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Trabeculectomy with iridencleisis

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SUMMARY An iridencleisis is added to the original trabeculectomy technique of Cairns as modified by Watson for the surgical treatment of glaucoma. The steps are described with special reference to the fashioning of the iridencleisis as an iris tongue lying curled upon itself with the pigmented layer lining the inner aspect of the iris resting between the scleral flaps. Two series of patients from Africa and one series from the USA show postoperative intraocular tensions of 24 mmHg or less in 90% to 98% of patients. The Caucasian series from the USA had 94% with pressures of 21 mmHg or less. At least 90% in all three series were controlled *without* continued glaucoma medication.

Trabeculectomy has gained acceptance for glaucoma surgery. The original technique as described by Cairns[1] and modified by Watson[2] included a peripheral iridectomy. Twenty years earlier Stallard[3] had described a full-thickness filtering procedure which incorporated an iridencleisis. Forty years ago, in 1944, Iliff[4] summarised: Iridencleisis is superior to trephining as an initial operative procedure and the complications are less severe. He was saying this in relation to the surgical control of glaucoma in the Negro.

After performing 35 trabeculectomies with peripheral iridectomies on black patients in Sierra Leone, West Africa, 1972–3, one of the authors (LG) realised that under 50% achieved intraocular pressures of 24 mmHg or less. This was comparable to the experience of Welsh[5] in Durban, South Africa. It became evident that trabeculectomy surgery of black patients resulted in only a fair success rate at that time. It was not until 1977 that David, Freedman, and Luntz[6] reported a 73% control of intraocular pressure by the Cairns and Watson techniques, and a 91·6% control following reoperation, with or without additional medications.

What we realised in 1973 in West Africa was that, by making an iridencleisis a part of the trabeculectomy procedure, a success rate of up to 90% *without* additional medication could be achieved. Special care was exercised *not* to manipulate the iris tongue, so that it lay curled upon itself with the pigmented layer lining the inner aspect of the iris resting between the scleral flaps.

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Materials and methods

This study includes three series of patients.

Series A represents 100 consecutive black patients receiving a trabeculectomy with iridencleisis in 1982 with an average range of follow-up of one year, as performed by I Gralle at the Lunsar Eye Hospital, Lunsar, Sierra Leone, West Africa. Skin snips for onchocerciasis were positive in 48%. 19% showed severe findings associated with onchocerciasis (keratitis, microfilaria in anterior chamber, posterior synechiae, iritis, chorioretinal lesions, and optic atrophy). An operating microscope was used.

Series B represents 100 black patients with glaucoma *not* associated with onchocerciasis, with an average range of follow-up of four years. Surgery was done by E Koeth at the Lunsar Eye Hospital, Lunsar, Sierra Leone, West Africa, during 1977-82. Operating loupes were used.

Series C represents 50 consecutive cases of Caucasian patients operated on by L Gess at Alexandria, Minnesota, USA, during 1975–82, with an average range of follow-up of five years. An operating microscope was used.

The findings recorded included age, sex, visual acuity, and preoperative intraocular tensions. The 'ultimate' postoperative tensions are noted along with the average time in years of follow-up. The condition of blebs, the number of patients needing additional glaucoma medication, and the complications are listed under 'Results'.

TECHNIQUE

The steps in the procedure of trabeculectomy with iridencleisis are as follows (Figs 1 and 2).

