REPLACEMENT OF TRAUMATIC IRIS PROLAPSE*

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THE various text-books of eye-surgery, in dealing with traumatic iris prolapse, give the traditional advice to cut the prolapsed iris tissue flush with the corneal surface, after having firmly pulled out the iris through the wound so that the cut edges of the iris may retract away from the corneal laceration. The result is usually a more or less broad disfiguring coloboma with the known drawbacks of dazzling and photophobia, particularly when the coloboma is in the lower part of the eye. Though Stallard (1950) recommends reducing a small post-operative subconjunctival iris prolapse by stroking the iris back into the anterior chamber, in cases of penetrating injuries where the iris is in direct communication with the conjunctival sac and infection is likely, the principle of his treatment is not replacement but abscission, making as small a coloboma as is compatible with avoiding anterior synechiae.

But even with the excision of a prolapse performed in the classical way one may not always achieve an ideal retraction of the pillars away from the wound, especially where the wound is concentric to the limbus and about midway between limbus and corneal centre and/or has slanting edges. Pulling the iris sufficiently out in such cases is dangerous in that the iris may tear at its root. Spaeth (1948) recommends a fresh keratome incision at the limbus near the perforation and withdrawing the iris from the perforation wound through this new incision. For some of these cases, particularly in freshly sustained injuries, he advises releasing the iris from the perforation and smoothing it flat. He states that, in general, these cases of traumatic iris prolapse are best handled by abscission of the prolapsed iris.

Duke-Elder (1954) writes that prolapsed uveal tissue should never be replaced because of the risk of introducing infection into the eye.

Because the new antibiotics now make it possible to prevent or combat nearly all forms of infection, and because of the beneficial effect of the corticosteroids on inflammatory reactions, the excision of an iris prolapse seems to us no longer necessary. On the basis of experience gained from handling anterior synechiae in leucoma adherens prior to corneal grafting, a method has been developed of replacing prolapsed iris by a manoeuvre from inside

* Received for publication July 15, 1957.

the eye, thus avoiding the traumatizing effects of trying to reinsert the iris with a spatula from outside through the corneal wound.

This method is suitable for cases in which the prolapse is not more than about 4 days old and not more than 6 to 7 mm. in extent, and in which the iris is not badly lacerated. The results have been so satisfactory that we feel justified in recommending it as a standard procedure for the management of prolapsed iris in the majority of suitable cases.

Technique

The extent of the perforation, its form and course, the amount of prolapsed iris, the nature of the incarceration, the degree of mutilation of the iris, the presence of foreign material in the wound or anterior chamber, and the risk of eventual injury to the lens all have to be investigated.

A smear and a culture is taken from the conjunctival sac to ascertain whether infection is present and to which antibiotics the bacteria are susceptible. Intensive local and systemic treatment with antibiotics is started immediately to achieve conditions as aseptic as possible up to the moment of operation which should not be unduly delayed.

The preparation of the patient and of the eye are the same as for any other intra-ocular operation: general and local analgesia and akinesia, retrobulbar injection of Novocain with adrenaline and hyaluronidase (this also in the case of general anaesthesia), lateral canthotomy if necessary, and bridle or traction sutures at the limbus. In badly lacerated corneal wounds with irregular and gaping edges with little chance of an exact apposition by intracorneal sutures, an adequate conjunctival flap is prepared. If the prolapse is covered with fibrin or by a layer of regenerated epithelium as in delayed cases, this is removed by gentle irrigation with warm saline, the floating tags being carefully picked up with a fine forceps. Adhesions between iris and wound edges are broken by carefully introducing the tip of a fine repositor.

The anterior chamber is then opened by a slanting trap incision at the limbus (Fig. 1).

FIG. 1.—The anterior chamber is opened by a trap incision with a cataract knife at a distance of 4 to 6 mm. from the prolapse.

The position of this opening depends on the site of the iris prolapse and should be situated about 5 to 7 mm. from the prolapse so that a spatula introduced into the chamber lies between the limbus and the corneal wound and as tangentially to the wound as possible. For this incision a narrow cataract knife is used instead of a keratome; the knife makes an incision even into a completely soft eye with ease and safety. A good knife-needle may be used. There are, as a rule, no difficulties even if the chamber is not present, so long as the entrance of the tip of the knife into the chamber is carefully watched and the knife is guided along the anterior chamber angle between iris and cornea until the inner opening is about 1 mm. wide.

