Figure 1a

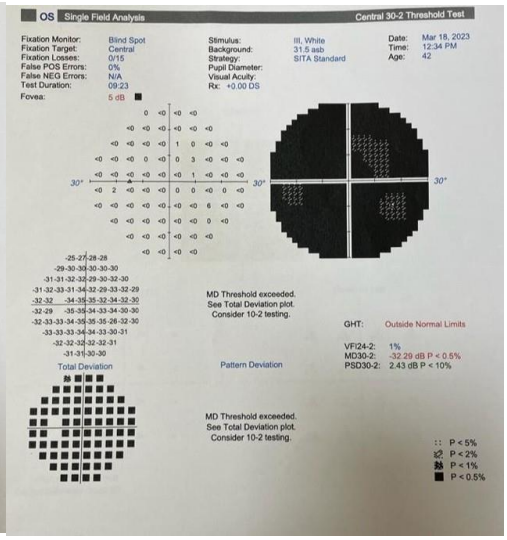

Figure 1b

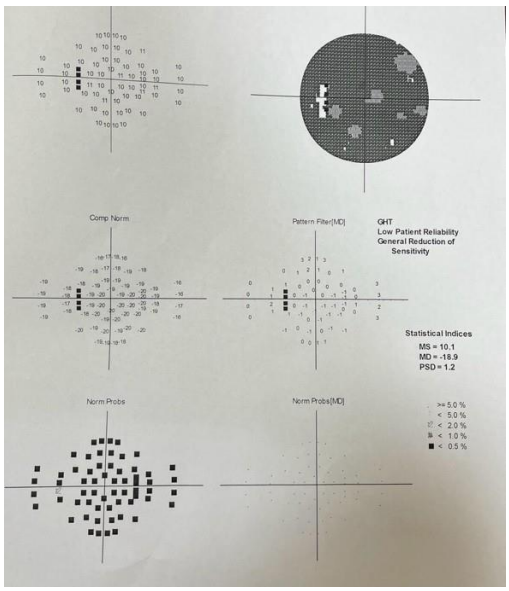

Figure 2a

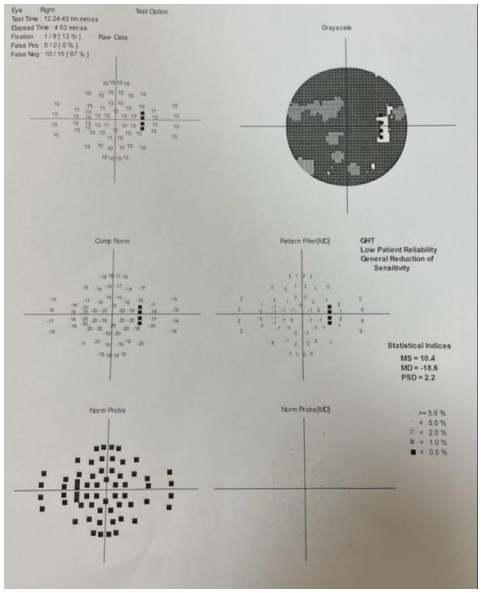

Figure 2b

III. Discussion

Ethambutol (EMB) is the primary anti tubercular treatment for extra pulmonary tuberculosis. The ocular toxicity induced from ethambutol is not usually common at standard doses used in the anti-tubercular treatment. Optic neuritis is the most serious adverse effect of EMB. It is reversible, but some studies indicate that it is irreversible.[4] Symptoms of ethambutol toxicity are usually seen between four and twelve months after starting EMB and are dose dependent.[1] On examination, central scotoma is common with the loss of color vision. The only treatment which has proven beneficial in EMB induced optic neuropathy is cessation of the drug. Mostly resolves in few months after discontinuing the drug. Isoniazid which is frequently administered with EMB can also cause ocular toxicity. If visual impairment persists even after the cessation of EMB, the discontinuation of INH is to be considered. Before treating, renal function test, history of eye diseases and record of visual acuity is

preferable. In a resource limited setting, routine visual acuity tests, and color vision tests is always preferable in specially the high-risk patients like the ones with comorbidities to avoid adverse effects due to EMB toxicity. This happens with awareness of the treating physician. There is a need for patient awareness about the importance of adverse drug reactions for seeking medical advice on priority.

IV. Conclusion

EMB, though being the primary anti- tubercular drug has the potential to cause serious ocular adverse effects that are dose and/or duration dependent leading to permanent vision loss. Early detection of EMB induced optic neuritis is important, the physicians should be aware of this potential sight- threatening adverse effect and its management.[1] There is a need to educate the patients about adverse drug effects and regular visual acuity tests for early toxicity detection. If there is no improvement in vision even after the withdrawal of EMB, cessation of isoniazid must be considered.

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