ANAESTHESIA FOR INTRA-OCULAR SURGERY*

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IN 1954, feeling that local analgesia was far from ideal for intra-ocular operations, I began using general anaesthesia for these cases (Anderson, 1954). The results in 160 cases treated during the past 2 years have been very satisfactory.

Method

Premedication.—Pethidine 100 mg., atropine gr. $\frac{1}{100}$, 45 minutes pre-operatively.

Anaesthetic.—In the anaesthetic room, xylocaine 4 per cent. or some other suitable analgesic solution is used to spray the nose and throat. Tubarine 10 mg., or more up to a maximum of 15 mg., is given intravenously depending on a clinical assessment of the patient; the average dose is 11 mg. (Roche, 1950). Then 0.125 to 0.25 g. 5 per cent. thiopentone solution is injected through the same needle and during the operation increments of this drug are given as needed. The airway is maintained by a Magill's pharyngeal tube or oral airway, into which oxygen is delivered through a fine-bore polythene tube at a flow of 5 l./min. (It is important to use a pharyngeal airway rather than tracheal intubation because of the risk of straining and coughing produced by the latter.)

The effects of these small doses of tubarine are interesting. Ptosis appears but the eye movements are still present although sluggish, while the iris retains its tone and reacts briskly to light.

In my opinion it is impossible to produce a central and relaxed eye with tubarine alone without at the same time causing apnoea (Parrish, Eason, and Karp, 1953; Henderson, 1953).

After the administration of the thiopentone there is an immediate change; the eye becomes central and complete relaxation of the extrinsic eye musculature occurs.

Topical analgesia is unnecessary, but if it is used the amount of thiopentone needed is decreased, this being an advantage in the "poor risk".

If the pupil is not sufficiently dilated, I deepen the level of anaesthesia in fit subjects; in the unfit the surgeon performs a more extensive iridectomy.

Observations

(1) Stimulation by the insertion of the superior rectus suture and pulling on the iris for the iridectomy may produce reflex movements of the limbs,

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although the eyeball remains immobile. Further increments of thiopentone are at once given—0.125 g. or more—to deepen the anaesthetic level.

(2) With the relaxation of all the extrinsic eye muscles, it can be difficult to fix the eye for incision.

(3) The iris remains tonic.

(4) Eye tension falls on an average 5 mm. Hg (Schiötz) because of atony of the extrinsic eye muscles as there is no fall in blood pressure. The vitreous falls away from the anterior chamber, thus reducing the risk of loss (Kirby, 1950).

(5) Respiratory exchange is diminished and some carbon dioxide increase occurs, but this can safely be ignored if the airway and oxygenation are adequate.

(6) Apnoea is uncommon but may occur through relative over-dosage with thiopentone, or sensitivity to tubarine. If the apnoea is due to thiopentone, gentle manual compression of the chest is carried out until detoxication of the drug occurs and respiration begins. If it is due to tubarine sensitivity, the administration of the appropriate antidote (prostigmin and atropine) will relieve the apnoea at once.

In this series I have had an occasional apnoea from thiopentone of a fleeting character, but none has occurred through the tubarine overdosage or sensitivity.

(7) The recovery phase is usually quiet and uneventful with little or no memory of the anaesthetic procedure. Weakness of the extrinsic eye musculature produced by the tubarine persists for 24 to 48 hrs, an advantage in intra-ocular procedures.

(8) Very occasionally uncooperative patients present a problem post-operatively:

(a) *Persistent "Squeezing"*.—A trial has been made of an oily suspension of tubarine (Burroughs, Wellcome) giving 1 to 2 mg. per stone bodyweight twice daily by hypodermic injection. It may help to control "squeezing" but of this I am doubtful (Barraquer Moner, 1953; Agarwal and Mathur, 1952; Agarwal, 1953).

