do doctors, and nearly all of them are booked. The Central Midwives Board has issued a form to be used by them as an ante-natal record, and, although many of the recently trained midwives are both doing the work and filling up the form, a large number are quite unable to do either. Knowing that the ante-natal supervision of midwives' cases was being to a great extent left undone, public health authorities, encouraged by the very real success of child welfare clinics, opened ante-natal clinics in the hope of making up the deficiency. There are now some 1,200 of them, and no doubt they are doing good work, especially in educating women in mothercraft; but it is doubtful whether they will ever prove an efficient substitute for careful supervision by the expectant mother's own midwife and doctor, for the following reasons. (a) Many mothers object to attending ante-natal clinics, and in rural areas find it impossible to do so. (b) There is a tendency for midwives to rely on the clinic to do their ante-natal work instead of improving themselves in it. (c) The members of the staff are often not engaged in the active practice of midwifery: not being present at the labour they have not the opportunity of learning from their mistakes. (d) The records of the clinic are not available to the doctor called by the midwife for emergencies: it is a handicap to the doctor to have no previous knowledge of the case. (e) It is no part of the duty of the clinic to treat abnormal cases, so that with responsibility divided between clinic, doctor, and midwife the patient remains untreated.

The committee considered this question very carefully, and advised that public health authorities should be enabled to make arrangements for the ante-natal care of midwives' cases (apart from women insured under the National Health Insurance Acts) by general practitioners,

and authority to do this was immediately given by the Ministry of Health. Under the scheme midwives would do the routine examinations and bring or send their patients to a doctor on at least two occasions—the first, early in pregnancy; and the second at about the thirty-sixth week. The obligation of the midwife to send the patient to a doctor if she discovers any abnormality during pregnancy would still remain as at present. In some areas the scheme is already working; in some it is modified by an arbitrary selection of general practitioners; in some it has not been started owing to financial pressure. For its effective working there must be co-operation between the medical officer of health and the general practitioners; unfortunately in some areas this is lacking. It is clear that, when such a scheme is adopted and working, many of the disadvantages to which we have drawn attention in connexion with ante-natal clinics will disappear.

CONCLUSIONS

1. Forethought during pregnancy and during the early life of the future mother can materially reduce the risks of childbirth.
2. Many doctors neglect ante-natal care because they do not realize its value or because they imagine they cannot do it effectively.
3. Ante-natal clinics suffer under many serious disadvantages.
4. More use should be made of the general practitioner for the ante-natal care of midwives' cases.
5. Contracted pelvis should be prevented.

REFERENCE

- ¹ Oxley: The Role of the General Practitioner in Ante-natal Work, *British Medical Journal*, January 3rd, 1931.

THE CHOICE OF ANAESTHETIC FOR ABDOMINAL SURGERY*

BY

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From the surgical point of view the requirements of a perfect anaesthetic are that the patient should be unconscious of pain, either physical or mental, and that there should be perfect relaxation of the muscles.

INHALATION ANAESTHESIA

In an inhalation anaesthetic the first of these points is perfectly obtained as regards physical pain, but mental pain or fear is often present, and one frequently hears patients state to-day that they fear the anaesthetic far more than the operation. In large part this fear is based on hearsay knowledge of the more uncomfortable methods used fifteen to twenty years ago. With ether or A.C.E. mixture given on an open mask the discomfort of the actual administration is negligible, but the fear of facing the ordeal is still great. To-day this may largely be overcome by the administration of drugs such as morphine, avertin, or nembutal in small doses while the patient is in bed, or, in some cases, by small doses of ether given in olive oil per rectum. I use the latter method as a routine in all my cases of exophthalmic goitre, and have found that it is very satisfactory. Drugs given in such a manner are, of course, used only as a means of making the patient unconscious for the period of transmission from the ward or room to the theatre, and until the real

anaesthetic is commenced. By this means the first part of our surgical requirements is easily obtained.

