

Modifications of Scheie's operation

M. ANWAR

Hillingdon Hospital, Uxbridge, Middlesex

In recent years Scheie's operation (Scheie, 1958) has been frequently performed because of its relatively simple technique. The results have been mainly satisfactory in bringing the intraocular pressure to normal in cases of glaucoma. Nevertheless filtration is not always well maintained, for various reasons:

- (1) Excessive scarring of the conjunctival flap causing closure of the limbal fistula.
- (2) Exuberant Tenon's capsule, especially in young patients.
- (3) Blockage of the fistula from within by tags of iris, ciliary processes, vitreous, and occasionally the lens.
- (4) Re-operations in which the fistula is more prone to closure.

In a study of the results in fifty eyes in which Scheie's operation was performed in the past 5 years, it was found that it was necessary to resume full medical treatment or even to re-operate to control the glaucoma in the majority of cases. It was therefore felt necessary to modify the technique of Scheie's operation, and procedure has been classified into four types, I, II, III, and IV, depending upon the site of the operation in the limbal area. In any particular case the procedure adopted is determined by the following factors:

(1) RATE OF PROGRESSION OF FIELD LOSS

When this is very rapid and severe, the postoperative intraocular pressure should be reduced well below the average readings.

(2) DEGREE OF EXCAVATION OF OPTIC DISC (CUP : DISC RATIO)

The greater the extent of cupping, the more generous the drainage should be at the limbal fistula.

(3) AGE

Younger patients present exuberant Tenon's capsule and a greater degree of vascularity in the episcleral tissues.

(4) PREOPERATIVE DEPTH OF ANTERIOR CHAMBER and NATURE OF THE ANTERIOR CHAMBER ANGLE

(5) WHETHER THE OPERATION IS PRIMARY OR IS A RE-OPERATION

The basis for typing is the anatomy of the limbus and the angle of the anterior chamber. The limbus is not a line but an area 1.5 to 2 mm. wide. Posteriorly it is limited by a shallow corneo-scleral sulcus and it ends at the conjunctival reflection anteriorly. To achieve a permanently functioning filtration, it is important to select an appropriate site for operation on the limbal area. It is this crucial step which brings success or failure to the whole operation.

Type I (Classical Scheie's operation: Fig. 1)

The incision is made 1 mm. behind the limbal area. A vertical incision at this site enters the angle recess in its narrowest posterior part. This incision is therefore prone to be easily blocked from within or from outside because of its close proximity to the vascular episcleral and scleral tissue. Because it opens into the narrowest part of angle recess, it can be blocked by iris or ciliary process, vitreous, or lens, especially in eyes with a narrow angle and a very shallow anterior chamber.

Indications for this operation are very few. It should be performed only in cases which need minimal drainage and have a deep anterior chamber with wide angles.

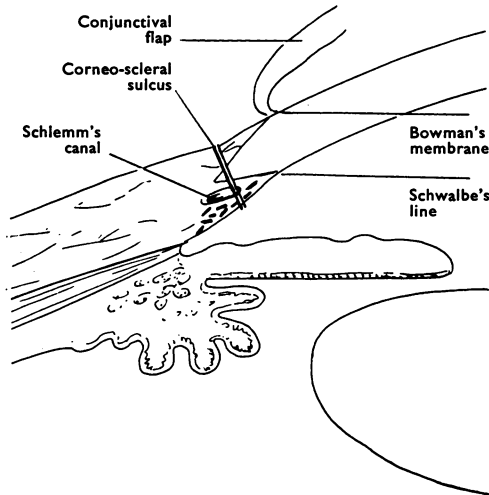


FIG. 1 Scheie's operation. Incision through corneo-scleral sulcus into Schlemm's canal (Type I)

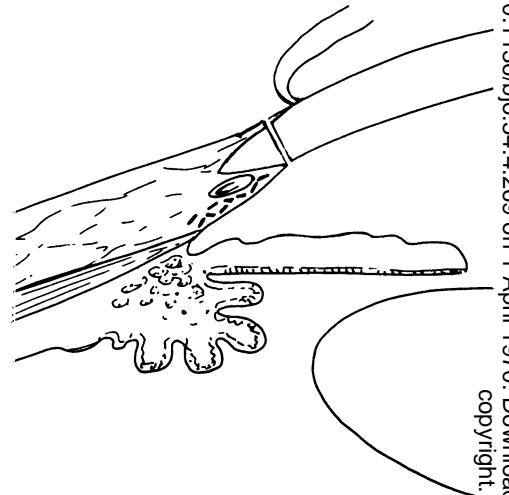


FIG. 2 Incision through anterior and posterior margins of limbus (Type II)

Type II (Fig. 2)

The incision is made midway between the corneo-scleral sulcus and the conjunctival reflection. This incision is more efficient because it is sited further forward from the vascular scleral and episcleral tissue and the internal opening lies at a reasonable depth in the anterior chamber.

This type should replace the classical Scheie's operation in eyes with a deep anterior chamber and wide angles and in which Tenon's capsule is thin and scanty. A shallow anterior chamber with a narrow angle is a contraindication.

Type III (Fig. 3)

The incision is made immediately behind the conjunctival reflection at the extreme anterior edge of the limbal area. The drainage bleb encroaches rather on the corneal side. Corneal tissue heals more slowly than the vascular conjunctival and episcleral tissue, so that the conditions are more favourable for the formation of fistula and a functioning bleb.

This type should be used in cases of uncontrolled glaucoma with a shallow anterior chamber and narrow angles, and in young patients where Tenon's capsule is vascular and thicker. This last factor is one of the common causes of failure to achieve a draining fistula.

