ANAESTHESIA IN GENERAL PRACTICE

This is one of a series of articles, contributed by invitation

ANALGESIA IN MIDWIFERY

BY

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The time has passed when the obstetric practitioner can satisfy the requirements of women in labour simply by committing their mental and physical sufferings to the care and moral support of a good nurse. The public is becoming increasingly aware that much can be done for the relief of pain, and an article on recent methods employed for the purpose is therefore justified. Two main types of administration are available: (1) drugs given by the oral route or hypodermically, and (2) inhalational analgesia.

Drugs

"Twilight sleep" is the term applied to a morphine-scopolamine narcosis in which an amnesic state is produced. It must be clearly understood that the labour is not painless, but when the narcosis is successful the patient should have no recollection of labour. The objection to its use in general practice is that constant supervision is necessary. There may be increased danger to mother and child unless the dosage has been very carefully gauged. This is controlled by strict observation of the patient, the technique being as follows.

When the pains are recurring at regular intervals the initial dose of morphine and hyoscine is administered by hypodermic injection, an average being morphine 1/4 grain and hyoscine 1/150 grain. The indication for the amount of morphine required below this is estimated at about 1/30 grain per stone of body weight. No more morphine is given, but at definite intervals the patient is roused and shown some common object—for example, a cup and saucer—and it is then noted what her response is when asked what she has seen. This is called the memory test. No further injection of scopolamine is administered during amnesia, but when this passes off 1/450 grain is given. The full effect of the drug is obtained when there is complete loss of memory. The patient is then usually flushed and the pupils dilated. Sleep occurs between the pains, but there is restlessness and groaning while they are present. After three injections of hyoscine, which are generally at hourly intervals, a longer period should elapse before another is necessary. Fluids will be frequently taken, as the drug causes extreme thirst, and attention must be paid to the bladder.

Nembutal (capsules 1½ grains each). This is administered orally, the technique being similar to that employed in twilight sleep. The initial dose in the average case is two capsules, with subsequently one capsule at three-hourly intervals, as required.

Sodium amytal (capsules 3 grains each). This drug is not as readily excreted as nembutal, and therefore gives a longer hypnosis. The initial dose ranges from three to six grains, and is repeated as indicated.

Sodium evipan (ampoules 1 gramme to be dissolved in 10 c.cm. of distilled water). Intravenous injection is the method employed, great care being exercised in administration to ensure an efficient airway. Small doses of 2 c.cm.

produce a condition of twilight sleep, and with larger doses there is complete anaesthesia for delivery.

With all these drugs there is risk of respiratory depression, and therefore respiratory stimulants, such as carbon dioxide and coramine, should be at hand. It should be more generally recognized that the only drug we have that is truly analgesic is opium. Scopolamine and the barbiturates are merely amnesic in their action. Consequently, although relief is obtained from the pains of labour, it is in proportion to the loss of memory and the degree of hypnosis that these drugs are found successful. They should never be prescribed where liver or kidney damage is suspected.

Inhalational Analgesia

Chloroform capsules (or brisettes, 20 minims of chloroform in each). One of these is crushed and inhaled by the patient at the onset of a pain. Some experience is necessary in timing the administration to obtain good results, and it is a convenient way of controlling a single dose of chloroform after the fashion of the time-honoured method of dropping the anaesthetic on the mask. As chloroform has a toxic action on the liver and heart muscle it is not recommended that it should be continued for any lengthy period.

Gas and Air Analgesia

Nitrous oxide gas is both analgesic and amnesic at the same time, and does not have any toxic effect on the patient. In my opinion the best method of giving relief is by the administration of gas and air in the right proportions. It is essential to have a reliable apparatus, which is described below.

Nitrous oxide is supplied in steel cylinders of different capacities: 50 and 100 gallon sizes are the most suitable. They are of two types: (a) straight valve, where the key for turning on the gas fits on the spindle at the top of the cylinder, the outlet being at the side, and (b) angle valve, where the spindle is at the side and the gas flows from the top. As nitrous oxide in the cylinder is a liquid under pressure of between 700 and 800 lb. per square inch, an efficient reducing valve is essential to make the gas available.

APPARATUS

This consists of the reducing valve, which allows gas to be delivered to a small rubber bag enclosed in either a metal drum or wooden box. An automatic valve causes the flow to cease when the bag is full. As soon as the bag deflates through inhalation more gas is allowed to enter. The outlet of the machine is divided into two channels—one for the passage of gas and the other for the admission of air through small holes. A check valve intermits the flow, and is only lifted when a fresh supply of gas and air is inhaled, thereby preventing an escape while the patient exhales. The whole action is controlled by inspiration. The holder fitted to the face mask has in it a finger hole, which is occluded by the patient herself, but when the finger is raised air only is inhaled. This is connected to the machine by concertina tubing. The amount of gas intermittently consumed is on the average 35 gallons per hour. In a series of private

practice cases the cost of gas averaged about ten shillings for a period of five hours. The analysis of the mixture is approximately 45 per cent. nitrous oxide in air.

