EVISCERATION UTILIZING AN INTRASCLERAL IMPLANT*†

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A RENEWED interest in evisceration, utilizing an intrascleral implant, has been apparent since the fear of sympathetic ophthalmitis has been largely dispelled by the reports of the results of evisceration in over 200 cases by Ruedemann (1958a, b), 190 cases by Poulard (1936), and 188 cases previously reported by Berens, Carter, and Breakey (1956, 1957). The purpose of this paper is to evaluate more cases after a longer post-operative period and to discuss recent experiences with a steel-mesh covered implant.

There appears to be no question that greater motility of the prosthesis is obtained after evisceration. There is less enophthalmos and deepening of the supra-tarsal sulcus than occurs after enucleation.

Unless an eyeball is of particular interest for pathological study, there is no reason, except where evisceration is specifically contraindicated, to sacrifice a patient's appearance for the sake of enucleation. Careful evacuation of the contents of the eye during evisceration will preserve the ciliary body, iris, choroid, lens, and much of the vitreous body for histological examination. Enucleation may always be performed as a last resort if there is any microscopic evidence of involvement of the uveal tissues.

Experience reveals that more patients will submit to evisceration than to enucleation because they are told that only the diseased portions of the eye will be removed. More patients are willing to undergo surgery and therefore the danger from sympathetic ophthalmitis and from an unrecognized intra-ocular tumour is probably lessened rather than increased.

The main contraindications for evisceration are: the presence of sympathetic inflammation, malignant tumour of the eyeball, and absolute glaucoma, when there is any reason to suspect the presence of an intra-ocular tumour. Evisceration is usually contraindicated in phthisis bulbi with marked shrinking and in advanced degeneration of the eyeball.

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The diagnosis in 230 cases of evisceration† using an intrascleral implant, observed for from 1 to 16 years, is shown in the Table.

TABLE

DIAGNOSIS IN 230 CASES OF EVISCERATION WITH INTRASCLERAL IMPLANT*
Observed for from 1 to 16 years

Diagnosis	No. of Eyes
Cornea lacerated, Perforated eyeballs	26
Cornea ruptured	9
Corneal leucoma (<i>Pseudomonas aeruginosa</i> infection in one) ..	3
Corneal dystrophy, Painful eye	1
Enophthalmitis	14
Glaucoma, absolute	14
Glaucoma, secondary	2
Glaucoma, secondary, Iris bombé	2
Glaucoma, haemorrhagic	5
Glaucoma, Bullous keratitis	2
Globe ruptured	9
Globe lacerated	24
Iridocyclitis, chronic, with Glaucoma	4
Panophthalmitis	30
Phthisis bulbi	16
Retinal separation, Degeneration of globe	2
Trauma	18
Trauma, Hyphaema, Secondary glaucoma	3
Ulcer, hypopyon	2
Ulcer, traumatic	1
Not given	38
Total	230

The original Rosa adult-size implant was inserted in 117 eyes. This implant was made of hollow plastic, spherical on the posterior two-thirds and flattened on its anterior surface, so that the retraction of the sclera produces a flat surface anteriorly. When the prosthesis is also flattened on its posterior surface to impinge upon the flattened surface of the stump, motion of the prosthesis is increased. To provide firm adhesion between the tissues and the implant, as well as to prevent rotation of the implant, the flattened anterior surface of the original Rosa implant was covered with steel-mesh and suture grooves were added, through which four double-armed braided white nylon (5-0) sutures may be preplaced.*† The modified Rosa-Berens implant was inserted in the scleral shell in 113 eyes, producing excellent vertical and lateral motility, with minimal sinking of the upper eyelid. There was little or no discharge and no operative or post-operative complications.

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Drs. Allen; Auten; Blake; Burch; Callahan; Carter; Chamichian; Cole; Culler; Cuthbert; Frell; Gill; Girard; Goar; Halberg; Hartmann; Hill; Holmes; James; Lebensohn; Lymberis; Marchman, Jr.; Matthews; Newell; Thomas; Town; Venable; Wenaas.

The report also includes the authors' private patients.