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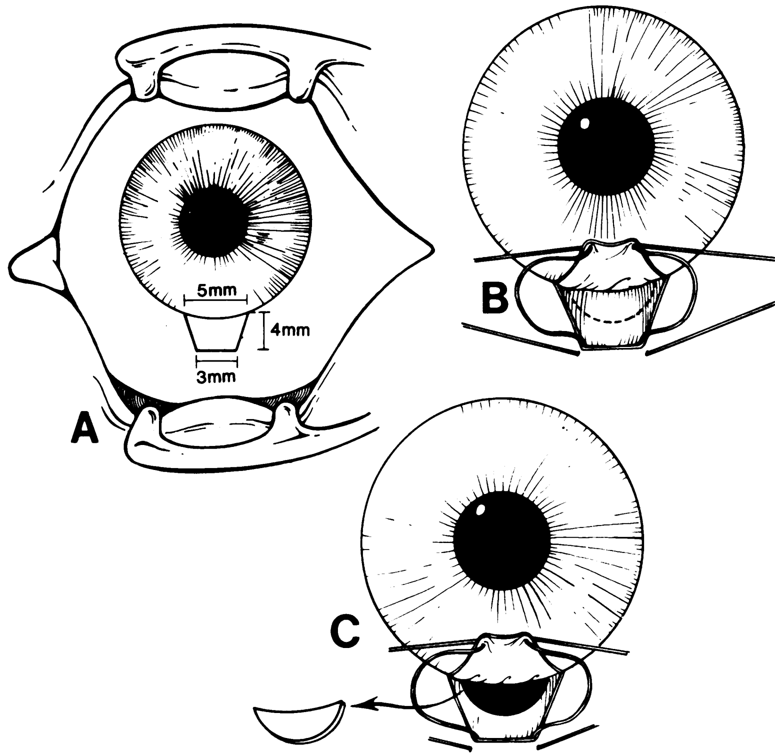

Fig. 1

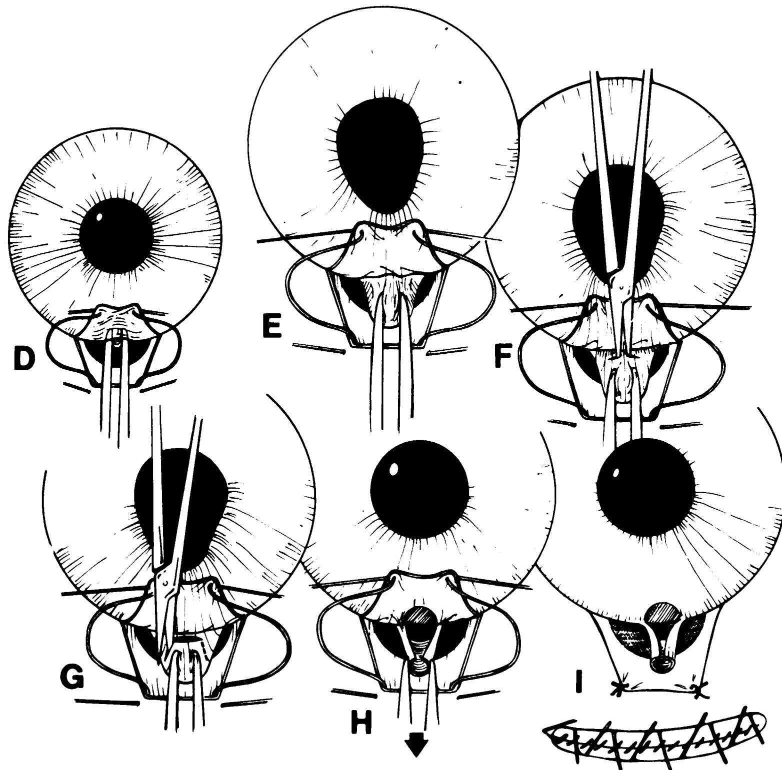

Fig. 2

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A (Fig. 1). Following a limbal based conjunctival and tenon's capsule flap a razor blade scratch incision less than half the scleral thickness outlines a flap with the base 5 mm, the sides 4 mm, and the top 3 mm.[7]

B. The scleral dissection extends into clear cornea anteriorly. The apex extends one-half the distance of the flap dissection, going beyond the scleral spur.

