Evaluation of visual function and OCT parameters in ethambutol-induced optic neuropathy: a longitudinal study

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Abstract

Aims To evaluate structural and visual functional parameters in ethambutol-related toxic optic neuropathy (EON).

Methods In this prospective study, we recruited 95 adults with EON presenting within 1 month of onset and 100 age-matched healthy controls. Best-corrected visual acuity (Early Treatment Diabetic Retinopathy Study chart), colour vision (Ishihara pseudoisochromatic plates), contrast sensitivity (Pelli-Robson chart), Humphrey visual field analysis (HVF 30–2 Swedish Interactive Threshold Algorithm-FAST), visual evoked response and spectral domain optical coherence tomography for macular ganglion cell-inner plexiform layer (mGC-IPL), retinal nerve fibre layer (RNFL) and papillomacular bundle (PMB) analyses were done at baseline, 3 months and 6 months.

Results Almost 52% eyes showed significant visual improvement of ≥ 2 Snellen lines after stopping the drug. RNFL (cases-100.84±21.87 μm vs controls-98.05±7.21 μm; p=0.37) and PMB thickness (cases-51.10±17.26 μm vs controls-53.45±6.42 μm; p=0.19) in cases were comparable with controls at baseline, but showed significant thinning at 6 months follow-up (RNFL −83.77±21.06 μm; PMB-30.96±11.02 μm; p<0.0001 for both). Average GC-IPL thickness (cases-29.66±6.86 μm; controls-39.68±2.59 μm) and ganglion cell-inner plexiform layer (GCL) volume (cases-0.85±0.17 mm^3; controls-1.08±0.069 mm^3) was significantly less as compared with controls (p<0.0001 for all) at baseline and showed significant further deterioration on follow-up (p<0.001 for all). The average GC-IPL thickness (p value :<0.0001, r:−0.31), GCL volume (p value :<0.000, r:−0.29) and PMB thickness (p value :0.043, r:−0.14) showed a significant negative correlation with final vision at 6 months.

Conclusion Progressive structural damage despite visual improvement raises concern about the irreversible nature of EON. PMB, GC-IPL thickness and GCL volume are better predictors of visual recovery in EON.

Data availability statement

Data are available in a public, open access repository. Not applicable.

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