* Implants made by the American Optical Co., Southbridge, Mass.

† Sutures made by the American Cyanamid Co., Danbury, Conn.

Results

Although excellent cosmetic and functional results were reported in 104 of the 117 cases using the original Rosa implant observed for from 6 to 16 years, extrusion of the implant occurred in five cases (4 per cent. of the total). Extrusion of two of the implants occurred because the adult-size implants were used in shrunken globes in which the scleral shells were too small to retain the implants, and for this reason the modified implants are now being made in three sizes :

Size	Measurements (mm.)
Adult	18 × 17 × 13
Juvenile	16 × 15 × 11·5
Infant	14 × 13 × 10

A necrosis of the posterior segment of the globe may have caused the extrusion of an implant reported by Callahan (personal communication). In a fourth case, a large blood clot was found behind the implant which may have caused increased tension and reopened the wound, according to Hartmann (personal communication). It is essential to control haemorrhage before the implant is inserted, and to make holes in the sclera for drainage. The fifth implant was extruded after a severe intra-ocular haemorrhage which occurred on the third post-operative day, and a marked muco-purulent discharge was seen for several days after the extrusion. This was considered to be due to severe chemosis of the tissues following a retrobulbar injection of alcohol, which is no longer practised.

Retention of the cornea in evisceration, as originally described by Burch (1940) and modified by Ruedemann (1958a, b), permits the use of a larger implant to replace the entire orbital volume than when the cornea is excised. However, the presence of corneal tissue necessitates the most exacting prosthetic fitting of a very thin shell to avoid corneal necrosis (Cole, personal communication). Necrosis has been reported by Hughes (1948) in one eye, and by King (personal communication) in seven of twelve eyes observed after using the Burch method of evisceration. Enucleation of these seven eyes was found to be necessary because these eyes continued to be congested and painful in spite of treatment.

Some question of ptosis has arisen in association with the Burch technique and its modifications. Adhesions of the superior rectus to the underlying scar and suture line, may produce ptosis.

Poulard (1936) retains the cornea (which he calls the old method) only in cases of great diminution of the volume or atrophy of the globe, when the

sclera alone does not suffice to surround the implant with sufficient space to allow for contraction.

In comparing the results of evisceration with the cornea left intact with those in cases in which the cornea was excised, oculists representing three leading manufacturers of prostheses felt that it was more difficult to fit a prosthesis with the cornea present than where the cornea had been removed. So far as the cosmetic appearance was concerned, all felt that either method afforded excellent cosmetic and functional results, and were superior to the results obtained by enucleation.

It would appear that there should be greater sensitivity with the cornea left intact, resulting in more discomfort, secretion, and tearing, than when the cornea is excised. Ruedemann (1958b) reports that "pain may persist for several weeks". However, more cases in which these procedures have been employed should be observed over an adequate post-operative period before a final evaluation of the two methods is attempted.

It is important for the ophthalmologist to inform the optician of the type of implant that has been employed (*i.e.* with flattened or rounded anterior surface) so that proper fitting of the prosthesis may be obtained. For best results in fitting and the elimination of "dead spaces" between the prosthesis and the stump, which minimizes secretion, a mould of the socket should be made.

Technique of Evisceration with Intrasccleral Implant

Retrobulbar transillumination should be performed on the operating table to determine whether or not a tumour is present in the eyeball.

A scleral section is made from 9 to 3 o'clock with a cataract knife, 1 mm. posterior to the limbus after undermining the conjunctiva circumcorneally to a depth of 10 mm. (Figs 1 and 2).

FIG. 1.—A circumcorneal conjunctival incision is made 1 mm. from the limbus and undermined for a distance of 10 mm.

FIG. 2.—A scleral section, from 9 to 3 o'clock, is made 1 mm. from the limbus.

The corneo-scleral section is completed with scissors and wedge-shaped pieces of sclera are excised at the ends of the horizontal meridian of the incision (Fig. 3).

If possible, the intra-ocular tissues are evacuated in one piece with a spoon. All remaining shreds of uveal pigment should be carefully removed from the sclera, using an illuminated retractor (Berens, 1947) to improve visualization (Fig. 4).