C. The trabecular block of tissue is dissected off from the scleral spur.

D, E (Fig. 2) A Max Fine curved forceps without teeth reaches into the anterior chamber to grasp the iris just above its mid portion. If the iris is bulging, it can be grasped outside the anterior chamber and the iridencleisis fashioned. If the bulging is confusing, a small iridotomy will deflate it, and the iris can be grasped from within the anterior chamber in its normal position.

F. A circumferential incision is made in front of the Max Fine forceps with pointed iris scissors.

G. One blade of the scissors is placed inside the circumferential opening and radial cuts are made on each side.

H. The tongue of iris tissue is laid down on the deep scleral bed. The tip of iris should extend beyond the trabecular dissection. It is not manipulated, so that it naturally curls up on itself with the pigment layer lining the inside.

I. The preplaced 7–0 absorbable sutures are drawn up to bring the superficial scleral flap back into position. Additional sutures are placed if there is gaping of the wound edges. Tenon's capsule and conjunctiva are closed separately with the 7–0 absorbable running suture.

Results

The results are shown in Tables 1–5.

Of the patients receiving surgery for glaucoma in Africa 70% were male, while nearly 70% of the Caucasian patients in the USA were female. Preoperative tensions were higher in the African population. Visual acuities were unchanged or improved in

Table 1 *Age and sex (in percentages)*

	Series A	*Series B*	*Series C*
Age			
<10	3	0	2
11–20	8	4	0
21–30	9	5	4
31–40	21	19	8
41–50	20	24	19
51–60	21	25	26
>61	18	23	46
Sex			
Male	78	71	34
Female	22	29	66

Table 2 *Preoperative intraocular pressures*

Pre op intraoperative pressures, mmHg	*Series A*	*Series B*	*Series C*
15–21			4
22–24			18
25–30	4	5	26
31–40	31	29	26
41–50	43	38	26
51–60	16	21	
61–80	6	7	

The patients in series C with pressure readings under 25 mmHg had significant glaucomatous nerve head and field changes.

Table 3 *Visual acuity changes (in percentages)*

	Series A	*Series B*	*Series C*
Unchanged	51	39	24
Improved (by at least one line)	20	31	52
Decreased (by at least one line)	29	30	24

Table 4 *Postoperative results (in percentages)*

	Series A	*Series B*	*Series C*
Range of postop. follow-up	½ to 1½ years	2–7 years	2–9 years
Average	1	4	5
Last intraocular pressures (mmHg)			
0–5	2	5	2
6–10	5	19	22
11–15	21	31	32
16–21	50	33	38
22–24	13	9	4
25–30	7	3	2
31–40	2		
>40	1		
Blebs: diffuse			72
Cystic	Not recorded	Not recorded	20
Absent			8
Controlled patients requiring continued glaucoma medication	10	8	8

Table 5 *Complications (in percentages)*

	Series A	*Series B*	*Series C*
Hyphaemas	6	3	24
Prolonged anterior chamber shallowing	2	4	4
Malignant glaucoma	2	0	0
Repair of wound	0	1	2
Reoperation	4	0	0
Iritis	Not recorded	Not recorded	2
Vitreous loss	0	0	0
Cataract formation	Not recorded	Not recorded	8

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at least 70% of each series. 90% to 98% achieved an intraocular pressure (IOP) of 24 mmHg or less. 94% of the Caucasians in series C had an IOP of 21 mmHg or less. At least 90% in all three series were controlled without continued glaucoma medication. One half of those requiring further medication in series C were diabetics.

The most frequent complication was hyphaema. The greatest measured 2·5 mm high. All cleared within two weeks, usually in two to four days. Prolonged anterior chamber shallowing occurred in 2% to 4% in each series.

Discussion

It is interesting to note that over 70% of the patients receiving surgery for glaucoma in Africa were male, while nearly 70% of the Caucasian patients in the USA were female.

