ON THE TREATMENT OF PROLAPSE OF THE IRIS

BY

A. MAITLAND RAMSAY, M.D., F.R.F.P.S.G.

LECTURER ON THE EYE, UNIVERSITY OF GLASGOW; OPHTHALMIC SURGEON,
GLASGOW ROYAL INFIRMARY.

PROLAPSE of the iris, whether due to a penetrating wound or to a perforating ulcer of the cornea, is always serious. In the majority of cases the aqueous quickly reaccumulates, and the anterior chamber re-forms; but the iris itself remains exposed, and that constitutes the real source of danger, because the prolapse interferes with the healing of the wound and lays the whole uveal tract open to infection, which may not only destroy the eye that has been injured, but may also lead to sympathetic inflammation of its fellow. The proper treatment of prolapse of the iris is, therefore, one of the most important problems in ophthalmic surgery. The method to be adopted in any particular case, and the success or failure of the treatment depend in large measure on the interval of time that has elapsed since the occurrence of the accident. If the prolapse be quite recent there is little difficulty in knowing what to do, but if several days have been allowed to pass before the patient is brought to the doctor, the prolapsed iris will be sealed to the edge of the rupture of the cornea by inflammatory exudation. The longer the time these adhesions have had to form the greater the difficulty for the surgeon, who must now be guided by experience whether it is wiser to interfere or to leave the case to nature. The expectant line of treatment is often the most prudent course to follow, for in many instances the result is quite satisfactory; but the patient will require constant supervision, and the surgeon will not be free from anxiety until the wound is securely healed.

The first step in the consideration of the treatment is therefore to distinguish between the cases that are of quite recent origin and those that are of more than forty-eight hours' standing; and although it may lead to repetition the methods of treatment will be described more clearly if a further distinction be made between those cases which are due to a penetrating wound, and those that are the result of a perforating ulcer of the cornea.

I. Prolapse of the iris due to a penetrating wound of the cornea.

(a) *A quite recent prolapse.*

A recent prolapse may readily be overlooked by the inexperienced, for the exposed iris, owing to its grey colour, is difficult to see. In every case, however, in which the iris is prolapsed the shape of the pupil is altered. It becomes displaced and pear-shaped, and the

narrow part always points to the prolapsed iris. The first indication for treatment is to try to draw the iris out of the wound back into the anterior chamber, and for that purpose atropin is used if the wound be towards the centre of the cornea, eserine if it be situated in the periphery. Although the use of these drugs is always recommended, it is only on rare occasions that they are successful, and there is the constant risk that, even although the visible prolapse disappears, an anterior synechia may follow, and give trouble in the future. The whole secret of successful treatment is to avoid the formation of an anterior synechia. Moreover, in the majority of cases the iris is bruised and has lost its elasticity, so that even if, by means of drugs aided by a spatula, it is put back into the anterior chamber, it has not sufficient contractile power to enable it to remain in its place, consequently it is almost certain to fall between the lips of the wound in the cornea, even if it does not prolapse again. There is, too, always the risk that, in replacing an iris that has prolapsed, infection may be carried inside the eye. All things considered, therefore, the best treatment for a recent prolapse is careful excision.

That operation, though simple in itself, ought never to be attempted by the inexperienced or by anyone who does not possess the proper instruments. Infection by pyogenic micro-organisms is the great primary danger, and failure will follow the most skilfully performed operation if there has not been strict attention to every precaution for the avoidance of sepsis. It is necessary, therefore, in order to avoid risk of infection from these sources, that the tear passages, the edges of the eyelids, and the conjunctival sac should be made as clean as possible before the eyeball is touched. The skin of the eyelids and the surrounding parts should be painted with 3 per cent. tincture of iodine immediately before the operation. A general anaesthetic is not necessary unless the patient be a child or an exceedingly nervous adult, but care must be taken to obtain perfect local anaesthesia by the free use of cocaine and adrenalin solution. The lids are separated by a spring speculum—one that keeps the eyelashes out of the way is to be preferred. A good light is indispensable. The iris will now be seen exposed on the surface of the wound. It is to be caught firmly by forceps, and, while it is kept on the stretch, cut by a single snip of de Wecker's scissors, the blades being held parallel to the corneo-scleral margin and pressed backwards against the eyeball. If the iris be kept tense in that manner, the cut edges retract within the anterior chamber, and the coloboma resembles an ordinary iridectomy. It is very important that no tag remains adherent to the wound in the cornea. After the iris has been excised the lips of the wound must be brought into accurate apposition by means of a small spatula.

