GENERAL ANAESTHESIA FOR EYE OPERATIONS.

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DURING last autumn several letters appeared in the *BRITISH MEDICAL JOURNAL* upon the subject of general anaesthetics in eye work. Most of the writers seemed to think that the dangers of chloroform were exaggerated, and that this drug, either alone or in combination with ether, was the most suitable for operations upon the eye which demanded a general anaesthetic.

As the subject was obviously one of considerable interest, I introduced a discussion upon the whole question at a meeting of the Midland Ophthalmological Society, held at the Birmingham Eye Hospital on December 1st, 1914. The discussion showed that all the members recognized the dangers of chloroform, and preferred to use ether, either alone or in combination. There was a general agreement that chloroform was too dangerous to use alone, and that the risk of the A.E. mixture was intermediate between chloroform and ether, but that in some cases it was more convenient than the latter. The following remarks contain the substance of my introductory paper, with the addition of the views expressed by some of the surgeons present.

In spite of the peculiar advantages which the eye offers for the action of local anaesthetics, and of the variety of drugs which we now have at our command for rendering the globe insensible to pain, there are still many operations which call for general anaesthesia, and some patients who are unsuitable subjects for local anaesthesia alone. Our operations are usually of such short duration that the problem of general anaesthesia in eye work is not exactly the same as that presented to the general surgeon, and merits special consideration.

Cases requiring General Anaesthesia.

The discussion of the subject falls naturally under three heads: Under what conditions is general anaesthesia necessary or advisable? What is the best agent to employ? and Which is the most suitable method of induction?

A general anaesthetic must be used when the operation is of such a nature that pain cannot be adequately abolished by a local analgesic; when, owing to tender age or diseased mentality, the patient does not possess the necessary self-control; and, finally, when the physical effect of the operation, even when it can be performed more or less painlessly, is liable to affect the patient adversely.

It is a matter of experience that cocaine and other local analgesics do not exert their full influence upon an inflamed eye, and when it is necessary to operate in the presence of inflammation general anaesthesia is called for. During my visit to Paris two years ago I saw two operations performed upon eyes which had been injured and were in an inflamed state. Local anaesthesia was employed, and in each instance the attempt was a failure. General anaesthesia is indicated for iridectomy in acute glaucoma and for operations during acute irido-cyclitis. It is not necessary when iridectomy is performed in cases of seclusio-pupillae with iris bombe, and as a prophylactic against recurrent iritis. In the presence of marked ciliary injection a general anaesthetic should be employed for an iridectomy. Paracentesis or a Saemisch's section is apt to be exceedingly painful if the eye be inflamed, and local analgesics will probably fail. It is far better to employ gas for both these operations than to risk failure by trusting to cocaine. My rule in such cases is always to use gas, or gas and ether, if there be any doubt as to whether a local agent will completely abolish pain. On the Continent, and especially in Germany, there seems to be a strong disinclination to employ general anaesthetics, but my observations in various foreign clinics have led me to the conclusion that the administration of general anaesthetics is in a very backward state upon the Continent, and that fatalities are more numerous than they are in the British Islands and in North America. To the best of my knowledge professional anaesthetists do not exist in these countries.

Excision of the lacrimal sac practically never demands a general anaesthetic. The expert use of codrenine gives a painless and almost bloodless operation.

I have rarely found that operations upon the tarsus are painless under local analgesia, but MacCallum and others state that most trichiasis operations can be performed in this way. Plastic operations upon the lids are best carried out under general anaesthesia. In addition to the fact that it is difficult to obtain analgesia, I believe that extensive infiltration with local anaesthetics diminishes the vitality of the flaps.

Many children are perfectly docile, and tolerate operations under local analgesia as well as adults. I have performed advancement upon children, aged 6 years, with cocaine and adrenalin; but generally we may say that children under 8 years of age require a general anaesthetic for advancement. During the past two years, in addition to instilling a solution of cocaine 5 per cent., I have injected a few drops of codrenine under the conjunctiva round the lateral recti, and find that advancement and tenotomy is painless and that quite young children make no objection to the operation. It is rather a question of temperament and home training than of years.

Certain adults have no self control whatever, and they must be anaesthetized for operations. It is exceedingly difficult, and even dangerous, to remove a cataract under general anaesthesia, but if the patient possess no self-control, extraction under cocaine is still more dangerous, for extensive loss of vitreous is almost certain to occur.

