

RECENT IMPROVEMENTS IN THE CRYOSURGERY OF CATARACT

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It has now become evident that the application of low temperature in ophthalmology is gaining more and more ground. A considerable body of facts has been accumulated, speaking in favour of cryosurgery and cryotherapy. It is also true, however, that these new methods still suffer from a certain lack of stabilization, especially as far as the operative technique, instruments and equipment are concerned. This is no surprise for one who remembers the saying that nothing that has been invented can be perfect from the very beginning.

There are reasons to believe that the constantly increasing interest in cryo-ophthalmology will contribute to its further advances, and a number of instances; can be quoted to confirm this belief. Apart from the cryogenic treatment of cataract, which has become a routine method in many ophthalmological centres, low temperature is now used for the operative treatment of retinal detachment to produce exudative chorioretinitis. A very important field has been opened to cryotherapy by the finding that some virus diseases of the cornea, and especially herpes simplex keratitis, respond favourably to that kind of treatment. Low temperature is also used to control the secretory function of the ciliary body, so that the symptoms of glaucoma can be eliminated in some cases. Mention should be also made of cyclocryoapplication, which, as we have found it of late, considerably alleviates the symptoms and speeds up the healing of chronic iridocyclitis.

It was the cryoextraction of cataract which, more than any other cryogenic technique, enabled us to do away with certain fears connected with the application in ophthalmology of such a potent physical factor as extremely low

temperature. We now know that, when the exposed lens is touched with the refrigerated cryoextractor, there is no risk of cold being transmitted to other parts of the eye, where it might have an injurious effect. We also know that accidental touching the iris or cornea with the cold instrument is a rare and by no means serious complication, since it can be easily controlled. In our practice we simply rinse the point of contact with a gentle stream of physiological saline, so that the tissue is immediately detached from the instrument, and the accident has no evil consequences.

This confidence in the safety of our method has, in turn, enabled us to use it with more freedom and to search for modifications which, in agreement with the general trend in cryosurgery, might contribute to its perfecting. In the present article, we should like to discuss two recent developments in the cryosurgery of cataract, one of them not very well known yet, the other a quite new one.

Thanks to Barraquer's enzymatic zonulolysis, which so efficiently abolishes the resistance of the zonule fibres, the uncertainty connected with intracapsular cataract extraction has been considerably reduced, but not eliminated. If, in some cases, cryoextraction is combined with zonulolysis $/3/$, the purpose is not to prevent the breaking of the lens capsule, but to abolish the resistance of the zonule, and thus to avoid complications resulting from excessive traction or pressure, such as iridocyclitis, vitreous loss, or retinal detachment. With cryoextraction, zonulolysis can be used less frequently and in a selective way, i. e. in cases when it is really necessary. The decision to apply zonulolysis can be taken intra-operatively, when on attempting to extract the cataract, a considerable resistance of the zonule is found. The operation can be interrupted by directing a stream of physiological saline onto the tip of the cryoextractor. (Fig. 1). Zonulolysis is then carried out, and cryoextraction can be resumed.

Since the time when we first introduced this principle into our clinical practice, zonulolysis proved to be necessary in 6.1 per cent of cryoextractions only.

Thanks to cryoextraction, the operator is no longer obliged to finish the operation under less favourable conditions, which might result from his primary decision to do without zonulolysis.

On the strength of our several years' experience with cryoextraction of cataract, we feel it now opportune to present a modification of the operative technique itself. So far, the original cryoextraction technique assigned an active part to the operating-theatre assistance: it was the assistant who lifted the corneal flap and pulled the iris upward with a retractor, forceps, or another instrument. Objections were occasionally made that able and highly trained assistants are

not always available; besides, there were operators who wished to be less dependent on another person's help. In smaller hospitals, where a deficit of trained assistance is often felt, this problem may be a real one.

