

REFERENCES.

1. **Hoffmann.**—Hereditary Bilateral Glioma of the Retina. *Trans. Twenty-fifth Ophthal. Congress, Heidelberg.*
2. **Lukers.**—Glioma of the Retina. *Jl. of Ophthal. and Oto-Laryng.*, January, 1909.
3. **De Gouvea.**—Hereditary Retinal Glioma. *Ann. d'Ocul.*, Vol. CXLIII, p. 32. *Ophthalmoscope*, Vol. VIII, p. 531.
4. **Caspar.**—Inherited Retinal Glioma. *Cent. f. prak. Augenheilk.*, Vol. VIII, p. 223. *Ophthalmoscope*, Vol. X, 1912. p. 223.
5. **Dabney.**—Intra-ocular Neoplasms. *Amer. Jl. of Surgery*, Vol. XXIX, p. 185.
6. **Berrisford, Paul D.**—Statistical Notes on Glioma Retinæ with a report of 41 cases. *Royal Lond. Ophthal. Hosp. Rep.*, Vol. XX, part 2, March, 1916.

SCLERO-CORNEAL TREPHINING FOR HYPER- TONY: AN EXPERIENCE OF TWO HUNDRED AND FIFTY OPERATIONS*

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OF the various types of operation suggested to secure a filtering cicatrix that of sclero-corneal trephining is one of the simplest and most satisfactory. In the early days, after the introduction of any new method or remedy, exaggerated claims are made for it, and too favourable a view is often taken of its effects, and, therefore, of its future possibilities.

I consider that, from the cases dealt with by me by this method of trephining, it will be seen that it is not a panacea; but if I am able to prove that the results are superior to those obtained by the older iridectomy alone, something will be gained.

Operative Technique.

The method employed differs but little from that described by Lieut.-Col. R. H. Elliot. Local anæsthesia is used in every case. It is produced with a 4 per cent. solution of cocain hydrochloride. After the instillation of two drops at a short interval, one or two ophthalmic tabloids of hemisin are introduced into the conjunctival sac and the lid is kept closed for two minutes. After blanching of the eye the patient is directed to look towards his feet, and then with a spatula cocain crystals are spread on the sclera just above the limbus, at the site selected for the trephine hole. The upper lid is held up by the finger for an interval of one minute, so that the crystals only slowly dissolving are not displaced. By this means I have found it possible to operate in almost all cases without any severe pain being experienced by the patient. After the release

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of the upper lid the conjunctival sac is washed out and the speculum introduced. Next, a long incision is made by sharp-pointed scissors at a distance of 8 to 10 mm. from the cornea, curved concentrically with the limbus. The flap consisting of the conjunctiva, which intervenes between the incision and the corneal limbus, is raised by cutting the subconjunctival tissues with blunt-ended scissors, curved on the flat, the concavity being always towards the globe, until the bluish corneo-scleral junction is reached. Next, the so-called "splitting" of the cornea is proceeded with by scratching with the closed points of ordinary curved sharp-ended iris scissors. A few strokes bring the point up against a dense overhanging edge which is formed of the more superficial layers of the cornea itself at its junction with the conjunctiva. Now, the bluish tint of the cornea has become much more evident, and it should be 1 to 1.5 mm. in breadth. In order to ascertain the exact position I frequently lay the point of an iris repositor against the over-hanging edge, flat on the sclero-cornea, and then lay back the conjunctival flap which has been held by the left hand with fine horizontally-ribbed conjunctival forceps. The exact extent of the "splitting" of the cornea is then evident through the transparent flap. If then I am convinced that an opening in the dense sclero-cornea will definitely enter the anterior chamber, I again draw down the conjunctival flap, exposing the sclera, and apply, at once, a 2 mm. trephine, pushing the side of it against the over-hanging edge. Having applied the trephine and rotated it once, the forceps holding the flap are rejected, and with fixation forceps, the conjunctiva at the junction of the flap and the portion remaining normally attached to the limbus, is firmly held. A good hold on the globe is thus secured during the further rotation of the trephine. If there is any doubt as to the position of the cutting edge, the trephine can be withdrawn temporarily, and the conjunctival flap put into its normal position showing, at a glance, whether the circular incision will cover the anterior chamber margin. For the first rotation or so, in order to get a good "bite," the trephine is held vertically to the globe, but this having been secured, a definite inclination of the distal end of the instrument towards the optic axis is made, and the rotation continued. I always endeavour to penetrate the thickness in the proximal half only, leaving the upper portion of the disc attached to the sclera in the deeper layers.

