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IS FILTERING SURGERY REQUIRED ?

It is a general rule for the treatment of glaucoma that when the pressure rises to such levels as to endanger the disc, one institutes medical therapy, beginning with timolol or epinephrine and adding miotics if necessary, until the pressure is reduced to safe levels. If topical agents are still inadequate, one supplements them with a systemic carbonic anhydrase inhibitor. The next step is laser trabeculoplasty. If, notwithstanding all these therapeutic efforts, the excavation of the disc or the loss of visual field continues to progress, one must then decide whether or not to try to lower the pressure by means of intraocular surgery. In the phakic eye one usually prefers a filtering procedure. If the eye is aphakic, cyclodialysis or cyclocryotherapy are considered.

It appears then that the treatment of the glaucomatous eye is a series of decisions made from month to month and from year to year, taking into account the intraocular pressure, modified as it may have been by treatment, and such changes in the optic disc or in the field of vision as may have occurred prior to or inspite of therapy. The making of such decisions is one of the most important tasks of the physician who undertakes to treat glaucoma, and understanding these decisions in their logical, emotional and social perspectives is essential to the optimal treatment of the disease; and yet, although these choices are forever being made, the decision itself is seldom if ever subjected to critical scrutiny. The spectrum of such decisions is broad. Some are simple to the point of being trivial, such as whether to use pilocarpine every four hours or four times a day; some are complex, such as whether to risk precipitating angle closure with yet stronger concentrations of a miotic. But no decision is more troublesome or more perplexing than to determine at any given time whether or not an eye should be subjected to intraocular surgery in order to lower the pressure. To simplify the exposition, I shall refer only to filtering procedures, although what I say applies, mutatis mutandis, to cyclodialysis and cyclocryotherapy as well. These procedures will be considered in greater detail in a subsequent issue of the Glaucoma Letter.

The decision for filtering surgery is often presented as a dogmatic prescription. You must not permit the patient's visual field to deteriorate without having offered him the benefits of filtration surgery. The rule is so clear and unequivocal that even a medical student will confidently make the decision, and the resident physician at the beginning of his training asserts with confidence what must be done. But the experienced surgeon, paradoxically, implements the rule not without some trepidation. The implementation is difficult because it constitutes a choice between alternatives neither of which is satisfactory. If the operation is not performed, there is a strong possibility that the patient will go blind from the disease, but performance of the operation by no means assures that the sight wi l be saved. Indeed, there is always the possibility that the operation will leave the patient worse off than he would have been without it, for filtering surgery entails a risk of complications that rival in seriousness the threat posed by the disease that was to be alleviated. That is why, for every patient whose glaucoma remains uncontrolled, the advisability of filtering surgery must be carefully reexamined. This is an issue to which uncounted discussions have been devoted, and which, nonetheless, arises anew, its vexatiousness undiminished, whenever one is confronted with a patient who seems to be unresponsive to medical treatment. Since the rule is so simple, why is it so difficult to apply ?

One reason why the rule is difficult to apply is that it is a simplification, and, strictly construed, the simplification is incorrect. The decision becomes far less perplexing when one understands the logical insufficiency of the rule. The teaching is that every patient with open angle glaucoma who, after laser trabeculoplasty and on maximum medical therapy, shows progressing glaucomatous damage, either by an increase in the size of the excavation or by enlargement of the field defect, should have filtering surgery. A corollary to this teaching is the dictum that no patient should go blind from open angle glaucoma unless filtering surgery has been tried at least once. These

statements require critical reexamination in the light of the following facts. The glaucomatous eye is subject also to other pathology. In a certain proportion of patients vascular disease will destroy vision before glaucoma takes its toll. Although we think of glaucoma as an irreversible and progressive disorder, in a certain small percentage, the pressure will improve spontaneously, without apparent cause. Most important, assuming that progression of glaucomatous damage is correctly identified, this does not necessarily mean that the patient will go blind from glaucoma. If the pressure is within or near the statistically normal range, loss of field may be very slow, may take place over the span of many years, and the patient may die long before he becomes blind, especially if his other eye is relatively good. It is also very important to keep in mind that not every patient who has the operation benefits from it. Some patients who have successful filtering surgery continue to lose vision nonetheless; some patients develop a filtering scar which lowers the pressure insufficiently or not at all; perhaps as many as two percent of patients develop intraocular infection through the filtering bleb and lose useful vision. Many patients develop cataract after filtering procedure. It is true that the cataract may then be extracted, but that operation in turn entails a substantial risk of losing the filtering bleb.

