Arch. Soc. Amer. Oftal. Optom. (1977)-11-233

COMPARISON OF CONVENTIONAL INTRACAPSULAR EXTRACTION AND PHACO-EMULSIFICATION FOR REMOVAL OF THE CATARACTOUS LENS

By
ERIC J. ARNOTT, F. R. C. S.
London, England

With the use of good general anaesthesia, the operating microscope, fine atraumatic sutures and the newer micro-surgical instruments the conventional cataract procedure has become very safe with the very minimal% of complications. With adequate suturing and reconstitution of the anterior chambre, the patient can be immediately mobilised and discharged from hospital that same day. (Slides shown). Inherent in this technique are certain post-operative conditions which it is almost impossible to eliminate. With even the small 90' incision a certain degree of astigmatism is liable to arise and the sutures cannot safeguard the eye from rupture of the section if postoperative trauma should occur. The hyaloid face of the vitreous even if intact may subsequently herniate into the anterior chambre and in many cases ruptures with or without late degenerate changes in the anterior vitreous. With the total removal of the lens the scaffolding effect of this structure of the vitreous has been lost, hence the 2% of aphakic detachments. While the zonule of the lens and the lens capsule are semi impermeable to the passage of aqueous the hyaloid face of the vitreous is not; the permeation of aqueous with prostaglandins, released from a traumatised iris or ciliary body, through the vitreous to the macula may be one cause for the Irvin-Cass syndrome. (Prolonged operative and postoperative hypotony and vitreous traction on the macula are other possible causes of macula oedema).

Since even the perfectly performed intracapsular extraction can be followed by a poor visual result due to inherent defects in the procedure alternative techniques have been introduced. At the present time the

K.P.E. operation is the most satisfactory alternative. In the congenital, infant or young cataract the procedure is essentially very simple and satisfactory. (Slides shown). In many of these cases ultrasonics are not required, the Kelman-cavitron machine being used for simple irrigation and aspiration. Even with the 25in. Hydrostatic pressure of the irrigating fluid used with this instrument it may be sometimes difficult to form the A.C. to insert the instrument, due to the natural elasticity of the infants sclera. In these cases a small iris repositor may be first introduced into the section to hold back the iris and the cavitron instrument can then be inserted into the pupillary area by sliding it over the repositor.

The K.P.E. technique in the adult cataractous eye is by no means such a simple performance and requires the skills of a dextrous specially trained micro-surgeon.

The major surgical steps of phacoemulsification of the senile cataract are well known and have been outlined today by the originator Dr. Charles Kelman.

They include:

a) Limbal incision 3.1 mm in length.

b) Anterior capsulotomy.

c) Prolapse of lens mass into anterior chambre.

d) Phacoemulsification of the nucleus.

e) Removal of cortical remnants from behind the iris.

f) Cleaning of the posterior capsule or opening it.

g) Peripheral iridectomy.

h) Closure of incision and injection of Miochol.

While problems may occur at each stagecareful established technique or simple modifications at each stage of the procedure should entail a satisfactory outcome. If at the commencement of the procedure it is noticed that the eye is sunken a retrobulbar injection of 1% lignocaine may help to slightly proptose the eye. A pupil size of less than 8 mm. should make the surgeon consider an alternative technique as almost certainly the pupil will furthur constrict once the eye is opened. The incision should be tailor made exactly 3.1 mm in size and horizontally placed through the surgical limbus into the anterior chambre of the eye using a razor blade fragment, Sinskie keratome or diamond knife. The capsulotomy may be made with

