

Retinal Toxicity to Triamcinolone Acetonide's Vehicle: An Electrophysiology and Electromicroscopy Study

Tamer Macky, MD (Cairo, Egypt), Dina Helmy, MD (Cairo, Egypt), Nihal El Shazly, MD (Cairo, Egypt)

PURPOSE

To assess rabbit retinal toxicity to triamcinolone acetonide vehicle, benzyl alcohol, when injected intravitreally.

METHODS

This prospective comparative experimental study included 24 pigmented rabbits assigned into 2 groups; group 1 (experiment, n=12) received intravitreal 0.1 ml of benzyl alcohol (BA), and group 2 (control, n=12) received intravitreal 0.1 ml of balanced salt solution (BSS); all injections were done in the right eyes. Clinical examinations were done on both eyes of all available rabbits before injection, at 1 and 3 hours post injection and together with electroretinograms (ERGs) at 3, 7, 14, 28 and 42 days following injections. Three rabbits from each group were killed at 7, 14, 28 and 42 days and both eyes were sent for either light or electron microscopic examination.

RESULTS

Mean amplitudes of ERG a and b waves of the BA-injected eyes were significantly reduced ($p < 0.01$ t-test) at 3 days; $6.42 \pm 9.02 \mu\text{v}$ and $11.18 \pm 15.18 \mu\text{v}$ respectively, (BSS-injected eyes: $30.87 \pm 8.22 \mu\text{v}$ and $57.90 \pm 13.38 \mu\text{v}$, respectively); and continued to be significantly reduced in the BA-injected eyes ($p < 0.01$ t-test) at 6 weeks. The mean ganglion cell count was significantly reduced ($p < 0.005$ t-test) in the BA-injected eyes 8.42 ± 2.4 (BSS-injected eyes: 16.42 ± 3.9). The mean inner nuclear layer (INL) and outer nuclear layer (ONL) thickness were significantly reduced ($p < 0.005$ t-test) in the BA-injected eyes $3.78 \pm 0.96 \mu\text{m}$ and $11.77 \pm 1.29 \mu\text{m}$, respectively, (BSS-injected eyes: $6.1 \pm 0.92 \mu\text{m}$ and $21.82 \pm 0.95 \mu\text{m}$, respectively). Electron microscopy showed intracellular irreversible changes in all layers at 6 weeks.

CONCLUSION

Triamcinolone Acetonide's Vehicle, benzyl alcohol, produced severe irreversible ERG and structural damage to rabbit neurosensory retinal following intravitreal injection.