CATARACT EXTRACTION BY EXPRESSION*

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BEFORE the introduction of enzymatic zonulysis by Joaquin Barraquer (1958), the normal procedure of senile lens extraction was either by intra- or extra-capsular extraction, or, more recently, by the use of the erisophake. This latter operation can be done with much greater facility by the use of the enzyme, as has been demonstrated by Barraquer (1958), Cogan (1958), and Cogan, Symons, and Gibbs (1959). The author has found that, with the use of this enzyme, the lens can be expressed intra-capsularly, in the great majority of cases, by a simple manoeuvre, to be described later. The advantages are simplicity of surgery and the absence both of the striate keratitis which appears to be a complication of erisophake extraction and of the tumbling technique of forceps extraction.

Procedure

Since September, 1958, 190 eyes have been operated upon by the method to be described. Patients are admitted 48 hours before operation and routine investigations are carried out including conjunctival swabs. On the night preceding the operation, Seconal, or some other hypnotic is given, the patients' lashes are cut, and 500,000 units penicillin are instilled into the conjunctival sac three times daily. The patient is told to wash the face three times daily. If the eyebrows are thick, these also are clipped.

The majority of patients are operated upon under general anaesthesia. If the operation is performed under local anaesthesia, the patient is given 100 mg. Pethidine and 50 mg. Largactil intramuscularly half an hour pre-operatively.

Immediately before the operation, 1 drop Adrenaline, 1 in 200, is instilled into the conjunctival sac. The lids are retracted by means of sutures through the upper and lower lid margins. The upper lid is elevated with a speculum, the superior rectus muscle is seized with Dastoor's forceps, and a suture is passed beneath the muscle. This and the lid sutures are clamped. A hooded conjunctival flap is fashioned hugging the limbus and involving three-fifths of the circumference of the globe in its upper part. This is mobilized as far backwards as possible. The eye is now opened with a keratome at the limbus and the section is enlarged with corneal scissors to the extent

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of half the diameter of the cornea (Fig. 1). Two buttonhole iridectomies are performed at 11 and 1 o'clock. A suture of Barraquer's silk with a large knot at the end is now passed through the margins of the cornea and the sclera at 12 o'clock. This has previously been single-knotted to the needle to prevent slipping. Using a spatula, the suture is then pulled in a loop away from the section to prevent entanglement with the lens when this is removed. The contents of one ampoule of α -chymotrypsin are injected, using a lacrimal needle, beneath the iris at 6 o'clock (Fig. 2), and through each iridectomy (Fig. 3), so that all parts of the periphery of the anterior chamber have been thoroughly flooded with solution. After 3 minutes, the α -chymotrypsin solution is gently irrigated from the anterior chamber with normal saline solution. The lens is now lying virtually free, the suspensory ligament having been digested by the α -chymotrypsin. As the enzyme acts, the lens becomes more spherical and the changing curvature is readily appreciated. The iris is seized with forceps at 12 o'clock near the pupillary border and is prolapsed from the eye, leaving a gap for the expulsion of the lens (Fig. 4). Gentle pressure is applied with a lens expressor, or the point of a tenotomy hook, below the limbus and in an arc over the lower third of the globe. The lens begins to tilt and is guided out of the eye by a following pressure of the expressor (Fig. 5.) As it leaves the eye, the action is like that of a cork in a bottle, thus preventing the escape of vitreous. The corneo-scleral section is drawn tight and the iris repositioned with a spatula. The wound is now closed with seven sutures of Barraquer's silk. With a fine cannula a bubble of air is blown into the anterior chamber, care being taken not to introduce too much air into the eye to guard against the risk of air glaucoma. The vitreous and iris are pushed back by the bubble to their normal relative positions (Fig. 6). The cornea is then firmly pressed upon to ensure that the section is air-tight; should bubbles escape, further sutures are introduced. The superior rectus suture is removed. The conjunctival flap is brought over the cornea and sutured to the lower part of the incised conjunctiva at each side with a single suture of Barraquer's silk so that the upper third to one-half of the cornea is covered. A drop of penicillin 500,000 units is instilled into the lower fornix and also a drop of 0.5 per cent. physostigmine. The lids are closed by strapping the upper lid suture to the cheek and the eye is then dressed with tulle gras, a pad of Gamgee with a perforation in the centre, and a cartella shield. These are secured in position by strips of Sellotape, and finally the eye is bound with a crepe bandage. The unoperated eye is not covered.