The thickness and toughness of the sclera vary considerably, and much depends on the sharpness of the cutting edge of the trephine. It therefore follows that it is not always possible to estimate with certainty when the anterior chamber has been entered. A definite sensation is sometimes felt by the fingers on penetration, but, of course, one is always sure of the fact if aqueous escapes in sufficient quantity to allow conspicuous shallowing of the chamber.

Not infrequently, however, the patient gives a slight start or expresses pain. Any of these experiences indicate perforation. The trephine is then withdrawn, and, unless the patient is remarkably quiet, a knuckle of iris presents in the opening. This is seized by straight iris forceps and a small portion snipped away.

No traction on the iris while in the grip of the forceps should be made, otherwise the opening may become blocked by iris tissue, in spite of excision of a portion. Immediately after the snipping, the iris usually retracts, and a small peripheral coloboma appears, which however is not so evident as later, when full retraction of the iris has taken place. It is not always possible to estimate accurately the size of the piece excised. The extent of the coloboma produced varies therefore in different cases.

I do not consider it essential to succeed to perform an iridectomy, especially in those cases where the iris does not prolapse, and the aqueous escapes without ballooning up the posterior chamber. However, in my opinion, a small coloboma gives a greater sense of security to the operator against subsequent blocking.

Now and again the iris repositor has to be used to get the pillars of the coloboma away from contact with the scleral wound. When the iris has been dealt with, I seize the proximal loose portion of the disc by straight iris forceps, and endeavour to cut away one-half to one-third of it only. It is essential, however, to be certain that the posterior lip of the disc, including a portion of Descemet's membrane, is taken away. In one recent case I had a return of tension in an eye within five weeks, although the eye had been subjected to instillations of a strong solution of atropin for the first few weeks after the operation without rise of tension. I could find no fault with the operation, but came to the conclusion that a thin portion of the posterior layer had been left, which, after the lapse of some weeks, healed and prevented filtration. Anyhow, the repetition of the operation, opening up the same wound, put the eye in a perfectly satisfactory condition.

When the iris is well retracted the conjunctival flap is replaced, and three very fine black silk stitches are then introduced, closing the original conjunctival incision. The upper part of the conjunctiva retracts very considerably under the upper lid, and on attempting to seize it the fine ribbed forceps frequently pull down sub-conjunctival tissue or Tenon's capsule, which looks like conjunctiva, but with care the real layer can be secured and recognized by its smooth shiny surface. Lastly, I wash out the conjunctival sac with sterile saline solution, and instil at once several drops of a solution of atropine sulphate, gr. iv. ad ʒi. The bandage is applied, and if the patient remains comfortable the eye is not looked at for two days. I then expect to find the anterior chamber formed, and the pupil fairly well dilated. On the fifth to

the seventh day I remove the conjunctival stitches, and if all is well, the patient is ready for discharge on the tenth day.

The thickness of conjunctiva and sub-conjunctival tissues differs very considerably. I think it wise to get as much tissue as possible when nearing the position of the trephine hole.

I strongly prefer the large conjunctival flap described, for, undoubtedly, it allows of better filtration and there is less likelihood of the formation of a large and irritating bleb at the site of the trephine hole. The size of the bleb is certainly less by the method of operation I now employ.

Buttonholing the conjunctival flap very rarely occurs, even with the thinnest membrane, but care should be taken to avoid tearing it by the forceps which hold it. In some cases the flap has been held in position overlying the cornea by a twisted pledget of wool soaked in antiseptic solution.

