Trabeculectomy Can Improve Long-Term Visual Function in Glaucoma

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PURPOSE: To measure the magnitude and direction of visual field (VF) rates of change in glaucoma patients after intraocular pressure (IOP) reduction with trabeculectomy.

DESIGN: Retrospective, comparative, longitudinal cohort study.

PARTICIPANTS: Patients with open-angle glaucoma.

METHODS: Patients who underwent trabeculectomy (Trab) with mitomycin-C (74 eyes of 64 patients) with ≥4 reliable VF measurements before and after trabeculectomy and at least 4 years of follow-up before and after surgery were included. Decay or improvement exponential models were used to calculate pointwise rates of perimetric change before and after surgery. A separate comparison (Comp) group with unoperated glaucoma (71 eyes of 65 patients) with similar baseline damage, number of VF tests, and follow-up was used to address possible regression to the mean. Proportions of VF locations decaying or improving before and after surgery in the Trab group, and during the first and second halves of follow-up in the Comp group, were calculated. A multivariate analysis was used to explore variables associated with VF improvement.

MAIN OUTCOME MEASURES: The rate of pointwise VF change before and after surgery in the Trab group and Comp group.

RESULTS: Patients in the Trab group were followed for 5.1±2.1 years (mean ± standard deviation) before and 5.4±2.3 years after surgery, with 8.9±4.7 VF tests before and 9.0±4.4 VF tests after surgery. The mean rate of change for all VF locations slowed from -2.5±9.3%/year before surgery to -0.10±13.1%/year after surgery (P < 0.001). In the Trab group, 70% of locations decayed and 30% improved preoperatively; postoperatively, 56% decayed and 44% improved. The differences between the Trab and Comp groups were significant (P < 0.0001, chi-square test). The magnitude of IOP reduction correlated with the excess number of VF locations that exhibited long-term improvement postoperatively (P = 0.009). In the Trab group, 57% of eyes had ≥10 improving VF locations postoperatively.

CONCLUSIONS: The results show that trabeculectomy slows the rate of perimetric decay and provides evidence of sustained, long-term improvement of visual function in glaucoma. These findings suggest the possibility of reversal of glaucomatous dysfunction of retinal ganglion cells and their central projections.

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