Through the incision a narrow, rounded cyclodialysis-spatula is introduced and guided carefully between iris and cornea so that it lies halfway between the limbus and the iris prolapse, its tip reaching beyond the distal margin of the prolapsed iris (Fig. 2). By a gentle sweep of the spatula from the periphery towards the centre, the prolapsed iris is swept back into the chamber and smoothed out. In broad prolapses or adhesions between iris and wound edges the lips of the corneal wound may at the same time be made to gape by spreading them with a second spatula. In extensive prolapses it is not always possible to replace the prolapse by one sweep. In these cases the reposition is performed step by step, starting with the part which is nearest to the limbal incision, or replacing an unmanageable portion from another better placed incision.

FIG. 2.—The iris prolapse is replaced by a cyclodialysis spatula introduced into the chamber through the trap incision.

After the replacement, as many intracorneal sutures are inserted as are necessary to accomplish an exact apposition and an air-tight closure. If exudate has already formed in the anterior chamber or if hyphaema is present, this is washed out, the tip of the irrigator being introduced between the wound edges. The corneal sutures are then tied.

The anterior chamber is restored by injection of sterile air through the trap incision. If the air escapes through the corneal wound an additional corneal suture is placed at the site of the leakage. When a conjunctival flap has been prepared, it is drawn into position, so preventing any escape of air from an irregular corneal wound which could not be exactly closed. Penicillin and cortisone are

injected subconjunctivally, atropine and Polyfax ointment are applied to the lower fornix, and both eyes are bandaged for 2 days.

In iris prolapses at the limbus or through the sclera adjacent to the limbus, though one may try to replace the iris by the method used when the iris prolapses during an intra-ocular operation, an exact reposition through a small wound without any entanglement of iris strands may be very difficult, even after relieving the herniated iris from the pressure of the aqueous by a peripheral iridectomy. It is much safer to apply the procedure described above, with the small modification that the incision is made into the sclera down to the ciliary body as for cyclodialysis, about 4 to 5 mm. from the limbus and parallel or perpendicular to it. Through this incision a cyclodialysis spatula is introduced between sclera and ciliary body up to a point behind the prolapse, and both the ciliary body when prolapsed and the iris are replaced by a sweeping movement towards the chamber (Fig. 3). Through the same opening air is injected with a special cannula into the chamber, after the corneo-scleral wound has been sutured.

FIG. 3.—Replacement of an iris prolapse at the corneo-scleral junction through a scleral incision in the manner of a cyclodialysis operation.

In large corneal wounds with extensive prolapse of lacerated iris, it is not right to replace the iris if it is hanging outside in ribbons. A neat coloboma will always be safer than rags of iris inside the chamber. But in these cases it is still unnecessary to excise the whole prolapsed iris. Only the lacerated parts should be excised, and the intact portions of the iris may be replaced as described above.

If the iris prolapse is complicated by a simultaneous traumatic cataract, one should proceed as though there were no cataract if there is only a small wound in the anterior lens capsule with a circumscribed opacity. There is more chance that the wound in the capsule will be closed and progression of the cataract stopped when the iris is replaced and is covering the opening in the capsule than when the iris is excised and the capsule wound exposed to the influence of the aqueous. In cases of wide lacerations of the lens capsule and quick opacification of the lens, the surgeon must decide whether to excise the iris or replace it. We prefer to replace a small to moderate prolapse, and after replacement as much as possible of the anterior capsule is removed through the wound. The anterior chamber is then thoroughly irrigated and larger pieces of lens cortex and nucleus

removed by means of a small Jaeger's spoon. These manipulations are started after corneal sutures have been placed. In some of these cases it may be preferable to delay the surgical repair for one or two days and to utilize the delay for intensive treatment with antibiotics; the postponement has the advantage that the lens becomes more opaque and disintegrates so that its removal is easier and more complete.

Results

In the last 3 years 42 cases of perforating injuries of the cornea complicated by a simultaneous iris prolapse have been admitted to the Eye Department of the Government Hospital at Tel-Hashomer, not including cases of severe lacerations and ruptures of the eyeball due to road accidents, mine explosions, and battle injuries. From these 42 cases twenty were selected as suitable for a replacement of the prolapsed iris. In the majority the prolapse was replaced 24 to 36 hrs after the accident, but in four cases 2 days had passed and in two cases 3 days. Even in these delayed cases no special difficulties were encountered in replacing the iris after having freed it from its adhesions to the corneal wound and stripped the fibrin from its surface.

In twelve cases the corneal laceration was not more than 4 mm. long, in four cases it was 5 to 6 mm. and in the remainder about 7 mm. In one exceptional case in which the replacement was successful, the corneal wound and the iris prolapse extended from limbus to limbus 2 mm. below the corneal centre.

In most cases the wound was more or less linear, but in three it was irregular, bruised, and gaping with loss of corneal tissue.