FIG. 3.—The corneo-scleral section is completed with scissors. Wedge-shaped pieces of sclera are excised at the ends of the horizontal meridians of the incision (see dotted lines).

FIG. 4.—The intra-ocular tissues are evacuated with a spoon, *in toto* if possible. An illuminated retractor is used to improve the visualization of scar and pigment.

Scleral scars are excised and the edges of these wounds united with double-armed 5-0 braided white Nylon mattress sutures. The optic papilla is curetted to the same level as the surrounding sclera to prevent secondary irritation of the nerve by the implant, and the scleral shell is carefully examined under direct illumination. The shell is swabbed carefully with tincture of metaphen.

Haemorrhage is controlled with a compressor (Berens, 1952) and adrenalin-soaked gauze packed into the scleral shell. If haemorrhage persists, the bleeding points may be cauterized with deliquescent crystals of trichloroacetic acid.

From six to eight double-armed 5-0 braided white nylon sutures are passed through the superior scleral lip, 2 mm. from the wound edge, and then passed intra-sclerally through the inferior scleral lip, to emerge 2 mm. below the edge of the inferior scleral wound.

Four double-armed 5-0 braided white nylon sutures are passed through the steel mesh and the four grooves in the implant of suitable size (Fig. 5, overleaf) to permit some scleral shrinkage.

The introduction of these sutures may be facilitated by holding the implant in an introducer for spheres (Fig. 6, overleaf).

The hollow plastic implant with the four preplaced sutures is inserted into the scleral shell, with the spherical surface posteriorly. Two of the sutures are brought through the sclera at the ends of the horizontal meridian, and the other two at the ends of the vertical meridian; these are then tied securely on the scleral surface. Incisions 5 mm. in length are made with scissors, 10 mm. from the

FIG. 5.—Four double-armed 5-0 Nylon sutures are preplaced through the steel mesh and the grooves in the hollow plastic implant.

FIG. 6.—The introduction of the four sutures may be facilitated by holding the implant in a sphere introducer.

sutured scleral wound, below and temporally and above and nasally, as suggested by Summerskill, to facilitate drainage of blood and serum (Fig. 7).

FIG. 7.—From six to eight double-armed 5-0 braided Nylon sutures are introduced through the lips of the scleral wound. The implant with preplaced sutures is inserted into the scleral shell. Two of the implant sutures are brought out at the ends of the horizontal meridian, the remaining two at the ends of the vertical meridian. The sutures are tied closing the scleral wound. Scleral incisions to facilitate drainage are made 10 mm. from the scleral wound, above, below, temporally, and nasally. The implant sutures are then tied.

(Inset) The conjunctival wound is closed with a centrally locked running catgut suture.

The preplaced mattress sutures are tied and the conjunctival wound is closed with a running centrally locked 5-0 plain catgut suture (Fig. 7, inset).

Antiseptic ointment and a pressure dressing are then applied.

Summary and Conclusions

Several failures in the 117 cases observed for from 6 to 16 years in which the original Rosa intrascleral implant was inserted after evisceration resulted in several changes being made both in the implant and in the operative technique.

The modified Rosa-Berens hollow plastic intrascleral implant with steel mesh cap and suture grooves, made in adult, juvenile, and infant sizes, was used in 113 cases. These patients were observed for from 1 to 5 years, and

the cosmetic results and motility were excellent. There were no operative or post-operative complications. Since the paper was written, one implant has been extruded; infection seemed the most likely cause.

No case of sympathetic ophthalmitis was reported in the entire series of 230 eyes after evisceration, nor in over 400 cases reported in the literature, with or without retention of the cornea.

In retaining the cornea, a larger implant may be employed to fill the orbital volume, but several cases of corneal necrosis have been reported after the use of this method. Since the prosthesis over the cornea must be made accurately and must be very thin, this complication may have resulted from an ill-fitting prosthesis.

Both methods afford good motility and satisfactory appearance, and it is clear that, where not contraindicated, evisceration should be performed in preference to enucleation.

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