It follows that the class of patients who show progressive nerve damage on maximum medical treatment must be divided into two subsets, those, presumably constituting the larger of the two subsets, who will benefit from filtering surgery, and those, fewer, but still significant in number, who will be worse off as the result of surgery. While these subsets cannot be rigorously defined, it is not difficult to identify patients, for example, who despite some deterioration of the optic nerve are nonetheless not in imminent danger of functionally significant vision loss. There is also a group of patients less likely to benefit from the operation, those, for example, who lose field at a relatively low pressure, those who are aphakic, or those who have inflammatory glaucoma, those who are youthful, or those who have had previous surgery. For each patient, moreover, for whom the operation is less likely to be beneficial, it is more likely to do harm. It is true that among patients who are better off without filtration surgery some will ultimately go blind from the disease, but their vision will be preserved longer and the loss of vision will be less injurious to them if it comes about as consequence of the disease rather than as the result of surgical intervention. It is indeed true in some instances where a patient goes blind from glaucoma that his physician procrastinated beyond the optimal time for filtering surgery. But it is also true that, in other instances where a patient goes blind from glaucoma, operation would not have prevented, but would only have accelerated the onset of blindness. If one scrutinizes the records of patients who have gone blind after filtering surgery one cannot escape the conclusion that for a large proportion of them not only did the operation fail to preserve vision, but in fact accelerated its loss. In the contemporary atmosphere of optimistic aggressive surgical intervention the traditional teaching that the physician's primary duty is to do no harm deserves at least passing consideration.

Thus the decision for filtering surgery cannot properly be made on the simple premise that the patient is losing field or disc substance in the face of maximum tolerated medical therapy, but must hinge on the determination whether the advantages of the operation to a given patient exceed its disadvantages, in technical terms, whether the economies of the procedure outweigh the diseconomies. And this is by far a more difficult decision. Since one cannot with certainty predict the effect of the operation, good or bad, for any given patient, one must take a probabilistic, statistical approach and try to answer the question whether it is more likely to help than to harm. Admittedly, stated in this manner, the rule is far more complex, but if it is less simple, it is also more valid. The cost benefit analysis of filtering surgery is obscure, and the estimates that one ventures to make must always be fitted closely to the particular circumstances of each case. It is an elementary fact, however, which is often overlooked, that if one wants to preserve the vision of the greatest number of patients for the greatest length of time one must systematically withhold the operation from those patients, when one is able to identify them, for whom the risk is highest in proportion to the potential benefit. Let me give two examples. The patient whose pressure is 40 mm Hg. and whose field is closing in rapidly and who has had a successful filtering procedure in the fellow eye is very likely to benefit from the operation and should receive it promptly. On the other hand, the patient who loses field slowly with a tension of 16 mm Hg. and whose fellow eye developed flat chamber, cataract, peripheral anterior synechias, and a scarred filtering bleb following surgery is likely to be better off without the operation. In this case, the second eye after filtering surgery is relatively likely to suffer the same complications as the first, thereby precipitously depriving the patient of his remaining vision. Then too, even if the surgery is uncomplicated, there is only a limited likelihood of attaining a tension much lower than 16. Without surgery, this patient might indeed ultimately go blind from glaucoma, but he would almost certainly have months, if not years of useful

sight. These examples are illustrative of principles. Patients' problems are seldom so clear cut. But the analyses that persuade us to operate on the first and to withold surgery from the second would be applicable to all patients considered for filtering surgery, if only we would systematically collect the necessary data on the successes and failures of our therapies.

These considerations incidentally shed light also on the origin of the conventional rule. The conventional rule is premised on the illusion that filtering surgery is always beneficial. For only if it were always beneficial would it be rational to offer it to every patient who was losing vision from glaucoma. Nor is it difficult to identify the sources of the optimism that has fashioned the theory. It arises on the one hand from the surgeon's determination to help his patient. It arises also from the patient's inextinguishable conviction that this operation will save his sight. Only under that condition is it possible for him to submit to it. And no matter how insistently the lawyer urges them both to acknowledge the risks and hazards of surgery, no matter how often the elaborate consent form is signed and countersigned, I have rarely seen a patient go to the operating room who was not secretly convinced that the impending operation would save his sight. But so far as the surgeon is concerned, one would be hard put to say, if one were the patient, whether one should prefer him to begin the operation with a detached acknowledgement of the possibility of failure or with a passionate belief in its success.