The risk of further infection is avoided by covering the wound with a flap of conjunctiva, which is an essential part of modern treatment. The flap is formed by dividing the conjunctiva at the corneo-scleral margin in the neighbourhood of the wound. The part of the conjunctiva which has been thus separated must be freely undermined, so that with the minimum of tension it can be drawn over to cover the wound perfectly. It is then fixed in position by one or two sutures. After the parts have been carefully dried, a coating of paraffin is applied to seal the edges of the flap to the cornea and give additional protection to the wound. The paraffin employed is a substitute for ambrine, and known as No. 7. It is non-irritating to the eye, and is readily applied in the liquid state by a medium-sized camel hair brush. It becomes solid almost immediately. After a drop of 1 per cent. atropin solution has been instilled, the speculum is removed and the lids are closed. The skin is painted again with iodine solution, and both eyes are carefully bandaged. The patient is put to bed, and, if no untoward symptoms occur, the dressings are not removed from the eyes for forty-eight hours. Pain and restlessness seriously interfere with healing, and ought at once to be overcome by a sedative draught, or by a subcutaneous injection of morphia. The patient as a rule, however, makes little complaint after being put to bed, and unless infection has taken place at the time of the accident, the eye is quiet and the pupil is dilated when the dressings are removed. Any discharge should be wiped away from the edge of the lids, a drop of atropin instilled, and the bandage re-applied to both eyes. In a week or ten days the sutures holding the flap give way, and the conjunctiva falls gradually back into place, leaving the wound of the cornea securely healed. The eye may now be regarded as free from danger. If sepsis occurs, means must be taken to overcome it; but, unless the affection be acute, the chance of a successful termination to the case is greatly increased by the protection afforded by the flap of the conjunctiva.

When the wound implicates the sclera as well as the cornea, it gapes, and is accompanied by loss of vitreous, and the prolapse includes not only the iris, but also the ciliary body and the choroid. The immediate danger in these circumstances is further loss of vitreous humour, consequently the spring speculum is to be avoided: there will be less risk of accident if the upper lid be held by an assistant with a strabismus hook or a light retractor. The bulbar conjunctiva should be separated from the posterior lip of the wound, and undermined freely for a considerable distance around the seat of injury. The whole of the prolapsed uvea must now be carefully excised, and the lips of the wound approximated by drawing the conjunctiva over the cornea like an apron, and fixing it securely in its new position by as many sutures as are required—

the fewer, however, the better. No attempt ought to be made to stitch the sclera.

(b) *A prolapse that has existed for several days.*—Here the prolapsed iris will have become sealed to the lips of the wound of the cornea by inflammatory exudation, and before any attempt at excision can be made, those adhesions must be carefully broken down. The longer the interval that has elapsed since the injury occurred, the firmer the adhesions, and the greater the difficulty in separating them from the prolapsed iris. If active infection has taken place, no attempt to reduce the prolapse must be made until the inflammation has subsided, and in all cases the greatest care in manipulation is necessary, because, after the iris is glued by exudate to the lips of the wound, rough or unskilful interference may readily open a path for the entrance of fresh sepsis to the interior of the eyeball. When the prolapse is small it is wisest to leave it alone: it will heal in a few weeks, forming a dense white scar which seals the wound, and binds iris and cornea firmly together. The cicatrix thus formed is, however, not free from danger, because, apart altogether from its being a probable cause of secondary glaucoma, it is, long after the injury, liable to infection, which may set up a suppurative irido-cyclitis that may terminate in panophthalmitis.

Whenever, therefore, it is possible to deal surgically with a prolapse, it is prudent to do so; but the *technique* of the operation must be carried out with great care and consideration. The iris must be separated thoroughly from the lips of the wound by breaking down the newly-formed exudate with a small spatula or a sharp probe, and when the case is of long standing it may be necessary to enlarge the wound, on either side of the prolapse, with a keratome. After the iris lies free in the wound, it should be grasped by forceps, pulled gently on the stretch, and excised with de Wecker's scissors, the blades being pressed firmly against the globe. As soon as the prolapse has been cut off, a small spatula should be passed into the anterior chamber, to make sure that no part of the edge of the coloboma remains in the wound. If any tags of iris tissue be discovered, they must be removed by fine forceps and scissors. If the edges of the wound show signs of septic infection they should be touched with the galvano-cautery, and afterwards covered by a flap of conjunctiva. In those cases it is my practice to give 4,000 units of anti-diphtheritic serum subcutaneously, and in twelve hours to repeat half that dose. In medicine it is easy to argue *post hoc ergo propter hoc*, but having seen at the bedside the favourable results that follow the administration of serum, I advise its use confidently in all cases where the eyeball is infected. As a rule, it gives rise to no constitutional disturbance.