In five cases a traumatic cataract was present. In three of these most of the lens matter and a large piece of the anterior capsule were removed at the same session, in two the cataract was removed later, and in one it was left *in situ* with a visual acuity of 6/24.

In two cases the wound was situated in the sclera and the replacement of the incarcerated iris was performed through an incision in the sclera as described above.

Complications.—In one case an implantation cyst had developed, and this was later removed successfully by a basal iridectomy. In about half the cases small posterior synechiae developed at the site of the prolapsed sphincter without greatly disturbing the round shape of the pupil. In some cases small patches of iris atrophy confined to the prolapsed part appeared, and in these parts the normal relief of the iris was lost. No other complications, no infections or serious inflammations and no traumatic cataract which could be related to the operative procedure were encountered.

Comment

Two decisions have to be made in considering the repair of a traumatic iris prolapse: whether to excise or to replace the prolapsed iris, and what method of replacement to use.

The chief argument against replacement of a traumatic iris prolapse has been the fear of introducing infectious material into the eye with the iris that has been exposed. Our experience, though limited to only twenty cases, suggests that this risk is no greater than in any other intra-ocular operation when adequate prophylactic measures are taken. In none of the operated cases did infection develop after the reposition and no additional inflammatory reaction was observed. The only complications seen were an implantation cyst in one case (the implantation having possibly occurred at the time of the original injury), and insignificant small posterior synechiae with atrophy of the adjacent iris at the site of reposition in about half the cases.

The results of this method whereby the prolapsed and incarcerated iris is freed from the corneal wound by a manoeuvre from inside the chamber have been so satisfactory that it might be used as a standard procedure where replacement of an iris prolapse is considered.

As to the general indications for replacement of iris tissue that prolapses after laceration, Callahan (1956) has reached the same conclusions. Because of the resulting photophobia, iris deformity, and occasional reduction of vision, he prefers excision to replacement of a small to moderate prolapse, and hopes that this will gradually become the standard method of management. The fundamental difference between his technique and ours lies in the method of replacement. Callahan reinserts the iris through the laceration with a spatula or iris hook. Everybody who has tried this manoeuvre knows how difficult, even impossible, it can be, because the prolapsed and incarcerated iris, being friable and without tonus, tends to come out again and again, even after the aqueous has been drained. This method of reposition is more difficult the smaller and more bevelled the corneal wound is, and it is almost impossible to perform it in an exact and gentle way when the direction of the bevel is towards the periphery and the wound near to the limbus. In wounds bevelled towards the centre there is the additional danger of injuring the lens with the spatula when one is trying to free the unyielding iris from the posterior lips of the wound. In both eventualities the manoeuvre of direct reposition through the wound is apt to damage the iris still more. No such difficulties are encountered when the iris is swept back into the chamber by the gentle pull of the spatula stretching the iris between its root and the point of engagement. In this manoeuvre the iris is not so much reinserted as replaced.

A second minor difference between the two techniques is the sequence of the operative steps. Callahan inserts the intracorneal sutures as an initial step in the repair, because in his opinion there is less danger of injuring the lens if it is protected by a cushion of aqueous which escapes when the iris prolapse is excised or replaced beforehand. We have never found that there is a special danger of injuring the lens when placing intracorneal sutures, even when there is no anterior chamber at all, even under the more difficult

conditions of suturing penetrating corneal grafts. On the other hand, when one tries to insert corneal sutures into a corneal wound that is plugged by iris, the iris both obstructs the free passage of the needle and impedes the seizing of its tip and may also be damaged by the thread when it is pulled through, the fine fibres of the thread engaging the iris and twisting it, even when the silk seems ideally smooth. It is therefore preferable to disengage the iris from the wound first and to insert the sutures afterwards.

Summary

The results of repairing traumatic iris prolapses by replacement of the prolapsed iris have proved that this mode of repair is clinically sound and is to be preferred in suitable cases to the traditional method of abscission. A special technique described and recommended as a standard procedure consists essentially in an intra-ocular reposition carried out with a spatula through an incision at the limbus.

REFERENCES

- CALLAHAN, A. (1956). "Surgery of Eye Diseases", p. 390. Thomas, Springfield, Ill.
DUKE-ELDER, S. (1954). "Text-book of Ophthalmology", vol. 6, p. 604. Kimpton, London.
SPAETH, E. B. (1948). "Principles and Practice of Ophthalmic Surgery", 4th ed., p. 618. Lea and Febiger, Philadelphia.
STALLARD, H. B. (1950). "Eye Surgery", 2nd ed., pp. 381, 574. Wright, Bristol.