In Germany it is quite a common practice to excise the eyeball after deep injection of local anaesthetics in the region of the ciliary ganglion. Pooley of Sheffield, at the Oxford Ophthalmological Congress (July, 1914), recommended this procedure, which he has undertaken several times with success. Priestley Smith, sen., told the meeting during the discussion upon this paper that he and his son had excised the globe under novocain anaesthesia in the case of a feeble old man who was held to be an unsuitable subject for a general anaesthetic, and the operation was completed without pain. Mr. Coulter of Newport stated that he had removed several eyes after deep injection of novocain with satisfaction to himself and his patient.

It seems, however, undesirable that a patient should be conscious during what must be to him a ghastly experience, and therefore, on psychological considerations, I should generally use ether for enucleation.

The Choice of an Anaesthetic.

In a letter, recently published in the *BRITISH MEDICAL JOURNAL*, Mr. Whiting said that upon this subject I hold views which he characterizes as "extreme, not to say immoderate." He is perfectly correct, but I hope to prove that I have some grounds for my uncompromising antagonism to the use of chloroform.

The anaesthetic agents at our command are: Gas; ether, used alone or in combination with gas or ethyl chloride; ethyl chloride; and chloroform, alone or in combination with ether.

I have found gas useful for paracentesis or for Saemisch's section. I have performed iridectomy for acute glaucoma under gas, in a case in which the anterior chamber was deep and the operation promised to be easy, but on the whole I prefer to add a little ether for these operations. Ethyl chloride is a suitable anaesthetic in such cases, but I do not use it because there have been several fatalities under this anaesthetic in the case of more robust individuals than the usual subjects of glaucoma and hypopyon ulcers.

Chloroform, either alone or mixed with ether or with ether and alcohol, is the anaesthetic most commonly used by ophthalmic surgeons. In many respects it is the most suitable. It is easy to administer from the mechanical standpoint, it is pleasant to inhale, and gives a quiet and deep anaesthesia. It is, however, now fully recognized that it is the most dangerous anaesthetic in common use. The patient is apt to die upon the table from sudden cardiac failure, and he may succumb later on to acidosis. The addition of ether slightly diminishes the danger.

The death-rate from chloroform is about 1 in every 2,000 administrations. The statistics of the Registrar-General show that the number of deaths from chloroform, and mixtures containing chloroform, vary from 83 to 90 per cent. of the annual total of deaths under anaesthetics. In the year 1911, 276 persons died from general anaesthesia—that is to say, that two patients die from chloroform

every three days! The number shows no tendency to diminish, but rather the opposite. Levy has analysed 109 fatal cases.¹ In no instance was there any evidence of over-dosage, and in 87 per cent. of them there is evidence that the patient was in a state of light anaesthesia. He develops the view that the exact cause of death is delirium cordis, ventricular fibrillation, and supports his theory by a series of very convincing experiments upon cats. Levy believes that under light chloroform anaesthesia the heart is in a condition which is peculiarly liable to fibrillation. In this stage a variety of stimuli may precipitate fibrillation. The injection of a renalin is a most potent stimulus, and rarely failed to kill a cat under light chloroform narcosis. It is now recognized by rhinologists that adrenalin cannot safely be used in conjunction with chloroform, unless injected before the administration begins. I have been fortunate in escaping a chloroform fatality in my own practice, but I have had two or three very narrow escapes. I have, however, personal knowledge of several catastrophes. During the past year there has been a chloroform death in this hospital, and only last week one of the surgeons had an alarming experience, which nearly resulted in a chloroform fatality. Two years ago, in the Warneford Hospital, an apparently healthy young girl died under chloroform during the induction stage, and we have had at least two deaths during the past eight years at the Coventry Hospital. I know of other chloroform accidents, but during the whole of my medical life I have heard of no case of death from ether, either on the table or afterwards. Bernard Cridland told the meeting that there had been two deaths from chloroform recently at Wolverhampton, and he was always nervous when a new house-surgeon was administering it. Dr. Haynes, anaesthetist to the General Hospital, Birmingham, said that although trained in Edinburgh to use chloroform by the towel method, he now rarely administered it, because he regarded it as very dangerous. The C.E. mixture was safer, but ether was incomparably the safest of all. Beatson Hird said that he would never use chloroform unless the administrator took the full responsibility. He regarded the A.E. mixture as the best anaesthetic for eye work. It must, however, be remembered that, as we have already said, fully 85 per cent. of all deaths from anaesthetics have been caused by chloroform.

The facts and opinions speak for themselves, and they have fully determined me never to employ chloroform, either alone or with ether, to anaesthetize my patients. I have forbidden all my house surgeons to use it for any patient under my charge.

Ether has certain disadvantages in general surgery, but they are not so marked in the short anaesthesia demanded in our work as during longer operations. It is a very disagreeable drug to breathe, but the use of nitrous oxide gas during the period of induction completely overcomes this objection. There is in some patients a tendency to congestion and to the excessive secretion of mucus in the respiratory passages; but in most cases these phenomena do not arise during the early stages of anaesthesia, and a short eye operation will be completed before the secretion of mucus becomes troublesome.