The term "splitting of the cornea" is sometimes used, but in one or two cases where I have been specially anxious to get far forward, I have taken measures to include in the conjunctival flap some of the superficial layers of the cornea; thus truly "splitting" it, but I find that if the opening is covered by such true corneal tissue firm healing takes place and no filtration is possible.

I have tried several sizes of trephine, namely, 1 mm., 1.5 mm., 2 mm., and 2.5 mm., but very shortly after having taken up this operation I came to the conclusion that the 2 mm. trephine is much the best for the following reasons:—

1. An opening of this size allows ordinary iris forceps to be freely introduced, even, if necessary, into the anterior chamber, to seize iris.

2. As I remove only the anterior portion of the disc, the eventual opening is more likely to communicate directly with the anterior chamber.

3. The risk of prolapse of the root of the iris, or of the ciliary body, is greatly diminished.

4. The superficial extent of the opening when only one-third to one-half of the disc is removed, is not greater than if the 1.5 mm. trephine is used and the whole is taken away, as is frequently practised.

Varieties of Trephine

I have tried several forms of trephine instruments, but quite recently have employed that suggested by T. Harrison Butler, and I now consider it to be certainly the best. First, it is longer than most others, and allows the fingers rotating the instrument to be so far away from the wound that the latter is easily visible during the rotation; whereas, some of the others when used, prevent this clear view.

Secondly, the roughening of the distal end gives a perfect grip; and, lastly, the most important, one excursion of the thumb and of the index finger produces several revolutions of the trephine, and, therefore, more rapid opening of the anterior chamber owing to this end having hardly a greater diameter than the cutting portion.

I am asking Messrs. Weiss to effect a slight modification by making a small hole in the barrel 3 mm. from the cutting edge. This will allow for passage of aqueous as soon as the chamber is entered, and be a further means of ascertaining when perforation takes place.

In all my cases the trephine operation has been placed in the upper quadrant, and even when more than one opening has had to be made in the sclera, the second one has been placed not very far from the original.

In no case where I have personally operated has the trephined disc passed into the interior of the eye. I have known, at any rate, of one case where the disc, left in the chamber, led subsequently to serious iridocyclitis.

In perfectly quiet simple glaucoma it is sufficient to remove even but one quarter of the 2 mm. disc. The only form of the disease requiring the whole of the disc to be taken away is where there is a definite tendency to exudative uveitis. Recently, I did the operation in a patient suffering from old disseminated choroiditis, and had to repeat the surgical procedure four weeks later.

In two cases, an extraction of cataract has been done at a considerable period after trephining. The section of the cornea was made in the usual position above, cutting across the trephine hole and obtaining a conjunctival flap. No interference with recovery was noted, but in one of these the tension rose, and the eye became blind. In the other, after a discission some months later, vision of 6/18 and J.4 was obtained.

Where the complete formation of the anterior chamber has been delayed beyond the usual time of two or three days, I have found, sometimes, that the chamber became normal after the removal of the stitches. Once, however, during the removal of the stitches the chamber gave way, but it re-formed by the following day.

Hæmorrhage into the chamber during the operation has been noted several times, especially in the sub-acute and acute forms, but it has given rise to no trouble. No special steps were taken to wash out the chamber. In a few cases no hæmorrhage was seen at the operation, but blood was found on the first dressing.

The length of time of recovery was always longer in the acute form, but the longest I ever had to deal with was in an old man with simple glaucoma, where recovery was retarded by persistent secretion from the Meibomian glands without definite suppuration. The globe

itself was not affected, and vision was quite as good a year and a half after the operation as before.

Number of patients, 204

Total number of trephinations on above, 259

A few cases have not been included owing to insufficient records.