The second part—that of the provision of adequate relaxation—is much more uncertain, and is directly dependent upon the skill of the anaesthetist. We are all conversant with the defects that arise when a strange anaesthetist has to be utilized in emergency operations performed at some distance, and how after a very bad administration we are told how peculiarly difficult that individual patient was to anaesthetize. We surgeons know, however, that this difficulty has but little to do with the patient, but is almost entirely dependent upon the skill of the anaesthetist, and thus we are not to be blamed because whenever possible we require the services of those known to us.

Pulmonary Complications

Although, however, such good results are obtained as regards the requirements at the time of operation, one has to ask at what cost they are obtained, and here there is no doubt that the results are not so satisfactory. I suppose all abdominal surgeons would agree with me that the greatest post-operative danger to-day is the onset of pulmonary complications. I do not include pulmonary embolism, for this appears to be independent of the anaesthetic, but there is no doubt that some form of bronchitis is a very frequent post-operative complication. It is difficult to estimate its frequency, for it varies so greatly in degree, in one case consisting only of a slight cough with the expectoration of a small amount of mucus and pyrexia rarely rising above 99.5° F. for one or two days, to a severe purulent bronchopneumonia with pyrexia in the neighbourhood of 103° F. lasting for a week or more. If all cases are included some such lung

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complication is probably present in nearly 90 per cent. of upper abdominal operations. It is only fair to state, however, that the anaesthetic is not the only factor. The limitation of thoracic movement owing to pain in the upper abdomen and the presence of the bandage does undoubtedly encourage collapse of the lungs, and thus aids the development of bronchitis or pneumonia. A cold atmosphere in the immediate post-operative period is another very important factor. This is clearly shown by the fact that these complications are more common in hospital than in private practice. For this I would in part blame the longer passage through cold corridors from the theatre to the ward, and in part the fact that the temperature of the general ward has to be kept so as to be most suitable to the majority of the patients—one which I regard as much too low for a patient recovering from an anaesthetic. In a private home the individual room can, and should be, kept for the first two days at a temperature which is uncomfortably hot for a normal person.

To a large extent the frequency of these lung complications can be reduced by careful pre-operative attention, and no anaesthetic of this sort ought ever to be given if the patient has a cold or a sore throat. This is one of the reasons why I insist upon every patient being in the home or hospital for at least twenty-four hours before the operation is performed. During this period any such infection of the nasal passages or throat will probably become manifest, and the operation can then be postponed. In spite of such precautions it is, however, very noticeable that the presence of lung complications is more marked during an epidemic of influenza. In these cases it is probable that there has been some mild infection of the air passages which has been lit up by the anaesthetic.

Although so frequently present, and so largely dependent upon the anaesthetic, these lung complications rarely progress to a fatal issue, but they do often give rise to much anxiety, and are a source of very grave discomfort to the patient. Their onset becomes a very big risk if there is any pre-existing lung condition. Especially is this so if the patient has, or has had, tuberculosis. One of the errors it is so easy to make is to mistake the dyspepsia which occurs with pulmonary tuberculosis for that due to a chronic duodenal ulcer. The performance of a laparotomy under such conditions is not only an unnecessary operation, but it is a very real danger to the patient, in that the pulmonary tuberculosis, which may have been latent, is often converted into a very active process by the anaesthetic. This danger is an answer to the claims of those surgeons who would advocate an exploratory operation in all cases of doubtful dyspepsia, and personally I am very loath to perform an abdominal operation in patients who have had a past history of pulmonary tubercle, partly because there is often no organic lesion, and in any case there is a considerable danger from the operation.

ALTERNATIVE METHODS

In order to overcome these difficulties and discomforts many new methods have of late been introduced, which may be considered as follows:

Intravenous Anaesthesia

Some twenty years ago the intravenous administration of ether was much employed. At that time I was assistant to Mr. Laurie McGavin, who was enthusiastic in its use. For a time it was very widely used, as it was thought that by this method of administration the risk of lung complications would be overcome. It failed, however, to realize the hopes of those who introduced