The conventional rule is premised on illusion also in respect to the validity of the data on which it relies. The theory assumes that one can determine conclusively that the patient has received the maximum tolerated medical treatment, that the disc excavation is increasing and or that the field is shrinking. It assumes moreover that one can determine reliably that shrinkage of field is not the result of lens opacity, ischemic neuropathy or retinal degeneration. And yet, considered closely, it is rare to encounter a patient undergoing filtration surgery in whom one or more of these assumptions are not open to serious question. So far as deterioration of the disc is concerned, comparison of descriptions or drawings from examination to examination often reflects what the examiner thinks should be happening rather than what is in fact occuring. Except in the most intelligent and astute of patients, visual fields are seldom strictly reproduceable. And even then, the occurrence of cataract or of macular degeneration makes the plotting of the field inaccurate. When a patient is first examined, he assumes that the visual field is full and tends to deny scotomata. As he becomes trained in the procedure of the examination he learns to recognize scotomata which previously he might have denied. As for the examiner, when the pressure rises and he becomes concerned about a possible loss of vision, it is only natural that he will begin to search more assiduously for field defects; and he may well find field loss that previously, when the concern for the integrity of the visual field was less acute, might have been overlooked. In general, a new examiner is likely to discover a field defect previously missed. Whenever there is a suggestion of progressive field loss, one may indeed confirm the accuracy of the most recent field by repeating it, but there is no way to go back three or six months in time to confirm the earlier absence of a scotoma.

The other important uncertainty concerns the question whether or not the field loss that one observes is in fact attributable to glaucoma or to some other disease. Arcuate field defects, as is well known, may occur also from causes other than glaucoma, most notably from vascular disease of the optic nerve, and we ordinarily hesitate to attribute them to glaucoma unless there is a concomitant excavation of the optic disc. There is no reason, moreover, to assume that the existence of a pathologic cup should immunize the nerve against such vascular damage, and thus it is almost certain that some patients who are subjected to filtering procedures for the presumed progression of glaucoma have unbeknownst to the physician sustained vascular accidents to the nerve. The lower the intraocular pressure at which the patient seems to be losing field, the more likely that such loss is from causes other than glaucoma, and the less likely that a reduction of pressure even to very low levels will arrest the progression of field loss.

Turning now to the decision itself, fashioned as it is within the framework of patently inadequate theory, dependent on manifestly unreliable facts, one begins to understand the function of the highly prized process of decision-making. To make a decision is to presume to be able to reconcile the inexorable constraints of reality with imperfect theory and inadequate facts. In any situation where all the consequences of various possible courses of action were known with certainty, problems of decision-making would disappear. What was necessary would be obvious. There would be no question as to what we should do, no room for decision. Conversely, it is the unavailability of data, the inability to look into the future, that creates the need for decision as a counterfeit of reality which substitutes our "judgment", our hunches, our prejudices, our veiled self-interest, for those facts which, if they were available, would determine conclusively what we had to do. To make a decision is to insinuate ones subjectivity into the conceptual

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representation of reality. It is to fill in the blank areas on the map of the future with ones intuition. The ophthalmologist who makes the decision for - or against - filtering surgery in fact compensates with the skill of his intuitive judgment for all that the data conceal and for all that the theory denies. The less precisely articulated the theory and the less reliable the factual data underlying the decision, the greater the skill and experience required to make it satisfactorily. The converse also is true: the more reliable the theory and the more accurate the data, the easier it will be to arrive at a decision that turns out to have been correct.

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This insight leads to two important conclusions. In the first place it sheds light on how we should proceed when faced with decisions that are difficult to make. Much of this difficulty flows from the unreliability of the data. The obvious remedy, and often the only effort required, is to reexamine the records and to reexamine the patient, and wherever feasible, to determine for oneself by serial examinations of the field whether or not the disease is indeed progressing. In many instances the need for decision-making will then evaporate. The facts will force the decision, one way or the other. The most satisfactory decision is one that has been preempted by the discovery of decisive facts.

There is a second conclusion which does not lend itself to such simple implementation. I have suggested that the conventional theory is wrong, in that it takes too optimistic a view of the consequences of filtering surgery, and that what is required is the painful admission that we cannot cure all patients with glaucoma. If we cannot face this truth, then, acting from the misguided presumption to be able to heal them all, we are condemned to making some of our patients blind in the effort. The task is to devise better criteria for surgery, to make objective assessment of the consequences of what we do, by scrupulous review of our records, by the performance of prospective studies, if necessary, double masked, of what happens to patients who are subjected to filtering procedures and what happens to those who are spared the hazards - or denied the benefits - of surgery. We have available large numbers of newly trained ophthalmologists for whom no patients are waiting in line. We have computing techniques to record and to analyse clinical data. All that we lack is the courage to confront our illusions and to face what we are doing. But perhaps that too will come.

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