

## ANAESTHESIA FOR EYE SURGERY

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SURGERY on the eye, except in children, has in the past been considered the field for topical or local (subconjunctival or retrobulbar) anaesthesia. At times, however, it has been necessary, because of an unco-operative patient, to use general anaesthesia. These occasions have been fraught with fear and apprehension both for the surgeon and for the anaesthetist. The end results have usually not been the best to be desired. On other occasions an anaesthetist has been asked to supervise a patient during the administration of curare as an adjuvant to topical anaesthesia. This technique also has not proven to be satisfactory.

As eye surgery has progressed, there have been many attempts to improve on the very necessary anaesthesia. These attempts have followed two main directions, one, to improve the topical anaesthesia and the other to devise ways and means of rendering the patient oblivious to the trials of surgery on the eye. This paper will deal only with the latter method, as it is felt that both the patient and the eye surgeon will be more appreciative of this new technique.

In reviewing the literature, we find that most eye surgeons have directed their attention to changing or increasing the basal narcosis and continuing with local anaesthesia. To this end, Johnson (1) has proposed the use of a combination of morphine, hyoscine, and ephedrine as premedication to render the patient semi-conscious. Moner (2) suggests the use of intravenous barbiturate, demerol, or morphine to keep the patient quiet during surgery under topical anaesthesia. He also advocates the use of curare to produce akinesia and a reputedly relaxed patient. In many of these cases an anaesthetist was required to administer oxygen.

Kilgore (3) describes the use of pentothal combined with local anaesthesia. He reports, however, that frequently a specialist anaesthetist is required to give a gaseous anaesthetic by way of an endotracheal tube. In 300 cases he reports no untoward effects referable to the general anaesthesia. Sanders and Cutler (4) advocate the use of a specially designed pharyngeal airway with a balloon-type fitting. This airway is to be used with pentothal, nitrous oxide, and cyclopropane. In their series no curare was used.

Parrish, Eason, and Karp (5) advance opinions very similar to our own on this subject. They state that endotracheal anaesthesia may be undertaken almost routinely in eye surgery with minimum danger to the patient and gratifying results to the surgeon and anaesthetist. Thus we see a progressive trend toward the displacement of local anaesthesia by general anaesthesia for eye surgery.

### GENERAL PRINCIPLES

With general anaesthesia the patient is relieved of all apprehension and nervous tension, and thus will accept the trials of surgery with equanimity. This is particularly appreciated after one operation under local anaesthesia. There is now no need to hold the eye steady, nor visualize the flashes of light associated

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with eye surgery. As a rule, too, the surgeon is more satisfied. He no longer needs to hurry and there is no fear of a sudden movement of the eye at a crucial moment. He does not need to concern himself with the general condition of the patient, as it is constantly supervised by the anaesthetist. Further, the centrally fixed eye with lowered intraocular pressure is easier to operate upon

#### TECHNIQUE

We have arrived at our present method by a series of trials and errors—fortunately none disastrous. We have used various combinations: pentothal with local anaesthesia; pentothal and nitrous oxide or cyclopropane or ether transported through a variety of oropharyngeal or nasopharyngeal airways. Each was discarded because of lack of control of the airway and the anaesthetic, or because sneezing, coughing, or laryngospasm increased our difficulties. With these methods, too, our surgeon was none too happy, as we frequently encroached on his sterile field.

As a result of this somewhat experimental work, we proceeded to a method using an endotracheal tube which gives complete control of the airway and the gaseous anaesthetic and keeps the anaesthetist away from the sterile field. The only restriction was on movement of the head in order to reduce irritation of the glottis.

Our patients are admitted the afternoon before surgery and are examined by the anaesthetist. Sodium amytal or chloral hydrate in appropriate doses are given as h.s. sedative. The preoperative sedative is given three-quarters of an hour before the time of operation and usually consists of seconal gr.  $\frac{3}{4}$ , demerol 35–50 mgm, hyoscine gr. 1/200 and a gravol suppository or largactil 25 mgm. This produces a basal narcosis and a basis for retrograde amnesia.