it, and has now very largely dropped into disuse. More recently other drugs have been given by this route, the chief of which perhaps is avertin. The benefit of the method lies in the fact that the whole of the drug administered is utilized, so that the dose can be accurately determined, and that theoretically there should be but little irritation of the stomach and the respiratory passages. The great drawback, however, lies in the fact that, although the actual amount of drug injected is accurately known, this in itself creates difficulties, as it does not allow for individual idiosyncrasies. Thus, if the patient is peculiarly susceptible, too much is given, whereas, in other cases, the ordinary dose is insufficient to produce complete anaesthesia. If an overdose has been given it of course cannot be withdrawn. By the use of a continuous intravenous administration with a very weak solution it was hoped that this difficulty would be overcome, but such a method is slow in its induction, and is liable to interfere with the work of the surgeon. The hopes that there would be no irritation of the stomach and lungs were not realized, probably because so large a portion of the anaesthetic is excreted by these paths. My own experience has been that vomiting and bronchitis are nearly as common after this method as after the administration of inhalation anaesthesia.

Anaesthesia of the Sensory Nerves

Physiologically the ideal method of performing an operation is entirely to obliterate all afferent impulses from the operative field without affecting the organism as a whole. This may be effected by many methods. The tissues themselves may be infiltrated by a weak solution of a drug which paralyzes the nerve terminals, and, if it also contains adrenaline, controls haemorrhage at the same time. The sensory nerve trunks may have their conductivity destroyed either by directly injecting an anaesthetic into them or by infiltrating the tissues around them. This may not only be used for the peripheral sensory nerves, but the splanchnic nerves may be treated in the same way, so that all afferent impulses from the viscera may be blocked and surgical shock be thereby prevented. Similar results may be more simply obtained by injecting an anaesthetic fluid into the spinal canal and thereby anaesthetizing the posterior roots, so that all afferent impulses are checked at this site. They have the great benefit that shock is much reduced, for even under full inhalation anaesthesia afferent impulses are conveyed up the sensory paths, and much shock may be produced. The toxic symptoms brought about by their use are slight, and hence vomiting rarely follows. They produce little or no irritation of the bronchial mucous membrane or lungs, and therefore pulmonary complications are less common. Patients are thereby often saved a considerable amount of discomfort in the period immediately following the operation. If used alone they have, however, what, to my mind, is a very grave drawback—that they do not render the patient unconscious, and thus do nothing to relieve the mental stress. This objection can be overcome by combining with them some other drug, such as morphine, omnopon, scopolamine, nembutal, or avertin administered by mouth or rectum, or they may be combined with a small dose of ether administered by inhalation or by rectum.

The infiltration methods are useful in certain operations in that the anaesthetizing drug can be combined with adrenaline, and this renders the field of operation almost bloodless. For this purpose it has for some time been my custom to use infiltration methods in conjunction with ether in all cases of hyperthyroidism. For abdominal work, however, I always feel that infiltration of the tissues interferes somewhat with the healing of the wound.

Methods of nerve blocking, whether applied to the sympathetic or peripheral nerves, have the same disadvantage—that they do not render the patient unconscious. They also usually have to be combined with local infiltration, and this occupies a considerable period of time, a very important consideration when there is a long list of operations to be performed. They require a certain amount of skill and experience in their administration, but there is no doubt that by paralysing the efferent paths they greatly reduce surgical shock, and they are a great comfort to the patient in that the vomiting and discomfort following an inhalation anaesthetic are greatly reduced. For this reason they have become very popular with many surgeons, and as Professor Finsterer has shown, their use may be followed by most satisfactory results. It is my custom to use one or other of the methods for all patients who are aged, considerably shocked, or the subjects of lung affections, and there is no doubt that if I were not so fortunate in always being able to obtain the help of the most skilful anaesthetists I should make a greater use of them.

Spinal anaesthesia has the drawback that it can only be applied with safety to the lower part of the spinal cord. It does not render the patient unconscious, and there is a risk to life which, although small, is in my opinion greater than in a general anaesthetic. For gravely ill patients, with profound shock and intestinal obstruction, it is undoubtedly of very great value. The main objections to all these methods are that if they are combined with some other drug to render the patient unconscious they occupy a long time in their administration, and that they may, to a certain extent, interfere with the healing of the wound if they are combined with infiltration methods.