On the day after the operation, the eye is dressed. The lid suture is removed, the lid margins are gently swabbed with warm normal saline solution, and a drop of penicillin 500,000 units is instilled into the lower fornix. The patient is then allowed up with dark glasses, but is warned to avoid stooping or straining. Penicillin drops are used three times a day for 3 days and are then followed by Neocortef twice a day. When bilateral

FIG. 1.—Conjunctival flap reflected, keratome section started.

FIG. 2.— α -chymotrypsin being injected below the iris at 6 o'clock.

FIG. 3.— α -chymotrypsin being injected through the iridectomies.

FIG. 4.—Iris prolapsed.

FIG. 5.—Lens being guided from the eye with the expressor.

FIG. 6.—Eye closed with air bubble *in situ*.

extraction has been performed, the patient is given a pair of Crooks B.1 glasses, +10 D sph. right and left. To avoid trauma when the patient is asleep, the operated eye is protected with a perforated pad of Gamgee, a cartella shield, and crepe bandage, as previously mentioned.

The normal post-operative stay in hospital is 10 days, except in cases of bilateral extraction where the duration is about a week longer. The air bubble gradually absorbs and has usually entirely disappeared within a week. The conjunctival flap normally retracts to its original position within a week to 10 days. The sutures of virgin silk cause little or no discomfort as they are covered by the conjunctival flap. Most of them seem to cut out and disappear, but occasionally it is necessary to remove them 3 or 4 weeks after the operation. This is best performed by first staining with fluorescein, as otherwise they are practically invisible.

Patients who have undergone unocular extraction leave hospital with dark glasses or wearing their own spectacles with an occluder before the operated eye. They are also provided with a cartella shield and are instructed to protect the operated eye with the shield at night for a total of 6 weeks after the operation. If desirable, the first aphakic correction is prescribed 6 weeks post-operatively, after which the patient can resume normal life.

Results

In this series, the total number of eyes operated upon was 190, and 23 bilateral extractions were performed.

Three early cases developed prolapse of the iris; this was considered to be due to an insufficient number of corneo-scleral sutures. In the early series of cases, only five such sutures were used; since the introduction of seven sutures no further cases of iris prolapse have occurred, despite occasional persistent vomiting and coughing.

Complications.— α -chymotrypsin failed to act on two occasions. In one of these cases the lens was extracted with intra-capsular forceps, no vitreous was lost, and full visual acuity was obtained. In the other case (a moderate myope), vitreous presented with considerable loss; a scoop extraction was performed and an ultimate visual acuity of 6/12 was obtained.

Rupture of the capsule occurred in fourteen cases, and in six of these this membrane was removed intact with forceps. Six cases required post-operative needling.

Slight vitreous loss occurred in three cases, and severe loss in one; in this case the iris became drawn up and the pupil occluded.

Striate keratitis occurred in one case. This patient was operated upon over a year ago and the keratitis is not now likely to resolve further. The visual acuity is 6/18 with an aphakic correction.

Epithelialization of the anterior chamber occurred in two cases.

Patients are normally refracted 3 weeks post-operatively and the visual acuity is usually found to be between 6/9 and 6/5 at this early stage. If no pathological ocular condition, such as diabetic retinopathy or senile macular degeneration, was present, full visual acuity was invariably obtained and has not since deteriorated.

In this series of cases, α -chymotrypsin does not appear to have had any harmful effect upon the eye. In only one case did persistent striate keratitis develop, but whether this was due to the enzyme or to some other cause is uncertain.

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ADDENDUM

Since this article was submitted for publication, a further 126 eyes have been operated upon, fifteen patients having had bilateral extractions.