Two models are illustrated: Fig. 1, size 12 in. by 8 in. by 18 in., weight about 15 lb. without cylinders; Fig. 2, size 16½ in. by 7¼ in. by 4¼ in., weight without cylinder

FIG. 1.

9¼ lb. In Fig. 1 two straight valve cylinders are securely attached by tightly screwing up the nuts and using efficient washers, as it is essential that there should be no leaks. Only one cylinder must be turned on at a

FIG. 2.

time, the gauge showing when it is empty. The valve of the one must be closed before the other is opened.

In Fig. 2 one cylinder (100 gallons) stands upright in a leather pocket made for the purpose, and a reducing valve is connected to it in a similar way, a small rubber pilot bag acting in lieu of the gauge.

TECHNIQUE OF ADMINISTRATION

The patient should be thoroughly conversant with the use of the mask before labour begins, so that when the time arrives for using it she is both confident in and familiar with what she has to do. If she is at all nervous she should be reassured; and she should fully realize that the analgesia is self-administered, that she does not lose consciousness, and that it gives definite relief from pain. The mask must be applied in perfect apposition to the face to prevent air-leaks, and the finger comfortably placed over the air-hole in the correct position. Unless care is taken with these details relief will not be obtained. The question is often asked as to when the analgesia should be started. The answer is, as soon as the pains of labour cause discomfort to the patient, at which time premedication with morphine 1/6 grain is of value, if desired.

In order that the full effect be appreciated it is important that the mask be applied to the face on the slightest indication of a pain—that is, before it has become established. The patient should be instructed to inhale and exhale normally, and to increase the depth and frequency of the breathing in proportion to what she can feel. When the pain is over the face-piece should be removed. This procedure can go on with each pain for hours and until the second stage of labour. The patient can drink freely of liquids when desired, as vomiting seldom occurs.

During the second stage of labour, when the expulsive voluntary muscles are brought into play, six to eight breaths should be taken in quick succession, the patient being told to hold her breath and force down as directed. At the time of delivery, unless full anaesthesia is indicated, the patient should be continuously inhaling from the face-mask as rapidly as possible, and must be instructed not to bear down. When it is considered that gas and air is not sufficient for the delivery of the child there is no objection to following it up with any anaesthetic, such as chloroform, ether, or gas and oxygen.

POINTS TO OBSERVE

1. The mother's pulse and the foetal heart rate should be estimated hourly.
2. Normal labour is accelerated by the use of gas and air. In those cases in which advance, however slow, does not take place, and relief is not obtained, these signs should be looked upon as diagnostic and a cause sought.

The following case is an illustration.

Gas and air analgesia was administered to a patient when the second-stage labour pains had become established. For the first two hours analgesia was satisfactory, but gradually became ineffective and the pains severe. No advance was taking place in the presenting part, although full dilatation was present. Both the mother's pulse and the foetal heart rate were rising. Diagnosis: a case of obstructed labour. Treatment: under a general anaesthetic a living child was delivered by podalic version.

3. It is important to remember that cyanosis (other than that caused by holding the breath) does not occur. If any is noticed steps must be taken to find out the reason.

The following case is instructive:

A woman started the administration of gas and air analgesia towards the end of the first stage of labour. After continuing this intermittently for a few hours it was found that cyanosis was produced, and the blueness did not completely disappear between the pains. Diagnosis: an examination of the chest revealed rales and rhonchi over both lungs and oedema was suspected. This was due to a previous influenzal cold, which had settled on the chest. Gas and air was discontinued as being an unsuitable analgesic.

There are, therefore, contraindications to the use of gas and air analgesia in labour, but only in the abnormal cases. These are: (1) Patients having any heart lesion in which compensation is incomplete. Apart from the physical signs this would be shown by rapid pulse and varying degrees of cyanosis. (2) Patients with pulmonary conditions—that is, phthisis, bronchitis, and other congestive conditions of the lungs. (3) Patients with albuminuria and high blood pressure, who might possibly develop an eclamptic fit.

The apparatus was never intended for the purpose of anaesthesia, so that it is precluded in the ordinary way for any obstetric operation, such as version, the application of forceps, or extensive repair of the perineum.