II. Prolapse of the Iris due to a Perforating Ulcer of the Cornea.

Prolapse of the iris may follow the perforation of any ulcer of the cornea where the iris can come into contact with the edge of the opening, but it occurs most frequently in the round marginal ulcer seen in phlyctenular keratitis. The great majority of the patients are children, and the eyes are damaged irreparably when perforation of the ulcer occurs. What follows here is for the most part a description of the treatment of those cases. The time of occurrence and the size of the prolapse are the chief considerations; but as a rule the ophthalmic surgeon does not see the child for several days after perforation has occurred, and by that time secondary infection of the prolapse has in all probability taken place. Very rarely, therefore, does it happen that an opportunity for simple excision of the iris presents itself. In all those cases there is a very rapid proliferation of new-formed tissue which quickly seals the iris to the cornea, and if the prolapse be no more than a brownish black projection about the size of the head of a pin, it is soon covered by a layer of exudate, which, becoming vascularised, is speedily transformed into connective tissue. In these circumstances, the only prudent treatment is to leave the case to nature. After a few weeks, by the gradual contraction of the new cicatricial tissue, the prolapse gradually flattens to form a scar level with the cornea. The scar is usually somewhat pigmented by the remains of the prolapse, and is directly continuous with the iris in the anterior chamber. The treatment here consists in keeping the eye clean, protecting it from light, instilling atropin, confining the patient to bed, and attending carefully to diet and to everything pertaining to the general well-being.

When, however, the prolapse is large, the remains of the cornea and the newly-formed tissue are not strong enough to withstand the force of the intra-ocular pressure, so, instead of the prolapse flattening, it bulges forwards, and unless something can be done to arrest it the eye will be destroyed by anterior staphyloma or by general distension of the globe. In these cases an expectant plan of treatment is unsuccessful, and an attempt must be made to reduce the prolapse and to strengthen the cicatrix. Whenever the prolapse with its covering of exudate shows signs of bulging, operation should be advised. Where the patients are children, as in most cases they are, a general anaesthetic should be administered; and as the conjunctival sac is always infected it is my practice, in all cases, to fill it with perchloride of mercury ointment, 1 in 3,000 (White's ointment), the night before the day of operation. After the skin of the eyelids and the surrounding parts has been painted with iodine, and the conjunctival sac washed with warm sterile saline

solution, the eyelids are separated by a spring speculum. The conjunctiva is then seized by forceps and divided with scissors at the corneo-scleral border in the neighbourhood of the prolapse, and separated freely from the episcleral tissues. The prolapse is now burned down to the level of the cornea by a galvano-cautery, heated to a dull red, great care being taken not to destroy the exudate which seals the iris to the substance of the cornea, and if possible the anterior chamber should not be emptied. The conjunctiva which has been separated from the eyeball is then drawn over the prolapse and the ulcer of the cornea, so as to cover them completely. While the flap is held in position by two pairs of forceps, a small piece of conjunctiva should be excised on either side, in order that, when the sutures are tied, two raw surfaces of conjunctiva are approximated. That prevents the flap from slipping back into its former position, and greatly assists in securing the whole object of the operation, which is to bring about the firm healing together of the flap of conjunctiva, the cauterized surface of the iris, and the edge of the ulcer of the cornea. The conjunctiva covering the cornea should be supported by a layer of paraffin, and after atropin has been instilled and a disc of ten per cent. collargol gelatine has been introduced, the speculum is removed, and the eye carefully bandaged. The collargol gelatine melts slowly and seals over any raw edge of the conjunctiva with an antiseptic plaster. It is an undoubted advantage when both eyes can be closed, but those children's eyes bear bandages badly, and, of course, anything that may favour recurrence of conjunctivitis is to be avoided. The patient must be kept in bed, and watched carefully, lest from restlessness or other causes the bandages are disturbed. If all goes well, the eye ought not to be examined for forty-eight hours, when, unless there be a recrudescence of sepsis, nothing more requires to be done than to wipe the edge of the eyelids and instil atropin. In from three to four weeks the eye should be healed; but even then danger is not past, because the adherent iris blocks the angle of the anterior chamber, and secondary glaucoma with all its disastrous consequences may supervene. Iridectomy should, therefore, be performed whenever the eye is firmly healed. When the iris is drawn towards the cicatrix so that the pupil is obstructed, the iridectomy should be placed so as to give the most satisfactory optical results. Even at the best, however, vision is seriously impaired, and in cases of deep ulceration of the cornea every effort ought to be made to prevent accidental perforation by timely paracentesis of the cornea through the floor of the ulcer. By that means prolapse of the iris will be prevented, and the formation of anterior staphyloma avoided.