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Case Report

A rare case report on ethambutol induced optic neuritis

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ABSTRACT

Ethambutol (EMB) is one of the first-line drugs in the treatment of tuberculosis. EMB induced ocular toxicity is a rare side-effect that observed as either dose or duration related effect and reversible on therapy discontinuation. We report a rare case of EMB-induced optic neuritis, even though the dose and duration are not related to it. After withdrawal of the drug, we observed there is a recovery and mapping of the central visual field showed only slight enlargement of the blind spot in the right eye. If there is no vision improvement, but ocular toxicity is not severe, isoniazid should also be stopped.

Keywords: Ethambutol, Optic neuritis, Isoniazid

INTRODUCTION

Ethambutol (EMB) hydrochloride is one of the first-line drugs in the treatment of tuberculosis. Infrequent, ocular toxicity in the form of optic neuritis (most commonly retro bulbar neuritis) has been well predictable since its first use in the 1960s. EMB induced ocular toxicity as dose and duration related and reversible on therapy discontinuation; reversibility of optic neuritis remains contentious. The ocular side-effects of EMB therapy were first described by Carr and Henkind in 1960s.[1] Optic neuritis is the most important budding side-effect of EMB. Medical Protection Society 1984 states that "it is wise to make a documentation of ophthalmic result, including visual insight, in each eye, before treatment starts, and at numerous (say monthly) intervals during treatment." This neuritis is generally reversible and is specific to dose and duration of treatment.[2]

CASE REPORT

A 21 year female diagnosed with tuberculosis. Standard IRPE protocol consisting of isoniazid, rifampicin, pyrazinamide, and EMB was planned after necessary work-up. Before the treatment eye examination was conducted. It showed a corrected visual insight of 6/6 in both eyes. EMB dose was 15 mg/kg.[3,4] However after 1 month patient reported blurring of vision. Ophthalmologic examination revealed a visual perception of 6/12 in the right eye and 6/9 in the left and physician prescribed glasses. After 2 months, ophthalmologic examination revealed that visual insight was 6/30 in both eyes. There were bilateral central scotomas. Color vision defect was started in both eyes. EMB therapy was promptly stopped, but therapy with isoniazid, rifampicin and pyrazinamide was continued. There was progressive but slow improvement in her vision. Within 12 weeks, the

visual insight was 6/12 - 1 in the right eye and 6/7.5 - 2 in the left eye. Approximately, 1.5 years later the patient had a visual perception of 6/7.5 in the right eye and 6/6 in the left. Mapping of the central visual field showed only slight enlargement of the blind spot in the right eye. Anti-tubercular therapy was stopped and not restarted.[5,6]

DISCUSSION

EMB is one of the habitually used anti-tubercular agents. Due to the delayed onset of ocular neuritis there is a rapid withdrawal of this drug. This visual impairment is either dose or duration related. Some are reversible it is majorly based on age. As the age increases, there is a decreased incidence in reversibility. Leibold described two types of ocular neuritis due to the therapy of EMB, i.e., axial neuritis and periaxial neuritis. Axial neuritis is the most common form which involves the papillomacular fibers of optic pathway and ensuing in decline of visual insight, color vision impairment and central scotomas. Periaxial neuritis peripheral defects are noted, but insight is spared.[7,8] Normally the neuritis is retrobulbar, and the fundus is normal. In general, EMB adverse effect is seen in high doses 35 mg/kg in 20% of patients. However, now the maximum dose is given as 25 mg/kg daily for 2 months, if the drug is continued for longer, the dose should be reduced to 15 mg/kg. However, in this case treatment is started with 15 mg/kg even though they an adverse effect and it is not having a relation with duration because patient experienced adverse effect within 1 month of starting the therapy and she does not have any complications like renal diseases. Hence, the exact mechanism, of causing the adverse effect, is unknown in this case but if we see the adverse effect is reversible. The Joint Tuberculosis Committee of the British Thoracic Society and the American Thoracic Society recommend routine visual acuity assessment prior to starting EMB, but no longer recommend a visual insight assessment during follow-up. Usually ocular toxic effects of EMB are not seen before 2 months, and in this case 1 month period has reported and the symptoms developed gradually. In most reported instances of visual impairment due to the therapy of EMB the changes appear to have been reversible.[9,10] One study states that although EMB has bacteriostatic agent and at the doses 25 mg/kg or higher it has bactericidal activity. The Joint Tuberculosis Committee has addressed the problem of EMB ocular toxicity with the advice of an expert ophthalmologist. Pre-treatment renal function should be measured, any history of eye diseases, pre-treatment record of visual insight, routine visual insight tests, best avoided in children. In these conditions, there is a close monitoring of toxicity to avoid complications. EMB is removed from the body entirely by excretion through the kidneys. Renal impairment is, therefore, a contraindication to its use because high blood concentrations may readily produce ocular toxicity. Hence the drug may be hazardous where renal function cannot be readily assessed before treatment, as may occur in some circumstances in developing measures to ensure a high level of consciousness of this potential adverse effect by medical staff and patients appear to be the best current anticipatory method.[11,12] Medical staff should frequently ask patients about changes in vision and, should they happen, make sure all patients understand that EMB should be immediately stopped and punctual medical advice required. If there is no vision improvement, but ocular toxicity is not severe, isoniazid should also be stopped weeks after stopping EMB.[13] The course of EMB-induced ocular toxicity is often impulsive. Patients undergoing treatment with anti-tubercular drugs includes EMB, patient education should be important on the visual side-effects of the drug and provides the awareness regarding the side-effects during the treatment.

CONCLUSION

EMB induced optic neuritis is a reputable "ocular" drug impediment in rare. It is one of the safest first line anti-tubercular drugs with the side-effect in which the mechanism is not exactly known. Although the side-effect is known to be either dose or duration related sometimes, it may be irreversible. Even though, International guidelines on prevention and early detection of EMB induced ocular toxicity have been published, there is still need of clinical pharmacist to educate the patients about side-effects and check regular vision tests for early toxicity detection. If there is no vision improvement but ocular toxicity is not severe even after withdrawal of EMB, isoniazid should also be stopped.

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