GENERAL ANAESTHESIA IN OPHTHALMIC SURGERY*

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GENERAL anaesthesia was applied to ophthalmic surgery very soon after its discovery in 1846. Brett (1847) records three ophthalmic operations, including a cataract extraction, performed satisfactorily under ether anaesthesia. However, the disadvantages of the associated vomiting were apparent from the beginning, and Collins (1929) states that it was some years before general anaesthesia became widely used in this branch of surgery. Chloroform introduced into ophthalmology by Jüngken (1850), was then the drug of choice. Cocaine was first used clinically by Koller, and local analgesia then rapidly became popular for ophthalmic work. General anaesthesia was reserved mainly for children, although some workers used basal narcosis for adults.

With the development of the ultra short-acting barbiturates, there was a revival of interest in general anaesthesia for ophthalmic surgery but local analgesia remains the more common method. Traquair (1938) considered general anaesthesia to be indicated for the insane, idiots, and most children aged between 2 and 9 years. Macintosh (1938), inquiring into the continued popularity of local analgesia, found that the ability of the patient to co-operate by moving the eye as requested was the reason most frequently given for its use, and, secondly, that the eye movement which often occurred under general anaesthesia was an obvious disadvantage.

If general anaesthesia is to be used for ophthalmic surgery, the following requirements must be met:

- (i) the eye must be still, *i.e.*, Stage 3, Plane 2 anaesthesia unless relaxants are used;
- (ii) there must be no vomiting, straining, or coughing, during or after operation;
- (iii) the intra-ocular pressure should be reduced;
- (iv) respiration should be quiet;
- (v) the surgeon must have adequate access.

Review of Recent Experience of General Anaesthesia

General anaesthesia has been used by the writer as a routine, and the last 200 cases to be personally anaesthetized are reviewed below.

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FIGURE.—Age groups of 200 patients operated on under general anaesthesia.

Material.—The accompanying Figure is designed to show that most of the two hundred patients in the series under discussion belonged either to the very young or to the very old age groups. In fact, the youngest patient was aged 9 weeks and the oldest was aged 90 years. Cardio-respiratory disease was common in the older age groups. The reasons for the two hundred operations

which were performed on this series of patients may be tabulated as follows :

Cataract extraction	41	Correction of ectropion	3
Iridectomy	21	Correction of entropion	6
Capsulotomy	18	Enucleation	5
Squint	50	Exenteration	1
Tarsal cysts	8	Cyclodialysis	2
Pterygium	8	Posterior sclerotomy	3
Probing of lacrimal duct	8	Trephine	12
Correction of ptosis	2	Miscellaneous	12

Premedication.—The method and dosages found suitable for different age groups may be tabulated as follows:

Age Group (years)	Depressant	Atropine
Up to 2	—	gr. $\frac{2}{100}$
2 to 5	Nembutal 0.6 gr./stone	gr. $\frac{1}{50}$
5 to 15	Nembutal 0.6 gr./stone	gr. $\frac{1}{100}$
Over 15	Morphia gr. $\frac{1}{8}$ to gr. $\frac{1}{6}$	gr. $\frac{1}{100}$

Anaesthesia

Children.—For probing the lacrimal ducts of babies, the ethyl chloride-open ether sequence is quite adequate. Nitrous oxide, oxygen, and “Neothyl” (methyl-N-propyl ether) have been used for older children after induction with nitrous oxide using a high rate of flow. The advantages of “Neothyl” are a smooth induction, since it is non-irritating, and a quick recovery. Blind intubation is performed when a longer operation is expected, e.g., correction of strabismus. Such cases also receive a small amount of relaxant intravenously, as recommended by Pleasance (1948), in order that the eye muscles, which are the first to be affected by such drugs, shall be relaxed. In this series, gallamine triethiodide was used, the initial dose being 1 mg./year of age.

Adults.—Pre-induction topical analgesia of the conjunctival sac using 4 per cent. cocaine is of the utmost importance.

Thiopentone alone is sufficient for shorter operations such as iridectomy and capsulotomy. By careful slow administration, active respiration by the patient is maintained throughout. The absence of reaction to the insertion of the speculum is used as an indication of adequate depth of anaesthesia. Oxygen is administered through the side tube of the airway. A total amount of from 0.5 to 0.7 g. thiopentone is usually given.

Sneezing, although very rare, does occur in association with light anaesthesia, but there has been no such incident in this series. The topical analgesia and pre-operative atropine are of value in preventing this complication.

For cataract extractions and other longer operations the thiopentone is supplemented by nitrous oxide and oxygen. To ensure control of the airway throughout, an orotracheal tube is passed under direct vision. The flexible guard designed by Bourne (1947) has proved valuable in preventing kinking of the tube. During induction, gallamine triethiodide is given intravenously in such dosage that laryngoscopy is facilitated but apnoea is not produced. Sixty to 70 mg. has been the usual amount. Supplementary small doses of thiopentone are given as required, *e.g.*, on finger movement.

Post-Operative Care.—Extubation sometimes produces an undesirable cough by the patient. The chances of this happening are reduced by lubricating the tube with an analgesic cream (*e.g.*, xylocaine) and by removing the tube very slowly. It is best to wait until the eye pad and bandage are applied before removing the tube so that if a cough does occur its effect will be minimal. The contemporary anaesthetic teaching that patients should leave the theatre with an active cough reflex does not apply to this type of work.

In this series, vitreous loss has been virtually non-existent and post-operative complications rare. Nothing has occurred to cause us to regret the use of general anaesthesia.

There were three deaths before discharge from hospital:

Case 1, aged 78, died of inanition 32 days after a cataract extraction.

Case 2, aged 73, died of cardiac failure and bronchiectasis 94 days after a trephine.

Case 3, aged 82, whilst ambulant in the ward after a cataract extraction, fell and sustained a fractured neck of the femur from which he died.

Control of Bleeding.—During some ophthalmic operations (*e.g.*, a trephine), bleeding may be troublesome. To minimize such bleeding, reliance has been placed on quiet respiration and a clear airway to prevent venous congestion, and on the topical application of adrenaline. Rycroft and Romanes (1952) have reported on the technique of controlled hypotension by the use of the methonium compounds. This method may be satisfactory for plastic operations on the lids and orbit of the type they describe, their oldest patient being 64 years of age, but such a technique would have been quite unsuitable for the aged patients of this series because of the dangers of coronary thrombosis (Hayward, 1952).

Curare with Local Analgesia.—Kirby (1950) devised the technique of local analgesia combined with the intravenous administration of curare to maintain the eye steady in the position of physiological rest and to ensure bodily relaxation of the patient. It would appear from further reports (Roche, 1950; Farquharson,

1951) that the method has attained considerable popularity, which suggests that local analgesia alone is not as satisfactory as is often claimed. The subjective sensations of the conscious subject after the administration of muscular relaxants, as described by Prescott and others (1946) and Laycock (1950), are so unpleasant that, quite apart from the dangers of apnoea, it appears difficult to justify this method.

Summary

General anaesthesia has been used as a routine in ophthalmic surgery with complete satisfaction. Two hundred recent cases are reviewed.

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