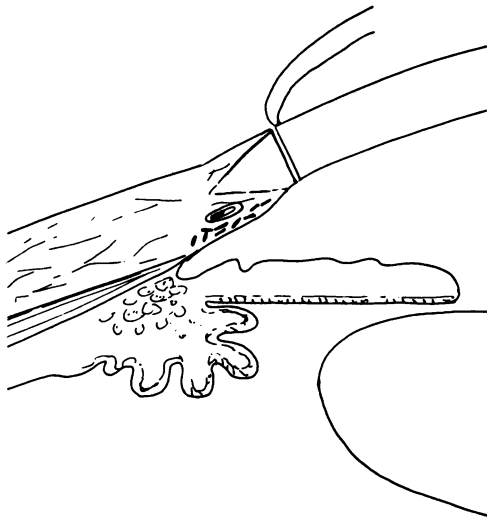


FIG. 3 *Incision at anterior limit of limbus. Danger of "button-holing" conjunctival flap (Type III)*

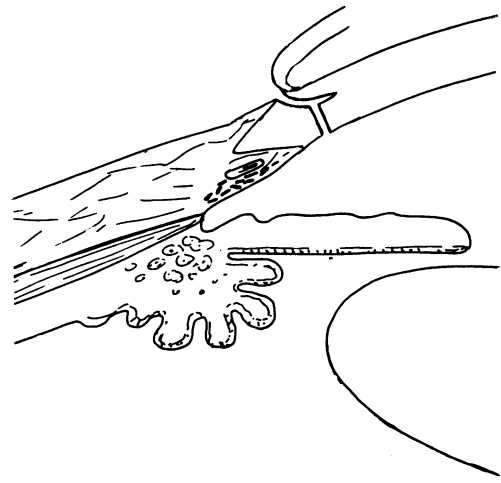


FIG. 4 *Incision through posterior layer of split cornea (Type IV)*

Type IV (Fig. 4)

The aim of this operation is to achieve a greater outflow which is the vital factor for success in certain types of glaucoma. The cornea is split into two layers starting at the conjunctival reflection at the anterior limit of limbal band. The incision to enter the anterior chamber is carried through the posterior layer of the split cornea. Great care is taken to avoid conjunctival "button-holing". The drainage site in this case would be more or less corneal. The postoperative bleb tends to be diffuse and multiloculated, but it is more effective in attaining the correct level of postoperative intraocular pressure.

The indications for this type are as follows:

- (1) A very wide cupped optic disc.
- (2) Juvenile glaucoma.
- (3) An extremely shallow anterior chamber.
- (4) Re-operations.
- (5) Congenital glaucoma.
- (6) Pigmentary glaucoma.
- (7) "Low tension" glaucoma.
- (8) In the coloured races the conventional drainage operations are often not very successful because excessive fibrosis closes the fistula.

Results

The results obtained in a series of fifty eyes in the past 5 years are shown in Table I (over-leaf). Eyes with less than 6 months' follow-up are not included.

Each eye was assessed preoperatively by careful measurements of the anterior chamber, and a gonioscopic view of the angle; other factors already mentioned were taken into account in selecting the type of Scheie's operation. In all cases operative treatment was indicated because of uncontrolled intraocular pressure, field loss, or both.

Fifteen eyes had a deep anterior chamber with wide angles and a Scheie's Type I operation was performed; eight still required treatment and four were uncontrolled.

Seventeen eyes had a rather shallow anterior chamber with iris *bombé* appearance and a narrow to medium angle. These eyes were operated by Scheie's Type II; only four still required treatment postoperatively.

In ten eyes with chronic closed-angle glaucoma, and a shallow anterior chamber with narrow angles, a Scheie's Type III procedure was carried out; all but two were controlled without further treatment.

Scheie's Type IV operation was performed in the following eight cases; all were controlled without further treatment:

- (1) A previous glaucoma operation was not functioning efficiently (3)
- (2) Thrombotic glaucoma with abnormal vessels in the angle (1)
- (3) Secondary glaucoma (1)
- (4) Low tension glaucoma (1)
- (5) Pigmentary glaucoma (1)
- (6) Chronic simple glaucoma, with a shallow anterior chamber and a very narrow angle (1)

Table I *Diagnosis in fifty cases of glaucoma requiring surgery*

<i>Type of glaucoma</i>	<i>No. of eyes</i>
Chronic simple	32
Chronic closed-angle	14
Thrombotic	1
Secondary	1
"Low tension"	1
Pigmentary	1

Table II *Type of operation and results*

<i>Type</i>	<i>No. of eyes operated</i>	<i>Results</i>		
		<i>Controlled without treatment</i>	<i>Controlled with treatment</i>	<i>Uncontrolled</i>
I	15	13	8	4
II	17	13	4	0
III	10	8	2	0
IV	8	8	0	0

The postoperative results are tabulated in Table II. Intraocular pressure was considered to be normal postoperatively if the reading was 24 mm. Hg or less by applanation, whereas a Schiötz reading of 30 mm. Hg was regarded as controlled by Scheie (1958).

The Table shows that filtration blebs sited anteriorly are more successful and function better, as the circumstances are more favourable for the formation of filtering fistula in tissue which is relatively less vascular. Therefore, the Type II procedure is recommended and Type III for shallow anterior chambers. Type IV is reserved for special cases.

I am most grateful to Mr. J. H. Romano and Mr. T. A. Casey for their kind advice and for the use of the departmental facilities in preparation of this article.

References

- BECKER, B., and SCHAEFFER, R. N. (1956) "Diagnosis and Therapy of the Glaucomas", 2nd ed. Mosby St. Louis
- SCHEIE, H. G. (1958) *Amer. J. Ophthalm.*, **45**, no. 4, pt 2, p. 220
- STALLARD, H. B. (1965) "Eye Surgery", 4th ed. Wright, Bristol