

THE EFFICACY OF TRABECULECTOMY UP TO ONE YEAR POSTOPERATIVELY

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Key Words

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ABSTRACT

Forty-eight glaucomatous eyes provided the data to study the efficacy of trabeculectomy. Each eye (except 1 in which this information was not available) received maximum tolerated medical therapy prior to surgery. Intraocular pressures were studied up to 1 year postoperatively. The findings showed an overall decrease in intraocular pressures.

Glaucoma is a silent complex disease which snuffs out the sight of its victims. It effects approximately one out of fifty persons over the age of thirty-five.<sup>1</sup> Since most patients in the early stages of this disease are asymptomatic, early detection is the key to preventing the loss of sight. Proper treatment includes medications and argon laser trabeculoplasties. These regimens tend to be employed during the earlier phases of the disease. When these procedures fail to control the progression of this disease, a trabeculectomy may be indicated. This report investigates the changes in the levels of intraocular pressures up to one year postoperatively of a trabeculectomy.

There are many different types of glaucoma: closed angle, low tension, developmental, and secondary glaucomas among others. Chronic open angle glaucoma is one of the most common types and upon which this discussion shall concentrate. It is characterized by:

1. Elevation of the intraocular pressure to a level sufficient to produce visual damage and associated with a gonioscopically open angle at the time of pressure elevation.
2. Pathological changes in the optic nerve, whose ophthalmoscopic counterpart is cupping

of the nervehead and the nasal deviation of the retinal blood vessels.

3. Characteristic changes in the visual fields. <sup>2</sup>

Physiologically there are two main causes of the elevated pressure seen in glaucoma. One is the overproduction of aqueous by the ciliary body itself. However the most likely culprit is an impairment of the aqueous outflow through the trabecular meshwork and Schlemm's canal. This impairment coupled with a normal or perhaps elevated production of aqueous leads to an elevation in the intraocular pressure consequently exerting pressure on the optic disc and compressing the nerve fibers. Once this compression has occurred, the nerve fibers slowly die, and a visual field loss occurs.

### Clinically

optic disc changes are important early findings. The temporal disc margin thins and the cup gradually becomes wider and deeper. The large vessels become nasally displaced, and the affected area of the disk becomes atrophic (light gray or white rather than pink).

The intraocular pressure is increased. The anterior chamber angle may be normal on gonioscopy. The loss of visual function from glaucoma can best be determined by repeated studies of the visual field.<3>

The most accurate and repeatable visual field results are conducted with a computer driven automated field analyzer.

Once a diagnosis of chronic open angle glaucoma has been established, the initial standard treatment is pharmacological. In many instances the nonselective beta-blocker timolol 1/4% (Timoptic) is the first medication utilized to help reduce the intraocular pressures. If Timoptic 1/4% does not provide an adequate reduction in the pressures, the adrenergic agonist dipivalyl epinephrine (Propine) may be added, and subsequently a direct acting muscarinic cholinergic such as Pilocarpine. When these medications are not sufficiently effective, a carbonic anhydrase inhibitor such as Diamox or Neptazane may be added to treatment regimen. This system of maximum tolerated medical therapy usually precedes any type of surgical intervention.

In many cases an argon laser trabeculoplasty (ALT) is performed before a trabeculectomy. It is done with non-penetrating argon laser burns to the trabecular meshwork which usually results in an improved aqueous outflow by an unknown mechanism.<sup>5</sup>

When all previously stated medical and surgical therapies

fail to control the progression of this disease, a filtering procedure such as a trabeculectomy may be indicated. This procedure involves "a rectangle of the underlying sclera to be excised, including the trabeculum, Schlemm's canal, and the scleral spur. This allows direct access of the aqueous to the collector channels or to the open ends of Schlemm's canal. It is felt that external filtration occurs in a large percentage of cases by leakage through the scleral flap."<sup>5</sup>

This study reviewed patient records from early 1987 to late 1988 to determine the efficacy of trabeculectomies on intraocular pressures up to one year postoperatively. Of the forty-eight eyes studied, 15 were male and 33 were female. The subjects' ages ranged from 31 to 89 years with the mean age being 65.63.

The eyes studied suffered primarily from chronic open angle glaucoma. Each eye was treated with maximum tolerated medical therapy (except for 1 eye in which this data was not available) which did not yield adequate control of the disease before the trabeculectomy was performed. This included 23 eyes (48.9%) without a previous argon laser trabeculoplasty, 23 eyes (48.9%) with a previous ALT, 1 eye (2.2%) with two previous ALTs and 1 eye

in which this statistic was not available. "The failure of previous operations of different types did not affect the success-rate of trabeculectomy."<sup>6</sup> Thus the eyes with previous ALTs were not evaluated differently than the eyes without a previous ALT. The values investigated included preoperative IOPs and postoperative IOPs at 1 week, 1 month, 6 months, and 1 year as assessed by Goldmann applanation tonometry.

The mean preoperative intraocular pressure was  $36.74 \pm 14.99$  mmHg, with a range from 16 mmHg to 70 mmHg. One week postoperatively the mean IOP was down to  $24.57 \pm 14.84$  mmHg with the range from 66 to 1 mmHg. The one month follow-up evaluation showed a slight increase in the average IOP measurement to  $24.74 \pm 11.64$  mmHg with a range from 62 to 8 mmHg. The 6 month postoperative evaluation elicited an average IOP of  $21.09 \pm 11.81$  mmHg with a range from 62 to 8 mmHg. The final 1 year follow-up evaluation showed an average IOP of  $17.60 \pm 2.06$  mmHg. The range was much narrower this time, from 21 to 13 mmHg (see Graph 1).

One week after surgery 71.11% (32 eyes) of the subjects experienced a decrease in IOPs and 28.78% (13 eyes) experienced no

represented. Similarly, at the one month postoperative evaluation, 77.77% (35 eyes) experienced a decrease in IOPs and 22.22% (10 eyes) saw an increase in intraocular pressures, with a representation of 93.75%. Six month postoperatively showed that 93.43% (32 eyes) had seen a decrease in their IOP measurements and .09% (3 eyes) experienced no change or an increase in pressures, with a 72.92% representation. One year postoperatively, with only a 29.17% representation revealed a 92.86% (13 eyes) decrease in intraocular pressure levels and only a .07% (1 eye) increase in IOP levels. All percentages were calculated relative to the actual number of eyes in which a concrete value was available (see Table 1).

Table 1  
Relative postoperative change IOP values

	<u>1 week</u>	<u>1 month</u>	<u>6 months</u>	<u>1 year</u>
Increase	11	10	2	1
No change	2	0	1	0
Decrease	32	35	32	13
Information not available	3	3	13	34

Although one year postoperatively there was only a 29.17% subject representation, the IOP values recorded were approximately one half of the original preoperative readings. The slight increase (.17 mmHg) in average IOP values between the first and sixth month readings seem to be caused by hypotonic eyes which stabilized out to a slightly higher pressure level (the range low for one month was 1 mmHg verses the range low for the six month evaluation, which was 8 mmHg). Once maximum tolerated medical therapy has been reached, a trabeculectomy is an effective procedure in reducing IOP levels up to one year postoperatively, as evaluated in this study. This study agrees with other studies<sup>6-11</sup> on the long-term value of this procedure in controlling IOP measurements.



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