Oral and Rectal Anaesthesia

The great benefit of the administration of drugs by the rectum or mouth is that it can be carried out whilst the patient is in bed, and that thereby a sound sleep is induced, which passes on to a state of anaesthesia, so that the patient can be taken to the theatre, the operation performed, and the return journey made to the room without his knowledge. With the modern generation's tendency to flaunt its nervousness rather than to conceal it, such methods are frequently requested. Because of the extra nervousness associated with the disease it has been my custom in cases of exophthalmic goitre to use a rectal administration of ether on the plan advocated by Gwathmey.

In these conditions the patient is given a rectal saline for some days before the operation. On the day of operation this is replaced by a mixture of three ounces of ether and three ounces of olive oil, usually given after a preliminary injection of morphine. In about half an hour a light anaesthesia is induced, and although the patient may show restlessness and uncontrolled movements she can be taken to the theatre, and is afterwards entirely unconscious that she has been moved. To-day many other drugs are given either by mouth or rectum, the most commonly used of such being nembutal and avertin. The public are now cognizant of the use of these drugs, and frequently ask that they should be administered. Like the intravenous administrations, this method suffers from the drawback that the initial dose, being once given, cannot be reduced, so that if the patient has an idiosyncrasy against the drug he is likely to have an overdose. For this reason there is a tendency to-day to give a minimum dose which will produce unconsciousness whilst the patient is conducted to the theatre and then to continue the anaesthesia either by some form of nerve infiltration or by the use of open ether or gas and

oxygen. If employed as the sole form of anaesthesia there is no doubt that their use is not free from danger, and they have the drawback that induction is more prolonged and is technically more difficult than that by inhalation methods, and thus they are not so suited for use with a long operating list in the hospital. If used merely as a preliminary they have a wider scope, and are often very valuable with nervous female patients and for prolonged operations, which are likely to be associated with much shock, for after their use a smaller quantity of ether is required, or gas and oxygen may be given, which alone is rarely satisfactory for the performance of major abdominal operations. Even when so given I am not yet satisfied that they are so universally safe as open ether, and thus am not inclined to use them for young men whose sole claim is their pride in stating that they are so nervous.

When given alone, or in combination with other methods, lung complications may still follow, although with less frequency than after the use of open ether alone. As already pointed out, these complications are probably due to several factors other than the irritation of the inhaled drug, and these factors may still be acting if the anaesthetic be given by mouth or rectum. It is also probable that many drugs so given (this is especially true of ether administered by rectum) are excreted by the lungs, and thus may still cause irritation of the lung tissue or the bronchioles. The same is true with the gastric mucosa, and therefore we not uncommonly see vomiting after rectal, as well as oral, administration of any anaesthetic. Because of the lesser frequency of bronchitis, avertin and nembutal are often used for patients with serious lung complications, and in many of my cases of gastric lesions in patients suffering from chronic bronchitis or asthma such methods have been employed with advantage.

CHOICE OF METHOD

As with all other methods of treatment, there can be no hard-and-fast choice. Much will depend upon the individual surgeon and his experience in the use of any one method. By preferring one procedure and utilizing it freely he may bring it to a state of perfection to which no other surgeon has attained, and may thereby gain results which in his hands are better than those obtained by other methods. It is therefore impossible to state that for certain lesions one, and one only, of the above methods should be used. The choice must be in the hands of the individual surgeon and anaesthetist. In my own practice I have found that as a routine the best results in abdominal cases are obtained by the use of open ether, but this must be given by a skilled anaesthetist, by one who is accustomed to its use in these cases, which are often difficult, and preferably by an anaesthetist who is used to working with the same surgeon. Its administration is followed by little or no shock, it gives the patient complete unconsciousness, and it allows an absolute relaxation of the muscles. With careful pre-operative preparation and post-operative care the onset of lung complications is much reduced and is rarely dangerous. In conditions of severe shock a minimum dose may be combined with anaesthesia of the sensory nerves, produced by one of the several methods described.

If there be serious lung complications drugs may be given by mouth or rectum, and the operation performed either after the administration of a minimum dose of ether or with the use of gas and oxygen. With very nervous patients rectal ether, nembutal, or avertin may be given, but in such cases they should be used only as a preliminary and, when the patient is unconscious, the anaesthesia deepened by the use of open ether.