USE OF 200 TIMES THE RECOMMENDED DOSE OF ALPHA-CHYMOTRYPSIN WITHOUT COMPLICATIONS*

BY

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Alpha-chymotrypsin has been widely used since January, 1958, and fairly frequently by many ophthalmic surgeons, but no report appears to have been published of its use in man at a concentration 200 times greater than the recommended dosage (25 units for each eye). The following is the report of a case in which the accidental use of this strong concentration in one eye had no apparent deleterious effect and a successful intracapsular extraction of cataract was performed. The strength later used for the second eye had no apparent effect on the zonule.

Case Report

A woman aged 38 years came to the hospital on January 1, 1958, with a complaint of gradual deterioration of vision for 3 months (left eye more than right eye). The visual acuity with correction was 6/12 and J1 in the right eye, but only 6/60 (+1) in the left eye because of a posterior sub-capsular cataract. With the slit lamp, a little powdery iris pigmentation was seen on the corneal endothelium.

No apparent cause for the patient’s early cataract was found, although she gave a family history of a sister (aged 49) who had poor eyesight due to cataract. Her general health was good, and she had had six children without complications.

She continued to attend the Eye Out-Patient Department until the vision failed, and she was then admitted to hospital for extraction of the left lens on January 28, 1960.

Operation (February 1, 1960).—A left intracapsular extraction of hypermature cataract was carried out under local anaesthesia. Premedication of Somnus 15 gr. was given one hour before the operation.

A limbal section with conjunctival flap was made with a von Graefe knife and a Liegard mattress suture was pre-placed at 12 o’clock. After the peripheral iridectomy had been performed, a solution of alpha-chymotrypsin (made up by mistake at a strength of 5,000 Armour units) was injected into the posterior chamber (four quadrants). The mistake was noticed after the solution had been injected only because the consistency appeared thicker than that of the usual solution. The anterior and posterior chambers were thoroughly irrigated with normal saline after 2 minutes, and the lens extraction was carried out without difficulty by the erisophake (without tumbling).

During the post-operative period there developed a deep milky opacity of the central cornea (more marked than the usual striate keratitis observed in previous cases with same method), but this cleared up in 14 days. The patient had 1 per cent. atropine drops and penicillin drops daily during this period and the unoperated eye was uncovered on the fourth day. The suture was removed on the 14th day (usually on the 12th) and the patient was discharged home on the 17th day, having been kept longer in hospital than usual as a precautionary measure.

On March 22, 1960, the visual acuity in the left eye was 6/3(−1) and J1 with correction.

Second Operation (March 30, 1961).—A right cataract extraction was done with a solution of 200 Armour units per ml. instead of the usual 100 units per ml. and the whole amount (instead of 0.25 ml. as recommended) was slowly injected into the four quadrants of the posterior chamber. Irrigation of the chambers was carried out after 3 minutes. The erisophake was used, but the zonule was still too tough. The capsule ruptured and the milky hypermature cataract and nucleus had to be washed out with normal saline and most of the capsule remnants removed with forceps.

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During the post-operative period a small hyphaema occurred, but this had cleared by April 6, 1961; it recurred on April 9, 1961, but again cleared up by April 20, 1961.

On November 21, 1961, the visual acuity in the right eye was 6/4·5 (partly) and J1 with correction.

Twenty months after the first operation, particular care was taken to ascertain that none of the following complications was present following the accidental use of the high concentration of alpha-chymotrypsin in the left eye.

(1) Delayed anterior chamber formation
(2) Delayed wound healing
(3) Anterior synechiae and hypertension
(4) Iris prolapse
(5) Hyphaema
(6) Sub-conjunctival filtration
(7) Iris pigment dissemination
(8) Later loss or flattening of anterior chamber
(9) Rupture of vitreous face and vitreous in anterior chamber (the vitreous face is irregular but is behind the iris)
(10) Retinal changes (whole retina appears to be healthy)
(11) Detachment of retina
(12) Vascularization of cornea

Subsequent examinations in the past 2½ years have revealed no ill-effects in the eye resulting from the high dose of alpha-chymotrypsin.

Discussion

This case suggests that the very strong solution of alpha-chymotrypsin mistakenly used for the left eye helped in extracting the lens intra-capsularly without any untoward effect except the immediate post-operative temporary deep corneal opacity. The higher concentration did not give rise to hyphaema.

The zonule of the right eye of the same patient did not respond to a dosage of alpha-chymotrypsin slightly higher than that recommended.

It may therefore be asked whether the enzyme is not less harmful in vivo than has been claimed by some surgeons. If this were so a stronger solution might be used for a second eye if the first lens did not come out intra-capsularly with the recommended optimum dose. This opinion is based on only one case, and it would be beneficial if any other such cases were reported in order to compare the results.

Summary

The case is reported of a 38-year-old woman with bilateral cataracts extracted with the use of alpha-chymotrypsin. In one eye, the drug was mistakenly given at a concentration 200 times the recommended strength, but no post-operative complications have been observed during the past 20 months. The post-operative course of the second eye (for which a dosage only twice the usual strength was used) was slightly complicated, and the suggestion is made that in some cases a higher concentration of alpha-chymotrypsin may be used with impunity.

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