In the operating room the anaesthetic is begun with 250–400 mgm. of pentothal and 40 mgm. of succinylcholine, or 20 mgm. of succinylcholine and one mgm. of syncurine, or 20 mgm. of flaxedil. The larynx is then exposed with a laryngoscope and sprayed with 5–10 per cent cocaine or  $\frac{1}{2}$  per cent pontocaine, after which intubation is carried out. As a rule, neither pharyngeal packing nor a cuffed tube are used because of the high incidence of coughing on their removal. Inflation of the lungs is carried out by rhythmic pressure on the rebreathing bag until normal respiratory excursion returns. Cyclopropane, nitrous oxide, and pentothal are administered as required to maintain the depth of anaesthesia in light third stage throughout the operation and until the dressings are on, tracheal toilet completed, and the tube out. This helps to prevent coughing while the tube is in place or after its removal, which might cause loss of vitreous. Oxygen is continued by mask until the respirations are well established and the condition of the patient is considered satisfactory for removal to the recovery room. Just prior to starting the operation, the surgeon does a facial nerve block on the appropriate side in order to prevent squeezing of the eyeball by the periorbital muscles and so loss of vitreous during or after the operation.

Postoperatively our patients are placed in the Simrn's position with the operative side uppermost. Oxygen is given by mask for one hour to help prevent

coughing which occasionally follows removal of the tube. Gravol or largactil are administered to decrease nausea and vomiting. After recovery of consciousness the patient is encouraged to breathe deeply and move from side to side and is given general supportive care. Resyl tablets, to keep mucus in a more liquid state, help to prevent chest complications.

This technique has been used for all intraocular operations with very satisfactory results. All eye operations receive similar care, but the extraocular cases are not so exacting.

Anaesthesia for eye surgery in children is usually for extraocular procedures. For these cases we use seconal at bedtime and seconal, hyoscine, codeine, or demerol in appropriate dosage for premedication. Cyclopropane by mask serves for induction, and is continued via endotracheal tube for maintenance, supported by nitrous oxide or ether. On this regimen, the children arrive in the operating room asleep, making induction peaceful and smooth. They are kept somnolent for forty-eight hours postoperatively by frequent doses of barbiturate. This reduces fretting and pulling off of dressings, but does not interfere with the taking of feedings or movement in bed.

#### COMPLICATIONS

For the surgeon, the main fears with general anaesthesia are coughing during and after the anaesthetic and post-anaesthetic vomiting. The coughing is controlled by a reasonably deep plane of anaesthesia until the endotracheal tube is removed, and the administration of oxygen by mask in the immediate post-operative period. Nausea and vomiting are largely controlled by the use of gravol and largactil in the pre- and postoperative periods.

Hoarseness and sore throat as a result of intubation are minimal and have been greatly relieved by nuporalis or aspergum. An active nursing régime of movement and deep breathing with administration of resyl tablets has prevented any chest complications even in known cases of chronic bronchitis or asthma.

One unexpected difficulty arose following some of our anaesthetics. A few patients became quite senile and fell out of bed or pulled off their dressings. One eye had to be removed after removal of a cataract as a result of this. However, we now cover only the eye on which surgery was performed and have had no further difficulty.

In our series of 242 operations on adults, 125 have been for cataract removal. The rest were for squints, iridenclysis, iridectomies, trephines, enucleations, etc. We have done 78 operations on children for squints. Of the 125 cataract operations we have lost only the one eye noted above. In all the rest the results have been quite satisfactory. Our patients have been completely unselected, ranging in age from 49 to 95 years, and with a variety of pre-existing diseases—hypertension, diabetes, bronchitis, previous coronary occlusion, etc. We alter our premedication to suit each case with respect to age and condition and, where it was deemed advisable, obtained the aid of a competent internist for special treatment. We have found that with adequate sedation these patients have amnesia and are pleased to have no recollection of the day of their operation.

## SUMMARY

1. We have presented a technique of general anaesthesia for eye surgery which is safe and pleasant for the patient and is satisfactory to the surgeon and anaesthetist.

2. Pentothal, a relaxant, and cyclopropane and nitrous oxide per endotracheal tube are considered a superior anaesthetic routine for any eye surgery.

3. Patients who have received general anaesthesia show no apprehension when they return for a second operation as is evident when this is to be done under local anaesthesia.

## RÉSUMÉ

Une série de cas et une technique d'anesthésie générale pour la chirurgie de l'oeil sont présentés. L'anesthésie générale est plus facile pour le patient, réduit la tension et les conditions d'urgence pour le chirurgien, et satisfait les exigences de l'anesthésiste.

Nous avons employé le pentothal, un relaxant, l'anesthésie topique du larynx avec cocaine ou pontocaine, suivis de cyclopropane endo-trachéal et de protoxyde d'azote à une profondeur générale d'anesthésie au troisième degré.

Le seconal, le démerol et l'hyoscine servirent à la prémédication, le gravol ou le largactil étant ajoutés pour réduire les nausées et le vomissement. L'oxygène, le gravol et le largactil, constituant un régime actif de soins après l'opération, ont réduit au minimum la toux, la nausée, le vomissement et les complications pulmonaires.

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