TECHNIQUE OF LAMELLAR SCLERAL RESECTION*

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THE purpose of this paper is to describe certain points in the technique of lamellar scleral resection which I think help in its efficient performance and shorten the time spent upon it. Particular mention is made of the scleral marker, the suture-retention coil, and the suture-tying forceps, new instruments which I have designed to assist in the orderly conduct of the operation. The time taken for a half-circumference resection of a scleral strip 28 mm. long is 45–55 minutes. The resection of a strip 45 mm. long which necessitated the division of three extra-ocular muscles for adequate exposure took 73 minutes.

TECHNICAL POINTS IN THE OPERATION

HAEMOSTASIS.—Oozing of blood is much reduced by injecting 0.5 ml. saline with adrenaline chloride 1:1000 one minim into Tenon's capsule in each quadrant for resection, that is 1 ml. with 2 minims adrenaline when half the scleral circumference is marked for lamellar resection.

RETRACTION OF CONJUNCTIVAL INCISION, TENON'S CAPSULE, AND A DIVIDED RECTUS MUSCLE.—It is well to keep the posterior edge of the incision in the conjunctiva and Tenon's capsule retracted by three interrupted sutures of No. 1 black silk placed at equidistant intervals and fixed to the head drape with clips.

The four needles of the two double-armed sutures which traverse the belly of an extra-ocular muscle 2 mm. behind its site of division are passed through the head drape in their correct sequence, and then these and the conjunctival retraction sutures are covered by a small green linen towel fixed in position by clips. The operative field is thus cleared of those sutures which are not required until the close of the operation and whose presence might confuse its progress by becoming intermingled with the scleral sutures. In the case of an extensive lamellar resection of about two-thirds of the circumference of the eye, there are as many as thirty sutures in the field of operation at the same time.

MUSCLE TRACTION SUTURES.—I have found that distinctive coloured traction sutures of No. 1 silk in the tendons of the three rectus muscles exposed for a resection of half the circumference of the sclera are helpful in turning and keeping the eye in different positions during resection and suturing of the sclera. A black suture is inserted in the stump of the divided rectus muscle, a white suture into one of its neighbours and a red suture into the other. The ends of these sutures are held in a curved pressure forceps which may either rest on or be clamped to

* Received for publication December 3, 1952.

the head drape when the eye is turned in the desired position. By means of these sutures the position of the eye may be changed and will remain so without any need for the surgeon or his assistant to apply forceps.

RESECTION OF THE SCLERA.—The scleral marker (Fig. 1) is easily applied to the exposed sclera with its anterior edge 10 mm. posterior to the limbus, and with a mapping pen dipped in gentian violet the outline of the marker is made on the sclera (Fig. 2). Markers of various lengths and breadths may be used. This method is much quicker than repeated applications and measurements made with compass dividers.

Invaluable instruments for the resection of the sclera are :

- (1) Two scleral hooks (Stallard).
- (2) No. 15 Gillette blade in a No. 3 Bard Parker handle (Fig. 2).

FIG. 2.—Exposure, marking, and incision of site for scleral resection.

is drawn over the sclera to a depth where a faint blue-grey colour of the choroid appears, that is to a plane where a single layer of scleral fibres remains on the choroid. It is important to keep this depth accurately throughout the incision for upon this depends the ease with which the strip of sclera is separated in the right plane.

A like procedure is carried out in the anterior line of the ellipse for incision. The two incision lines join at each tapered end of the part marked for resection. One tapered end is then grasped with Jayle's forceps and lifted whilst the belly of the Gillette knife cuts the deeper scleral fibres tangentially in the plane which leaves on the choroid a single layer of scleral fibres, and with slight tension on the raised

The Gillette blade is exquisitely sharp and well finished and its belly

is sufficient.

tongue of sclera held in the forceps the sclera separates this desired plane aided by gentle sweeps of the knife. It is important not to drag the scleral tongue so that distortion of the normal scleral curve occurs, for this might cause the knife to leave its correct tangential plane and either cut the deepest scleral layers and so expose the choroid, or to pass too superficially and so leave a thicker amount of sclera than is desired. After dissecting in this way for 1 cm. the scleral tongue is turned back on itself, and in the line of resection three or four interrupted scleral sutures are inserted; this procedure is repeated with each cm. of resection (Fig. 3).

RETENTION OF SCLERAL SUTURES.—In some cases, particularly when resections of 45 mm. are made, 22 interrupted scleral sutures, placed at 2 mm. intervals, are used to close the incision. To avoid the confusion which might result from these white sutures becoming crossed, entangled, and difficult to identify on account of blood staining, it is essential to secure at least one end of each suture. It is preferable to anchor the longer posterior end, and to leave that part of the suture which emerges from the anterior lip of the incision lying on the sclera. The latter is cut so that it is not more than 1 cm. long and so does not cross the limbus to touch the cornea.

The suture-retention coil (Fig. 4), which is 6 cm. long, is fastened to the head drape by three spring clips. Its coils act like a spring and they retain the sutures in their proper order when these are placed between them at appropriate intervals (Figs 3 and 5). The sutures thus held do not become stained with blood and tissue

FIG. 3.—Lamellar dissection of sclera.

FIG. 4.—Suture-retention coil.

FIG. 5.—Sutures held in suture-retention coil, and application of caustic potash.

fluids. This retention device is better than the use of multiple bull-dog clips which may cross each other and cause tangling of the sutures.

