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Oxidative stress markers in aqueous humor of glaucoma patients

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Abstract

Purpose

Oxidative stress and antioxidant status in eye tissues may be associated with glaucomatous damage. The aim of this study was to establish the antioxidant status of aqueous humor of patients with primary open-angle glaucoma. For this purpose the authors measured the total reactive antioxidant potential (TRAP) and the activities of the antioxidant enzymes superoxide dismutase (SOD), catalase, and glutathione peroxidase.

Design

Case control study.

Methods

Aqueous humor was obtained at the time of surgery from 24 patients with glaucoma and 24 cataract patients; TRAP was measured by chemiluminescence. Activities of the antioxidant enzymes were measured spectrophotometrically. Superoxide dismutase activity was determined by inhibition of the rate of adrenochrome formation at 480 nm. Catalase activity was evaluated by decrease of H₂O₂ absorbance at 240 nm.

Glutathione peroxidase (GPx) activity was determined following nicotinamide adenine dinucleotide phosphate oxidation at 340 nm.

Results

Total reactive antioxidant potential value of the cataract group was 124 ± 5 μmol/l Trolox. This value was significantly decreased, by 64%, in glaucoma patients. An increase of 57% in SOD activity was observed in glaucoma patients when compared with cataract patients (41.7 ± 2.7 U SOD/ml). Glutathione activity was threefold higher in glaucoma patients than in the cataract group (6.1 ± 0.6 U/ml). No significant changes were found in catalase levels.

Conclusions

Oxidative stress may lead to an induction of antioxidant enzymes and contribute to TRAP decrease. Superoxide dismutase, GPx activities, and TRAP may be useful oxidative stress markers in aqueous humor of glaucoma patients.

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