Ocular Toxicity of Anti-Tuberculous Treatment

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Aim
To study the incidence of ocular complications in patients treated with anti tuberculous therapy.

Introduction
Ethambutol one of the major oculotoxic agents among the anti tuberculous drugs continues to be widely used especially with the increased incidence of atypical and resistant mycobacterial infections in immuno compromised patients. Although Isoniazid and Streptomycin are also known to cause oculotoxicity Ethambutol remains the drug widely studied for its toxicity.

The incidence of ethambutol toxicity has been reported as varying from 0.5-4.3%(2% in some studies), in some others as 1.1-4.3%(22) and in yet another as 0.5-1.5%(1)

Ethambutol causes two types of optic neuritis one is axial neuritis causing decreased visual acuity, colour vision abnormalities and central scotoma, and the other one is the less common paraxial neuritis resulting in peripheral visual field defects, but the colour vision and visual acuity remains unaffected in this type.

Toxicity with Ethambutol is quite rare and can occur after two months of therapy although the average time is around seven months. Prognosis is good following the cessation of the drug but recovery may take upto 12 months and a minority of patients may have residual visual impairments.

INH has also been documented as a cause of bilateral optic neuritis especially when used in combination with Ethambutol. INH is presumed to be responsible for optic neuritis if visual abnormalities persist even after 3 months of discontinuation of therapy Ethambutol.

Materials and Methods
It was a retrospective study done on 100 patients on ATT attending eye OPD of Kasturba Hospital in the year 2004 from January to December.

Patients were assessed for visual acuity with Snellens chart, near vision with near vision charts and colour vision with Ishihara’s chart. Field charting was done with Humphrey’s 30-2 and Goldmann’s perimeter. Slit lamp anterior segment evaluation and fundus evaluation with direct and indirect ophthalmoscopy were also done.

Results
Out of the 100 patients, 7 patients (7%) belonged to the age group of <20 years, 31 (31%) belonged to the age group of 20-40 years; and 47 patients (47%) belonged to the age group of 40-60 years. 68 out of 100 patients were males and rest were females.
Visual acuity assessment showed that 2 patients had vision <6/60, one with bilateral optic atrophy (RE-CF 4M, LE CF 1M) and the other with senile mature cataract of the lens in BE. In this patient we could not do colour vision assessment, fields, or fundus examination. 15 patients had visual acuity between 6/60 – 6/12. They had either immature cataract of lens or changes of age related macular degeneration. Rest of the 83 patients had visual acuity of >6/12.

10 patients (8 men and 2 women) showed ocular manifestations like changes in visual acuity, colour vision or visual field. Of these only 5 cases could be attributed to ATT as they had no other ocular abnormality like cataract or retinal lesions to account for the abnormalities detected. Two of the remaining five patients had optic disc changes suggestive of glaucoma and another two patients had fundus changes suggestive of age related macular degeneration and one patient had post meningitic optic atrophy. Hence in these patients their field changes or changes in visual acuity or colour vision could not be attributed to ATT alone.

Among the five patients with changes suggestive of ATT toxicity 3 patients, who had no other ocular disease had colour vision abnormalities. One patient was a 65 year male, who could not identify any colour. He had total optic atrophy in BE. This patient had been on ATT (INH 300mg OD, Rifampicin 450mg OD and Ethambutol 800mg OD) for the past 8 months. He had visual loss for past 2 months and his vision was CF 4m in the RE and CF 1m in the LE and hence his visual fields could not be assessed because of low vision. On confrontation testing, he had right homonymous hemianopia. His CT scan showed left occipital infarct.

2 other patients showed colour vision abnormalities. These were a 16 year old boy on 2 months of ATT (INH – 300 OD, Ethambutol 1200 OD on alternative days, Rifampicin 600 OD on alternative days and streptomycin 1g I/m OD on alternate days) and a 50 year old male on 6 months of ATT(INH-300 mg

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Colour vision</th>
<th>Visual acuity</th>
<th>Fundus</th>
<th>Fields</th>
<th>Type of Tuberculosis</th>
<th>Drug details and duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Could not identify any colours</td>
<td>RE-CF 4m, LE-CF 1m</td>
<td>Total optic atrophy both eyes</td>
<td>Right homonymous hemianopia (confrontation)</td>
<td>Pulmonary TB</td>
<td>INH 300m 1-0-0/day RIF 450mg 1-0-0/day ETH 800 1-0-0/day X7M</td>
</tr>
<tr>
<td>2</td>
<td>Difficulty in identifying primary colors especially green</td>
<td>RE-6/6, LE-6/6</td>
<td>Temporal pallor (RE&gt;LE)</td>
<td>Normal</td>
<td>Tuberculous lymphadenitis</td>
<td>INH 300 1-0-0/day ETH 800mg 1-0-0 on alternate days Streptomycin 1g ⅔ on alternate days All X2M</td>
</tr>
<tr>
<td>3</td>
<td>Difficulty in identifying primary colours especially green</td>
<td>RE-6/5, LE-6/5</td>
<td>Temporal pallor LE&gt;RE</td>
<td>Normal</td>
<td>Pulmonary TB</td>
<td>INH 300 1-0-0 RIF 450 1-0-0 ETH 800 1-0-0 PZA 1-5g 1-0-0 All X 6M</td>
</tr>
<tr>
<td>4</td>
<td>Normal</td>
<td>RE-6/9, LE-6/9</td>
<td>Normal</td>
<td>Paracentral field defect</td>
<td>Pulmonary TB</td>
<td>INH 300 1-0-0 ETH 800 1-0-0 PZA 1-0-0 SM D 75g ⅔ OD All X7M</td>
</tr>
<tr>
<td>5</td>
<td>Normal</td>
<td>RE-6/18, LE-6/9</td>
<td>Normal</td>
<td>Paracentral field defect</td>
<td>Pulmonary TB</td>
<td>ATT x 8 months then INH 300 1-0-0 Strepto 0.75g ⅔ ETH 1g 1-0-0 All X3M</td>
</tr>
</tbody>
</table>
OD, Rifampicin 450 mg OD, Ethambutol 800 mg OD and Pyrazinamide 1.5 g OD) x 6 months. Both these patients had difficulty in identifying colours especially green. Their fundi showed bilateral temporal pallor. However their visual fields were found to be normal.

Paracentral field defects were found in two patients, a 55 year old female on ATT for seven months and a 70 year old male on 11 months of ATT. But these patients had no colour vision abnormalities or fundus changes.

Discussion

In this study the incidence of toxicity of ATT has been found to be about five percent which matches with the earlier studies. The period after which the ocular manifestations occurred were found to be an average of 6.6 months, which was found to be similar in literature given earlier (about seven months). The colour vision abnormalities found in the presence of good central vision could not be attributed to any other cause other than toxicity of ATT. The visual field defects were paracentral in two patients and right homonymous hemianopia in one patient with optic atrophy. The remaining two patients out of the five patients had no detectable defect in visual fields. This could explain the good visual acuity in four out of five patients. The one with poor visual acuity had bilateral optic atrophy.

Conclusion

Our study showed an incidence of five percent of ocular toxicity among patients treated with ATT and this included changes in colour vision, fundus changes or field defects. Timely baseline and follow up ophthalmological evaluation would lead to early detection and prevention of severe visual impairments in such patients.

References