the cystitome christmas tree style with enlargement or if no christmas tree appears in the anterior capsule, the can opening technique of Sinskie may be employed. In this modification small nicks are made around the whole circumference of the capsule some 2.5 mm. from the equator of the lens. Prolapsing of the nucleus into the anterior chambre is the most difficult part of the procedure. The see-saw in the 3 o'clock and 9 o'clock meridians gives usually the most satisfactory results. Using the cystitome the nucleus is rocked and torted into the anterior chambre; the torsional movement of the nucleus helps to strip the nucleus from the posterior cortex, which may be impeding its progress into the anterior chambre. If the nucleus cannot be prolapsed into the anterior chambre a conversion may be considered. The harder nucleus is most easily prolapsed. Removal of the nucleus if soft, may be carried out in the posterior chambre as long as certain rules are observed. The nucleus must be lying free in the posterior chambre and not attached to posterior capsule. With low ultrasonic power the anterior part of the nucleus is scalloped away after which it will tend to spontaneously roll into the anterior chambre for its final removal. The handpiece tip must at all times be kept horizontal and not be tilted downwards onto the nucleus which may then inadvertently be pushed into the vitreous. Ultra sonic removal of the nucleus in the anterior chambre may be time consuming but presents little difficulty as long as the tip is kept horizontal and moved gently to and fro into the lens in the mid-pupillary zone. If the nucleus tends to bounce off the tip less power is required.

Once the cortex has been removed the posterior capsule can be gently polished with the Kratz scratcher. Only if the posterior capsule is very thickened do I consider a posterior capsulotomy to be necessary.

The selection of cases requires some care. If a cataract has been present for over seven years the nucleus will tend to be hard (Little).

One of the merits of the K.P.E. procedure is the ease with which an intraocular lens can be inserted. At one sitting the lens can be inserted by enlarging the incision to 8 mm after the K.P.E. procedure has been completed. A variety of suitable lenses are available. The Binkhorst irido-capsular lens can be inserted with the upper and lower wings fitting between the posterior capsule and the remnants of the anterior capsule. A lens can also be inserted as a secondary procedure at a later date. This will entail a modification of its insertion since the anterior capsular remnants will have fused with the posterior capsule. If a Binkhorst iridocapsular lens is now used it will require suturing to the iris. A satisfactory alternative which we have

used is the Choice mark 8 with peripheral anterior chambre support which is easily introduced.

The final benefits of the K.P.E. as compared to conventional cataract surgery will take some years to be known. With careful operating the K. P. E. technique has been found to have compramable operative complications to the Intra-capsular cataract operation. It is to be hoped that by limiting the operation to the anterior segment of the eye and keeping the capsular face intact, posterior segment complication may be reduced. The hoped for results may not be attained until furthur refinments to the technique are found which will reduce the posterior capsular thickening which occurs in a fair percentage of cases, particularly the younger patients.

SUMMARY

The author believes that even though the complications of the conventional procedure of the intracapsular extraction of the cataract have been reduced to a minimum, due to the creation of the surgical microscope and the instruments for microsurgery, certain postoperatory conditions persist, which are inherent to its technical characteristics, such as astigmatism, opening of the wound, hyaloid rupture and its following sequela, retinal detachment, and Irving-Cass syndrome. On account of this, alternative techniques have been searched, among which the most satisfactory, at present, is Kelman's phacoemulsification (K.P.E.).

The author also believes that in soft cataract cases ulstrasounds are not necessary.

In cases of hard nucleous cataracts, Kelman's technique must be performed practising:

a) Total dilatation of a pupil.

b) Only one incision, 3.1 mm wide, practiced horizontally through the surgical limbus, using a razor blade, a Sinskie Keratome, or a diamond knife.

c) He thinks the most difficult step of the technique is the prolapse of the nucleous in the anterior chamber. He performs the dislocation using a cystitome. The harder the nucleous, the easiest it is to dislocate it.

d) When the nucleous is softer it may be fragmented and aspirated in the posterior chamber.

e) Cleaning the posterior capsule with Kratz' scratcher.

f) One of the advantages of the K.P.E. is the ease with which intraocular lenses may be inserted. He refers to the Binkhorst Iridocapsular Lens during the same operatory step, including the upper and lower lens wings between the anterior and posterior capsule remnants. If a lens is inserted later, it must be sutured to the iris.

The long-term results of this technique may not be judget yet.

C. B.