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# RATIONAL CHOICE OF THERAPY IN ESTABLISHED OPEN ANGLE GLAUCOMA

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## SUMMARY

Currently, the standard treatment for primary open angle glaucoma favours initial medical therapy. Laser trabeculoplasty and filtering surgery are reserved for those patients who fail medical therapy. There is now, however, good evidence to suggest that perhaps this approach deserves reassessment.

## CLINICAL TREATMENT STUDIES

Watson and Grierson's large retrospective study of patients treated for glaucoma<sup>1</sup> indicates that, although initial control of intraocular pressure (IOP) is achieved in 74% of patients on maximal medical treatment, only 40% remain under adequate control with medication alone after a five-year period. A more recent study of patients treated by trabeculectomy at the same centre showed no increase in the incidence of cataracts which could be related to operations, although a decrease in the visual acuity and visual fields did occur.<sup>2</sup>

In addition, experimental studies suggest that chronic underperfusion of the outflow system<sup>3,6</sup> which could be caused by inhibitors of aqueous secretion and the continuous use of strong miotics,<sup>7</sup> can lead to progressive irreversible damage to the trabecular meshwork.

In a randomised prospective multicentre follow-up study carried out in Scotland, patients with glaucoma were either treated immediately with trabeculectomy, or managed conventionally with eyedrops.<sup>8</sup> If the latter failed to control the IOP or the visual field, then these patients were treated surgically. Recent data, with a mean follow-up of 4.6 years, shows that 90% of those that underwent trabeculectomy immediately after diagnosis had no field change after three years of follow-up, whereas only 60% had no field change in the medical group.<sup>9</sup> Moreover, the loss of field in the medical group occurred in the first two years after diagnosis while the medical treatment was being modified, or, as was necessary in more than half of this group, until surgery was resorted to. However, once

control of the IOP was achieved, the reduction in visual field remained the same in the two groups with those with extensive field loss continuing to lose field despite normal IOPs and remaining stationary in those with early field loss. The eyes that lost the most visual field were those with the least field loss at diagnosis. This paradox was attributed to the prolonged attempt at borderline medical control in these eyes because they were thought to be at lower risk for visual field deterioration. Visual acuity was not compromised by early surgery.

These findings are reinforced by recent analysis of data from the Moorfields Primary Therapy Trial.<sup>10</sup> This randomised prospective study which compares medical, surgery and laser treatment in open angle glaucoma, showed statistically lower IOPs in the surgery group—compared with the laser and medical groups. The mean IOP in the surgical group at four years was 13.3 mmHg, with that of the medicine and laser groups being 16.8 and 17.8 mmHg respectively. In addition there was a significantly higher success rate (98%) in terms of IOP control in the surgery group at four years, compared with 80% in the medicine and only 60% in the laser group. There was a progressive failure of the IOP control in the laser patients with the progression of time. A concern often expressed with regard to glaucoma filtering surgery, is the possibility of a reduction in the visual acuity following surgery. However, the mean reduction in the visual acuity in the surgical group was less than half a line on the Snellen chart. Pointwise regression analysis of the Humphrey visual fields in the three treatment groups showed no statistical difference in the incidence of field progression between the groups.<sup>11</sup> However, the field results of the first two-year period of the treatment protocol have so far not been analysed. This is where the expected difference might lie.

## OUTCOME OF PRIMARY TRABECULECTOMY

An explanation of the very high success rate of primary trabeculectomy has been suggested: this success could be due to the state of the conjunctiva at the time of surgery, which could affect the healing and thus the bleb outcome.

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Comparing conjunctival biopsies from patients undergoing primary surgery and from those who had at least two topical medications for a minimum of one year, a significant increase in the numbers of lymphocytes, macrophages, mast cells and fibroblasts in the conjunctiva and Tenon's capsule, and a significant decrease in the number of goblet cells was noted in the medically treated group.<sup>12</sup> These results suggest that long-term topical medication can induce chronic inflammatory changes in the conjunctiva which may enhance the risk of external bleb scarring and failure of filtration surgery. The fault may lie in the preservative used in the eyedrops, rather than in the active ingredient in the drug.

Further evidence of better results with early surgery was seen when the patients who underwent primary surgery as part of the primary treatment study were compared with a group of patients who underwent trabeculectomy after failed medical therapy.<sup>13</sup> The two groups were similar in terms of race, gender, presenting IOP and presenting visual fields. The only identifiable difference between the two groups was the duration of topical eyedrops. However, the success rate in the long-term medical therapy group was only 79%, compared with 98% in the primary surgery group. Most trabeculectomy failures occurred within the first three months. This early failure was associated with a hypercellular response in the conjunctiva.

Conjunctival incisions in glaucoma filtering surgery are followed by a healing response, the degree of which could reflect the pre-existing state of the conjunctiva. This response could affect the success of drainage surgery in some instances.

The Moorfields experience has thus shown excellent IOP control with primary surgery, with maintenance of this control over the period of follow-up and few complications. Nevertheless, the management of the patient with established open angle glaucoma still requires clinical judgement and individual assessment of each patient.

### CONCLUSIONS

Several conclusions can be drawn from the above studies as regards the current role of medicine, surgery and laser in the management of this disease.

Medical therapy still has a definite place in the management of these patients and results in satisfactory IOP control in a good percentage of cases. However, multiple medical therapy in the form of more than two topical medications and/or a carbonic anhydrase inhibitor, is rarely indicated.

Laser trabeculoplasty appears to be effective in the short-term control of IOP, but there is concern over the long-term efficacy of this form of treatment. It may be indicated in certain selected patients such as the elderly

who are unfit for surgery and who do not take the eyedrops. However, these patients do require continual monitoring, as the IOP control may suddenly be lost, with an acute rise in IOP.

Filtering surgery performed early gives excellent IOP control with minimal complications. Early surgery, or indeed primary surgery, may now be considered if a patient is not controlled on simple medical therapy, if compliance is a problem, or if glaucoma medical medications are not available.

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