TRAINING OF MATERNITY NURSES

A course of instruction in the administration of nitrous oxide and air by midwives has been inaugurated in many teaching hospitals, and when a sufficiently high standard of efficiency has been attained a certificate is issued. Consequently, maternity nurses who have obtained this certificate will be qualified to undertake the supervision of the administration of gas and air both in domiciliary practice and in nursing homes. This will enable the practitioner confidently to receive great assistance from the nurse during the earlier stages of the labour.

DETAILS OF RESEARCH

It may be of interest to record the scientific work that was carried out with the assistance of Dr. Hilda Garry in the Liverpool Maternity Hospital in March, 1934, to show that there was no danger to mother or child by the use of gas and air analgesia. Electrocardiograms were taken of a series of patients immediately before and at the end of the administration, and again a day or two later. Dr. Leslie Cunningham, medical officer in charge of the electrocardiograph department of the David Lewis Northern Hospital, Liverpool, kindly reported on these, and stated that they did not appear to be influenced to any extent as the result of the patients' experience.

The alteration in the mother's pulse and in the foetal heart rates, estimated at approximately equal intervals during analgesia, was within normal limits.

A biochemical study was made of blood obtained from a maternal vein and the umbilical cord in a number of patients immediately after delivery, with and without analgesia. The conclusions were that, although the administration of gas and air reduced the oxygen content of the mother's blood, the blood of the umbilical cord did not show any marked alteration.

In January, 1936, the British College of Obstetricians and Gynaecologists published a report on the investigation into the use of analgesics suitable for administration by midwives, in which it was stated that gas and air administered by a similar apparatus to that described was a safe and satisfactory method of producing analgesia. There were certain criticisms concerning weight and bulk, and it is highly gratifying to note that these difficulties have now been removed.

During the last three years the just demands of parturient women for the provision of the best relief available have received greater recognition. As the public grows more "gas-minded" drugs will give way to inhalational analgesia. With the further increase of interest, acquirement of knowledge, and improved organization, the means for obtaining this relief will become still more simple and expedient.

A NEW RADIOLOGY DEPARTMENT IN EGYPT

BY

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The Pyramids at Cairo are known throughout the world and to many they symbolize Egypt. Not so well known is the progress made in many modern spheres under the dynasty of Mohamed Aly the Great. The Ministry of Education, which recently celebrated its centenary, provides a striking example of the advance made with the help of extensive European guidance, and the development of the Egyptian University over the last twelve years has been extremely rapid. The Faculty of Medicine, which includes the old Kasr-el-Ainy school and hospital, is building on an island in the Nile what probably will be when completed the largest teaching hospital in the world. In 1922 an international competition resulted in Messrs. Nicolas and Dixon Spain of London being chosen as architects.

The foundations of the whole hospital were completed in 1930, and about 400 beds are now in use. The radiology department as planned in 1922 was found to be smaller than was required by the increase in the work. At my suggestion it was replanned in 1930, the electrotherapy accommodation removed elsewhere, and a new story added to the building. In 1932 the plan was further modified to include two wards pending the completion of the whole hospital. In 1936 a start was made by the reception of patients. In this hospital, as in Sweden, radiologists have clinical charge of beds, and forty-three beds are now (May, 1937) occupied by patients receiving treatment by radium or x rays, or both these agents. There are five radiologists on the staff of the department, three of whom hold the Cambridge diploma, while an assistant surgeon is delegated from the department of surgery to act as surgical specialist. In addition, radium is available to such of the surgical or gynaecologist staff as wish to employ it, but its use in this way has been mainly by the ear, nose, and throat staff.

Lay-out and Equipment

The department occupies part of the first and the whole of the second floor above the out-patient accommodation. On the first floor are situated lecture theatre, museum, photographic dark room, film stores, patients' waiting rooms, workshop, and typist and filing clerk and technicians' rooms. The second floor has the shape of a capital T, the top of which is principally for diagnostic radiology. The stem of the T is for therapeutic radiology. The diagnostic section has barium insulation and rubber flooring, and includes an electrically refrigerated dark room. All rooms used for patients (except the wards) have electric heating. There are screening rooms and two radiographic rooms. Of the four rooms three are equipped with two tables, making seven tubes in all. One of these is of rotating anode type. By means of electrically interlocked and operated switchgear, designed by me and made in Cairo by kind permission of the Director-General of the Physical Department, each of the four control tables in the four x-ray rooms on the low-tension side and the corresponding x-ray tube on the high-tension side can be connected to either a six-valve or a four-valve generator. Both generators can be employed simultaneously. This system, which is believed to be original and which saves almost the whole cost of two generators, facilitates the repair of faults, as each generator acts as a stand-by for the other. All the apparatus is shock-proof, the generators being situated in a machine room upstairs, and cables are led through the ceilings to the x-ray tubes. A dental apparatus of the new self-contained type is also in use for the work of the dental school.