Visual acuities were unchanged or improved in at lest 70% of each series. 90% to 98% achieved intraocular tensions of 24 mmHg or less; in 94% of the Caucasians in series C it was 21 mmHg or less. At least 90% in all three series were controlled without continued glaucoma medication. One-half of those requiring further glaucoma medication in series C were diabetics.

A diffuse or cystic bleb was usually present in the patients who had a successful result. R Witmer (personal communication) notes that 2–3% are successful without a bleb. He suggests that the filtration may go through Schlemm's canal in those cases, so he prefers to include the trabecular meshwork in his block of dissection.

J E Cairns of Great Britain (personal communication) has also expressed concern about hyphaemas, iritis, and sympathetic ophthalmia. The patients in series C had 12 small hyphaemas. The greatest measured 2·5 mm high. All cleared within two weeks, usually in two to four days. There were no late hyphaemas.[8] There were no cases of iritis that did not respond to cycloplegics of the atropine strength. Often movement of the pupil was achieved with homatropine or tropicamide. Hyoscine was used on several occasions. Topical steroids were used. Rarely subconjunctival or systemic steroids were necessary.

Sympathetic ophthalmia was not encountered in the more than 1000 procedures performed in Sierra Leone, West Africa (E Koeth, I Gralle, J Stilma, H Friesen, M Scudder, E Ceesay, T Gess, L Gess), in Pakistan (N Christie), or in the USA (T Gess, L Gess).

Some authors[9,10] consider that filtering procedures pose special difficulties in the Negro race. Krishna M Moni[11] observed that intraocular pressures of 28 mmHg or less were achieved in 85% of the African eyes treated with trabeculectomy and the standard peripheral iridectomy. African patients in series A and B in this study of trabeculectomy with iridencleisis had an intraocular pressure of 24 mmHg or less in 90% or more of the cases.

Other authors[4,12–15] report results that are similar between blacks and Caucasians. Our findings in the three different series from two continents show similar results in spite of the surgery being done by three different surgeons. Each surgeon, however, fashioned the iridencleisis in the same manner. There were no segmental iridectomies, as was done in the original procedures using iridencleises. Also the original iridencleises had the iris lying flat rather than being allowed to roll up into a tube with the pigmented layer lining the inside. Occasionally excision of Tenon's capsule was done when reoperation was necessary, especially in patients under 40 years of age.

Series A, which included patients with onchocerciasis, surprisingly did not have significantly more complications than the other two series. However, the chart records do not specifically record the number of patients with iritis or uveitis, which most likely would have been increased by the nature of the onchocerciasis infestation. Sandford-Smith[16] noted that nearly one-half of the cases that failed in his series had positive skin snips. Kietzman[10] also observed only 50% control in onchocercal eyes undergoing trabeculectomy.

It is a general consensus that trabeculectomy has a harmful effect on the lens, leading to sclerosis.[17] Of the four patients in series C with development or progression of postoperative cataract two have had extracapsular cataract interactions with posterior chamber lens implantations through corneal incisions. Visual acuities are 20/20 and 20/25. Intraocular pressures are 18 and 19 mmHg.

In spite of apparent cataractogenic effects, troubling hyphaemas, which readily and spontaneously absorb, and rare prolonged flattened chambers, Lowenthal[18] considers that a surgical approach to open-angle glaucoma is the procedure of choice. Argon laser therapy, while being effective in controlling the intraocular tension[19] in 77% of cases, still has 82% of patients receiving glaucoma medication.[20] In this series of trabeculectomies with iridencleises 90% received no medication postoperatively. It remains to be seen if patients treated with argon laser will have rising intraocular tension in the succeeding years that ultimately requires a filtering operation.

The present study records encouraging statistics for iridencleisis in trabeculectomy for partial-thickness glaucoma filtration. In black patients with glaucoma it was found to be especially effective in reducing intraocular pressures to normal. Onchocer-

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ciasis patients with synechiae responded well. The procedure was effective for Caucasian glaucomatous patients, with 92% needing no further glaucoma medication.

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