AGE INCIDENCE.		TYPES OF CASE.	
0 to 9 years	— 3	Acute Glaucoma	— 23
10 „ 19 „	— 1	Sub-acute „	— 22
20 „ 29 „	— 1	Chronic „	— 186
30 „ 39 „	— 15	Absolute „	— 2
40 „ 49 „	— 31	Hæmorrhagic „	— 1
50 „ 59 „	— 64	Traumatic „	— 3
60 „ 69 „	— 66	Secondary „	— 7
70 „ 79 „	— 19	Congenital Buphthalmos	— 1
80 „ 89 „	— 9	Retinitis Pigmentosa	— 1
Age not recorded	— 2	Sympathetic Disease	— 1
Both eyes operated on in 52 patients.		Anterior Staphyloma	— 4

SIDE AFFECTED.

Right 126.
Left 125.

The secondary cases include 1 of aphakia, 3 of cyclitis, 1 of neuro-retinitis, and 1 of embolism of central artery of the retina.

In 6 eyes the operation was performed twice and in 1 eye thrice, owing to recurrence of the hypertony.

Three eyes were, on account of recurrence of tension, operated on months or years after an excellent iridectomy.

In one case Lagrange's sclerectomy had been done to the other eye, and in another an iridectomy had been done previously to the other eye.

In one instance, in double sub-acute glaucoma, I did a trephine operation on one eye, and iridectomy on the other at the same sitting in an elderly patient. Here the iridectomised eye settled down the more readily. In fact, I am now rather of the opinion that iridectomy is advisable for acute and sub-acute glaucoma occurring in old debilitated subjects, and it is for these alone that I reserve the older operation.

I have not, as yet, attempted the trephine operation in a case of conical cornea, as suggested by Col. Elliot.

Size of trephine

1mm. in 1 case, 1.5mm. in 25, 2.5mm. in 5, and the remainder, 2mm. Since January, 1914, the 2mm. trephine has been employed in every case.

An accompanying peripheral or complete iridectomy is reported in 203 of the cases, but in only a very small proportion was the coloboma continuous with the original pupil. In ten cases loss of vitreous occurred, but these were all in the early days. Vitreous is never seen, or never should be seen, unless indeed where a trephine is done for hypertony following dislocation of the crystalline

lens. The glaucomatous condition was associated with retinal hæmorrhages in four cases. I regard trephining, however, as being far superior to iridectomy in the hæmorrhagic form, the risk of profuse intra-ocular bleeding being much less. In three old-standing cases choroiditis was present. A few days after the operation, in quite a small percentage, a separation of the choroid has been noted, but always it has returned to position without any special treatment after the lapse of some weeks. According to the hospital notes, separation of the choroid only occurred in two cases, but separation of the retina in eight. My own view is, however, that the greater number of these were really separations of the choroid; but in one there was undoubted detachment of the retina before the operation.

It has been held that any surgical interference with an eye suffering from sympathetic disease is almost always disastrous, but where persistent high tension is found, I think trephining is a safe procedure. In one case noted no exacerbation of inflammation took place, and although the vision eventually failed, the tension remained normal ever after, the unfortunate result being in no way attributable to the operative interference.

For retinitis pigmentosa I have tried the operation once only, and that in a very advanced case with mere perception of light before the operation, but this disappeared, no doubt, from further progress of the degenerative changes, and not as a result of the trephine operation.

The one case of congenital buphthalmos in a baby appeared to be quite satisfactory.

For a time the intra-ocular hæmorrhages met with in one case of hæmorrhagic glaucoma were not more marked, but later vision was lost by a large hæmorrhage taking place at the macula.

Four eyes were operated on for anterior staphyloma. Three were not improved, and one was doubtfully improved.

There were three cases of iridocyclitis; one was improved, one remained stationary as regards the cyclitis, but of the third there is no record.

After the older operation of iridectomy for glaucoma, very frequently there was further loss of vision, ascribed to progressive atrophy of the optic nerve. According to my records, I find two only, among the whole number traced, to which loss of sight could be attributed to this cause.

As regards the fields, the records are not sufficiently satisfactory to justify any very definite statement. In my opinion, for the most part, they were much the same after operation as before. In two cases, however, further contraction took place on the temporal side only, and in one case marked contraction of the whole circumference set in. On the other hand, in two patients some

slight enlargement of the field was found. All these refer to cases of simple chronic glaucoma.