Such doubts were expressed by several authors, among others by Castroviejo². Becker¹ presented a special speculum combined with an iris retractor, designed to facilitate the performance of cryoextraction without assistance. Rubinstein⁴

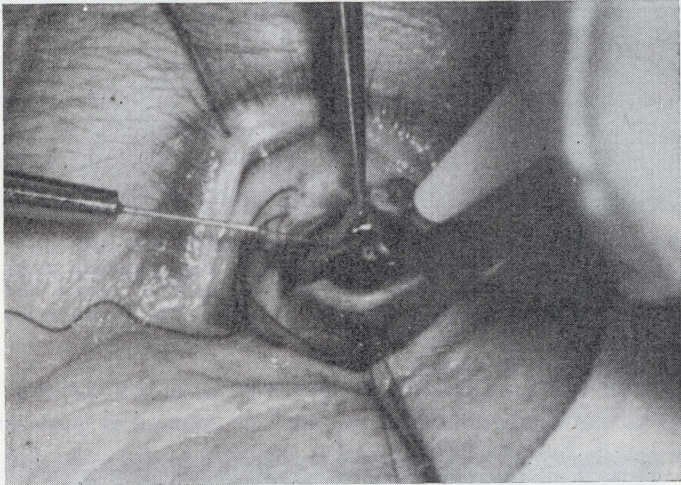


Fig. 1. The contact between the cryoextractor and the cataract is interrupted with a stream of saline directed onto the tip of the instrument.

was of the opinion that cryoextraction with round pupil is not a one-man procedure and that an assistant is needed to deal with the iris retractor and cornea.

It is our belief that the inconveniences discussed above can be removed by using the following modification of the cryoextraction technique. Prior to making the corneo-scleral section, a long, thin silk suture is laid near the corneal limbus, beside the regular suture which is to close the operative wound. The function of this auxiliary suture is to lift the corneal flap. After the section has been made, both ends of the suture are grasped with a delicate clamp, the corneal flap is lifted without undue bending, and the clamp is placed on a napkin or, if preferred, held by an assistant, who will see to it that it does not change its position. Meanwhile, the operator grasps a small area of the pupillary border of the iris with a delicate, smooth forceps, and, lifting the iris upwards in the form of a tent, exposes a sufficiently large part of the cataract surface (Fig. 2).

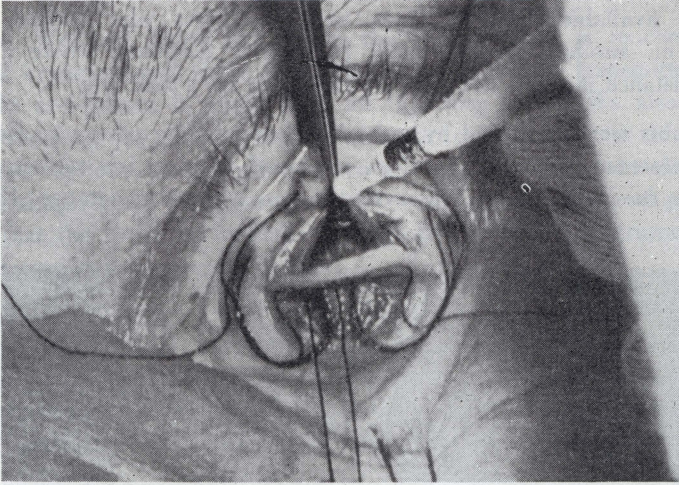


Fig. 2 The corneal flap is lifted by means of the auxiliary suture. Using a delicate, smooth forceps, the operator grasps with one hand the iris near its pupillary margin and lifts it upwards in the form of a tent. The cryoextractor, ready for use, is held in the other hand.

This is done with one hand only; with his other hand, the operator applies the cryoextractor to the cataractous lens, as near its equator as possible (Fig. 3). As the cataract is delivered with rotating movements, the iris, still held with

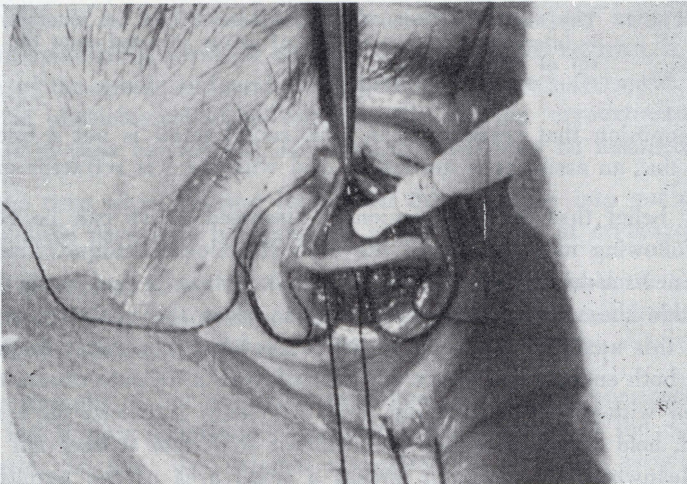


Fig. 3. The end of the cryoextractor is applied to the cataract, as near its equator as possible.