It has been suggested that the apparatus used for inducing ether anaesthesia is apt to incommode the operator. This is by no means the case. If such a machine as Clover's inhaler be employed, it is perfectly easy to remove it when the operation is being performed. If the procedure be a long one, the inhaler can be replaced by a piece of lint or gauze, and ether can be given by the open method, or the open method may be adopted from the first. I have, however, without inconvenience, carried out hundreds, I think I may say thousands, of operations upon the eyelids, at the British Ophthalmic Hospital, Jerusalem, while ether was administered from a Clover's inhaler by an Arab boy. I have in more recent times performed several squint operations in the same manner, and the inhaler did not worry me in the very slightest degree. The absolute freedom from any anxiety as to the safety of the patient enables one to concentrate one's whole attention upon the details of the operation.

Its opponents state that ether is liable to cause pneumonia and bronchitis. I have had no experience of these complications either after ether or chloroform. As a matter of fact, statistics show that lung complications are

enormously more frequent after chloroform than after open ether anaesthesia. The following figures were given by Dr. Rood at the Liverpool meeting of the British Medical Association.² Korte had 7.2 per cent. of lung complications in 3,909 laparotomies under chloroform; Czerny had 3.9 per cent. in 1,302; Kummel 2.5 per cent. in 1,754; and Trendelenburg 5.4 per cent. in 1,829. With open ether anaesthesia Krönlein only had 0.56 per cent. in 1,409 cases. The average for chloroform is 4.75 per cent. against 0.56 per cent. for open ether. In other words, chloroform is in this respect eight times more dangerous than ether. Ether is also far less likely to produce degenerative changes in the liver and kidneys than chloroform. Leedham-Green, in a paper read at the same meeting,³ said: "There is no doubt that chloroform is six or seven times as dangerous as ether, and, as at present administered in most of our large hospitals, is attended by very serious risk to life—so serious that a very grave responsibility rests upon those who use it as a routine anaesthetic." My experience fully corroborates this view, and I think that any one who has a death from chloroform when ether could have been used is morally responsible for the loss of his patient.

I shall not consider the methods of giving chloroform: they are all dangerous. The most recent Harcourt type of apparatus, which gives a 2 per cent. vapour at will, has proved no less dangerous than the simple towel or lint mask.

Ether may be given either by the open method or by a Clover type of apparatus. I prefer to induce with gas and ether mixed, and then for long operations to continue with the open method. It is most essential to keep the jaw well forward, the lower teeth must be kept well in front of the upper. I find it most difficult to get this done, and in consequence patients become cyanosed. It is rarely necessary to move the index beyond the quarter sign; most young administrators use far too much ether, and then when faced with difficulties blame the ether.

In conclusion, I would ask that ether should be given a fair trial, but that it be correctly administered. A cataract extraction is the final test of an anaesthetic; I have performed one with perfect ease under ether, but I arranged to have a first class administrator.

REFERENCES.

- ¹ *Proceedings of the Royal Society of Medicine*, vol. ii. No. 8.
² *BRITISH MEDICAL JOURNAL*, September 14th, 1912. ³ *Loc. cit.*

MYELOID SARCOMA OF THE FEMUR, WITH PATHOLOGICAL FRACTURE.

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THE following case raises certain interesting points affecting diagnosis of pathological fracture:

Miss G., aged 28, a children's nurse, who had suffered from no previous diseases of importance, except that she had had haematemesis on several occasions (the last during February, 1914), came under treatment with the following history:

Towards the end of December, 1913, she was carrying a pail of water down some stone steps, when she slipped and struck the inner side of her knee against one of the steps. She experienced a sickening pain, and had to sit down for a few moments. A day later a bruise appeared, but the pain soon ceased, and she forgot all about the accident until March, 1914, when she was troubled by aching in the muscles behind the knee.

On March 21st, as she was stepping off a bus (which was not moving at the time), her knee suddenly gave way under her, and she fell. She was in great pain, was unable to rise, and could not straighten the limb. On examination at home soon afterwards the knee was seen to be slightly flexed and externally rotated. Any attempt at passive movement caused great pain. Dr. George diagnosed laceration of the internal semilunar cartilage, manipulated the leg as well as possible, and bandaged it up. As the position was still not perfect, however, the patient was transferred to hospital, and a general anaesthetic was administered. The leg was then easily put straight, and went back with a click strongly suggestive of the reduction of a dislocated semilunar fibro-cartilage. On