In five of my cases the eyes were subsequently removed. One was an anterior staphyloma; two where shallow anterior chamber persisted, and the tension remained high; and two were lost by acute panophthalmitis, one at an interval of twelve months, and another at an interval of two years.

The fear of subsequent panophthalmitis certainly has deterred many surgeons from resorting to the trephine operation; but the occurrence in less than 1 per cent. of my cases does not appear to me to be a sufficient reason for discarding an operation, which, in other respects, is so satisfactory.

The loss of an eye by acute panophthalmitis is, of course, very striking, and makes a deeper impression on the mind of the surgeon than a large number of cases the sight of which slowly decays after iridectomy from progressive atrophy of the optic nerve, or from other complications.

It was always the practice in the old days to remove eyes painful with absolute glaucoma, but such a cosmetic loss, I think, may be prevented by the trephine operation, as is proved by two of my patients who have retained their sightless organ.

In any case where there is a return of tension at a considerable period after the original trephine operation, I advise the use of physostigmin and massage by the finger through the medium of the upper lid before resorting to further surgical interference.

In the rush of hospital work it has not been found always possible to take readings with the tonometer, but, undoubtedly, the instrument is of great service, especially in doubtful cases where the visual acuity is normal—or practically so—and the field shows hardly any contraction, and there is no definite cupping of the optic disc. I do not think the tonometric readings alone justify one in recommending operation, unless there are histories of haloes round lights or definite objective signs.

I consider that operation should be resorted to as soon as possible after a definite diagnosis has been made. To this rule, even, there are exceptions, as illustrated by two cases:—

1. A very feeble old man with undoubted chronic glaucoma, in whom the expectation of life is not long, and under miotics the visual acuity and the fields are holding their own.

2. A middle-aged man in whom operative procedure of the older type failed to save the left eye. The right eye possesses full normal acuity with a perfect field and healthy disc. Very occasionally he has had slight mistiness of sight with haloes for a few hours, but the nightly instillation of a weak solution of physostigmin has prevented any such symptom for, at least, two years. As he is a sensible fellow, and can resort to surgical assistance at once in

case of need, I do not feel justified in recommending operation, unless examination reveals any incipient failing on the part of the eye to hold its own.

The number of recorded cases, with late results, many of which concern eyes that have been trephined up to six years, is 96.

As to final results:—

Acute Glaucoma.	Improved	...	...	= 70 per cent.
	Stationary	...	...	= 25 "
	Worse	...	...	= 5 "
Sub-acute Glaucoma.	Improved	...	...	= 47 "
	Stationary	...	...	= 42 "
	Worse	...	...	= 11 "
Simple Chronic Glaucoma.	Improved	...	...	= 32 "
	Stationary	...	...	= 48 "
	Worse	...	...	= 20 "

These figures refer to visual acuity.

With regard to the chronic form, those that were worse were due to (1) recurrence of the disease requiring further operative treatment; (2) the quiet iritis which used to be found before the days when I instilled strong atropin solution at the end of the operation; (3) opacification of the lens, not the result of trauma at the operation.

The best one can expect in most cases of simple chronic glaucoma is to retain the vision which remains at the time of the operation, and if 80 per cent. is the true proportion, it is far superior to the 62 per cent. claimed for iridectomy,* and I consider in the future with the experience already gained, the percentage of retention of vision, as good as before the operation, will be even greater. !! bi

I wish to express my obligation to Dr. Lily Stopford for valuable assistance in the preparation of this paper.

A CASE OF LEUCO-SARCOMA OF THE CHOROID WITH EPITHELIOMA OF THE LIP IN THE SAME PATIENT†

BY

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Elizabeth Bailey, aged 55, epithelioma of lip removed, with glands of neck, on the right side, in October, 1915, at the Portsmouth Royal Hospital.

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† Read at the 1917 meeting of the Ophthalmological Society of the United Kingdom.
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