TYING OF SCLERAL SUTURES.—After the resection is completed, the remaining layer of scleral fibres is lightly painted with caustic potash 3 per cent. (Fig. 5), and

the sclera and choroid are punctured by a penetrating diathermy needle over the site of the inter-retinal fluid. This may be done in the line of the resection. The inter-retinal fluid is gently sucked through the penetration and after this the intra-ocular pressure falls in most cases so that coaptation of the scleral incision is possible. The longer end of each suture is picked up from the retention coil with a pair of epilation forceps, for the sutures have been drawn through sterile liquid paraffin to facilitate their passage through the sclera and are apt to slip when seized by gloved fingers. The longer end of the suture is then wound round the curved end of a pair of suture-tying forceps, the tips of which are then opened to grasp securely the shorter end of the suture between the blocks (Fig. 6). Fig. 7 shows a pair of these suture-tying forceps made on the pattern of fine curved mosquito forceps with the inner surface of each end fitted with smooth surfaced blocks 7 mm. in length exactly opposing each other. A fine silk suture may be held securely between these closed blocks.

FIG. 6.—Scleral suture being tied by suture-tying forceps and epilation forceps.

FIG. 7 (a) Suture-tying forceps.

FIG. 7 (b) Enlarged view of tips of forceps.

Interrupted sutures close the scleral incision neatly and smoothly, but mattress sutures, which are recommended by some surgeons, cause puckering of the sclera and an uneven suture line.

COMPLICATIONS

Closure of the Scleral Incision.—There is very rarely any difficulty in bringing the edges of the scleral incision together, and when this occurs paracentesis of the anterior chamber may allow a further fall in the intra-ocular pressure sufficient to tie the sutures with the scleral edges co-apted. The unpleasant sequel of vitreous forced into the anterior chamber after repeated paracentesis followed by forceful attempts to bring together the edges of the scleral incision has been reported by Shapland in full-thickness scleral resection, but I have never known this to happen in lamellar scleral resection.

Herniation of the Choroid.—If the knife blade is not kept accurately in the plane of the lamellar dissection, the deepest layer of the sclera may be sliced and the choroid exposed. If the area of exposure is 3 mm. or more, and the manipulations have raised temporarily the intra-ocular pressure, the choroid may bulge progressively into the wound. Immediate action should be taken by puncturing the

sclera with penetrating diathermy over the site of the deepest part of the inter-retinal fluid and evacuating sufficient of this to allow the choroid to recede. It is important not to puncture the bulging choroid, for immediately behind this may lie vitreous gel and not inter-retinal fluid.

It is possible, but difficult, to continue the lamellar dissection after evacuation of some inter-retinal fluid.

Results

During 1951 and 1952 I performed this operation on 28 patients, and in two of them in both eyes, making a total of thirty eyes. The patients chosen were those with extensive retinal detachment, some of long duration, for whom the prognosis was bad on account of high myopia, aphakia, stellate folds, Eales's disease, severe trauma, and (in six cases) when one or more previous diathermy operations had failed. The majority were forlorn hopes. None of the failures were made worse by the operation and in no instance was excision of the operated eye indicated. It is probably too early to be sure that some of the successes will so remain.

Success.—In thirteen patients (fourteen eyes—one bilateral) the retina has been completely replaced. Of these cases whose operations were successful, four (5 eyes) were aphakic, five had myopia, two were emmetropic, one had severe traumatic retinal detachment of 5 years' duration, and one suffered from Eales' disease with retinal detachment associated with bands of fibrous tissue organized from blood in the vitreous. In eleven of the fourteen eyes half the circumference of the eye was resected, in one three-quarters, and in two the entire circumference. The visual result of these successes is between 6/6 and 6/24 in nine cases, and 6/60 in two cases; in the remaining three, macular changes made the vision less than 6/60.

Moderate Improvement.—Seven eyes were improved; that is the area of retinal detachment is much reduced after operation and has remained so to date but is not entirely replaced. In one instance the retina was completely replaced and remained so for 3 months before a small area became detached. In this group aphakia was present in three cases, myopia in three, and emmetropia in one. Vision improved to 6/18 in one case and to 6/36 in another.

Failure.—In eight patients (nine eyes—in one patient one eye was successful and the other a failure) the operation was a failure, the retinal detachment being as extensive as before. Of these, two have aphakia, five myopia, and two trauma. One of these last had a penetrating wound with an intra-ocular foreign body lodged on the nasal edge of the optic disc whence it was removed by the posterior route technique; he subsequently developed retinitis proliferans and total retinal detachment. In one of these failures the retina was completely replaced for six months before detachment recurred.

I think it may be stated with certainty that this operation, accurately performed, eliminates the dangers of choroidal haemorrhage and vitreous

loss, two serious hazards which may complicate and spoil the full-thickness scleral resection particularly when there are adhesions between the choroid, sclera, and retina after a previous diathermy operation. In my limited experience the results are better in this series of lamellar scleral resection than in comparable cases where the full-thickness scleral resection has been done.

Summary

Certain points in the technique of lamellar scleral resection are described. The use of new instruments, the scleral marker, suture-retention coil, and suture-tying forceps, reduce the time taken over this operation and increase its efficiency.

I thank Messrs. Stone and Jaspar of Down Bros. and Mayer and Phelps for arranging to make these instruments to my design and for their helpful advice in modifying the handle of the scleral marker.

REFERENCE

SHAPLAND, C. DEE (1951). *Trans. ophthal. Soc. U.K.*, **71**, 29.