the forceps, is gradually returned to its normal position (Fig. 4). Immediately after the removal of the cataract and adjustment of the iris, the lifted corneal flap is allowed to fall back into position (Fig. 5; the assistant's help may be of use at this moment), and the auxiliary suture is removed prior to tying the corneo-scleral suture. Thanks to this technical modification, the part that the assistance takes in the operation becomes equal or even smaller than when one of the traditional methods of cataract extraction is used.

So far, we have carried out more than 300 cryoextractions using this modified technique, and we feel that this series is an improvement on the 3,000 operations performed earlier, by the original cryoextraction technique, with the assistance of an excellently trained staff. In our opinion, the modification presented above contributes to an even more delicate and smooth cataract extraction, so that intra-operative complications, both capsular and others, become even less frequent than with our standard method of cryoextraction.

Thus, the principle that neither the most efficient assistance nor the best equipment can replace the delicate feeling of the operator's hand has been found true once more.

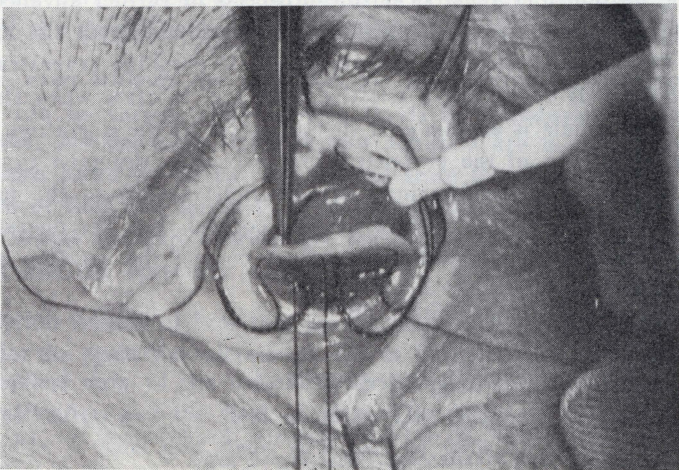


Fig. 4. As the cataract is delivered with rotating movements, the iris, still held with the forceps, is gradually returned to its normal position.

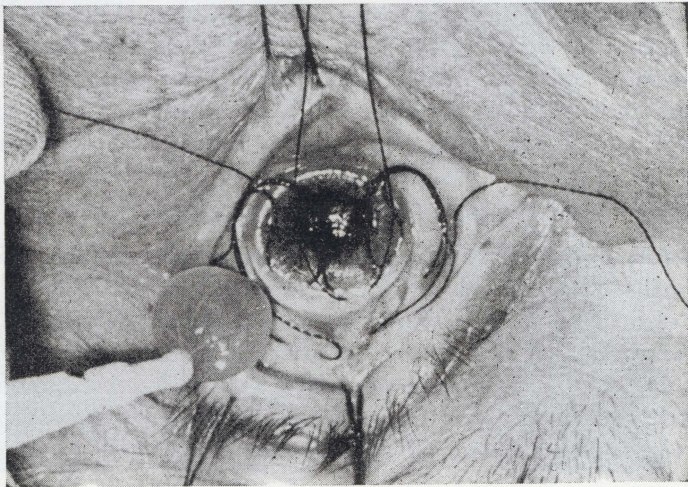


Fig. 5. Immediately after the removal of the cataract and adjustment of the iris, the corneal flap is allowed to fall back into position.

SUMMARY

After some introductory remarks on the prospects of further advances in cryo-ophthalmology, the author presents two recent developments in the cryosurgery of cataract. One of them concerns the possibility to combine cryoextraction with enzymatic zonulolysis applied in a selective way, i. e. in cases when an increased resistance of the zonule is encountered in the course of the operation. The other topic is a modification of the cryoextraction technique, designed to reduce the part of the assistance in performing the operation: thanks to the introduction of a second, auxiliary suture used to lift the corneal flap, the operator is now able both to handle the cryoextractor and to control the position of the iris during the extraction.

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