(b) *Restlessness*.—The most effective method of control is by the intravenous injection of the "lytic cocktail" (pethidine 50 mg., largactil 25 mg., phenergan 25 mg.), which produces a quiet patient for many hours with no risk, even in the aged. The effect may easily be prolonged by using a 100-mg. largactil suppository as required.

(c) *Vomiting*.—This rarely occurs and is usually controllable by largactil.

(d) *Pain*.—Patients anaesthetized by this method are pain free, in contrast to those given local analgesia.

All intra-ocular operations are now performed under tubarine/thiopentone anaesthesia by the surgeons with whom I work. Their comment is that

operating is now simpler and entails much less strain on surgeon and patient.

This method is also particularly valuable for teaching purposes. Patients in the series who have had cataracts removed by both methods much prefer general anaesthesia.

Analysis of Present Series of Cases

160 intra-ocular operations have been performed at the Western Ophthalmic Hospital using this technique. 104 cases were cataract extractions, mainly intra-capsular, and the rest were cases of iris inclusion, iridectomy, trephine, etc.

Age.—This varied from 11 to 89 years (average 66).

Physical Condition.—As was to be expected, this was not always good, and 110 suffered from arterio-sclerosis and hypertension, coronary insufficiency, diabetes, or bronchitis with emphysema. Only twenty were in good condition and thirty were fair; despite these physical abnormalities no trouble was experienced either during or after the anaesthetic, except in three cases.

Dosage.—Tubarine varied from 5 mg. in the youngest to 15 mg. for the middle-aged and fit (average 12). Thiopentone varied from 0.25 to 0.8 g. (average 0.5).

Operating Time.—This varied from 5 to 15 min. (average 7).

Recovery Phase.—This varied with the amount of thiopentone used. The reflexes were usually returning when the patient left the theatre. Consciousness as a rule returned in 20 minutes, and oxygen was given routinely until this occurred. The airway should be removed on the return of the swallowing reflex to avoid coughing as anaesthesia lightens. It is important to institute breathing and moving exercises post-operatively in elderly patients as soon as possible.

Complications.—Two patients were so restless and uncooperative that largactil, avomine, and sedatives were of no avail. Both lost their sight, one through iris prolapse and the other through vitreous loss. They were both mentally unstable and could not have been operated upon at all without the use of general anaesthesia. Latterly the use of the lytic cocktail has overcome this difficulty.

One patient vomited but with no ill-effect on the eye.

Results.—Of the 160 operations, 158 were successful. I feel that the use of this or some similar method will largely replace local analgesia for intra-ocular surgery in the future.

Summary

(1) 160 cases of intra-ocular operations performed under tubarine/thiopentone anaesthesia are reported, showing synergism, evidenced by the

small dosage of tubarine and thiopentone used, and absolute flaccidity of the extrinsic eye musculature which persisted for 24 to 48 hours.

(2) Oily tubarine was tried post-operatively for persistent squeezers and intractable patients.

(3) A lytic cocktail was given post-operatively as a means of controlling uncooperative patients.

(4) The relaxants are shown to have great advantages in eye surgery for all ages and most types of case.

(5) Intricate intra-ocular surgery can be taught more easily by this means.

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REFERENCES

- AGARWAL, L. P. (1953). *British Journal of Ophthalmology*, **37**, 558.
 ——— and MATHUR, S. P. (1952). *Ibid.*, **36**, 603.
 ANDERSON, S. M. (1954). In "Modern Practice in Anaesthesia", 2nd ed., ed. Francis T. Evans, chap. 33, p. 582. Butterworth, London.
 BARRAQUER MONER, J. I. (1953). *Amer. J. Ophthalm.*, **36**, 789.
 HENDERSON, J. W. (1953). *Ibid.*, **36**, 781.
 KIRBY, D. B. (1950). *Arch. Ophthalm. (Chicago)*, **43**, 678.
 PARRISH, R. G., EASON, E., and KARP, M. (1950). *Amer. J. Ophthalm.*, **33**, 883.
 ROCHE, R. (1950). *Ibid.*, **33**, 91.