A NEW PRINCIPLE IN ETHYL CHLORIDE ANAESTHESIA FOR ORAL SURGERY

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The technique of this method of anaesthesia was elaborated by Dr. Max Borchardt of Berlin. It has been in use on the Continent during the past two years, during which time many hundreds of cases have been reported.¹ The only reference to it in the English literature which I have been able to trace is a short article by H. H. Tomlinson of Liverpool.² The method introduces such a complete innovation in ethyl chloride anaesthesia that it well merits a more detailed description.

The Somnator

The apparatus shown in Fig. 1 is known as the "sommator," and is easily portable. It consists of two parts: a metal mouthpiece (see lower part of the figure), to the inside of which is attached a bag of a highly absorbent material, readily permeable to air; and a nosepiece, which is made to fit into the mouthpiece, and consists of a wire frame over which is stretched a bag of the same fabric. The mouthpiece and nosepiece are attached to each other by rubber bands, by which they are also attached to two metal loops designed to fit over the ears. A further rubber band passes from one ear loop to the other behind the occiput in order to retain the apparatus in position. The fabrics are easily interchangeable, and the whole apparatus may be sterilized by boiling.

Administration of Anaesthetic

The technique of administration is as follows. The nosepiece is placed inside the mouthpiece, and the patient is asked to hold the latter between the teeth or lips, a dental prop having previously been inserted, if desired. The ear loops are placed in position, and the

patient is receiving abundant supplies of air through the nose, and the anaesthetic is diluted by the air passing through the mouthpiece. This is a very important fact, as inhibition of respiration is easily brought about by too concentrated a vapour.

As the anaesthesia progresses the nosepiece is lifted out of the mouthpiece and inverted over the nose (Fig. 3). Ethyl chloride is now sprayed on to both fabrics, the concentration being increased until the third stage of anaesthesia is reached. The mouthpiece is then lifted out of the mouth and inverted over the nosepiece (Fig. 4). The surgeon now commences his work, and during the operation the mask remains over the patient's nose, such quantities of ethyl chloride being sprayed on to it as may be necessary.

FIG. 1.

Advantages of the Method

It will readily be seen that this method is a great advance in the technique of ethyl chloride anaesthesia, and that it introduces such an element of safety that it is likely to replace present methods in suitable cases. In the present method ethyl chloride is administered by means of a face-mask or rebreathing bag until the patient is judged to be so deeply under its influence that the anaesthesia will last throughout the course of the operation. Using the sommator this no longer applies. The surgeon can commence as soon as the patient has become anaesthetized, and the

subsequent depth of anaesthesia is entirely under the control of the anaesthetist. Dangerous dosage or concentration of the anaesthetic are avoided, and by reason of the large quantity of air which the patient receives throughout the anaesthetic the colour remains pink. These are most important factors in contributing to the safety of the anaesthetic.

In my experience of over a hundred cases it has proved equally satisfactory for children and adults, and has given anaesthesia of four minutes' duration without ill effect. It is in my opinion as great an advance on present methods as nasal nitrous oxide is an advance over the old "straight" gas. In cases where it is not desired to pack off the mouth, or where it is important to eliminate

FIG. 2.

FIG. 3.

FIG. 4.

occipital rubber band attached (Fig. 2). The apparatus is now self-retaining, and the anaesthetist's hands are free to hold the jaw and steady the head. A few drops of ethyl chloride are sprayed on to the fabric. It is important not to spray more than 0.5 c.cm. of anaesthetic on to the fabric at once, so that the possibility of liquid ethyl chloride reaching the patient's face is avoided. The patient is told to breathe deeply. During this stage the

mouth-breathing, the anaesthetic may be commenced with the apparatus over the nose, as shown in Fig. 4, the mouth being covered with an obturator during induction. The slight disadvantage of a prolonged induction due to the dilution of the anaesthetic vapour by air can easily be eliminated by means of a towel placed over the apparatus. In general anaesthetics, where open ether is preceded by an ethyl chloride induction, the use of this

method entirely eliminates the fear which is engendered in a patient by the face-mask. The induction is pleasant and almost imperceptible to the patient, and after induction the apparatus is easily removed and the usual mask substituted.

For use with the somnator there has been elaborated a new type of ethyl chloride, containing 15 per cent. of added constituents (valerian, camomile, peppermint, and alcohol) by which the boiling point has been raised and freezing of the ethyl chloride on the fabric thus prevented. This latter constitutes one of the disadvantages of ordinary ethyl chloride, as when freezing occurs the concentration can no longer be controlled. It is also claimed that the added valerian reduces excitement and after-vomiting, a claim which appears to be substantiated in my series of cases. Out of thirty-four cases in which the apparatus was used with ordinary ethyl chloride eleven (32.3 per cent.) vomited, but in thirty-six cases where the special ethyl chloride was used only two (6.6 per cent.) vomited. This ethyl chloride has, however, the disadvantage that induction appears to be unduly prolonged, and its anaesthetic action is somewhat weaker.

I am much indebted to Mr. F. St. J. Steadman, the senior dental surgeon to the West London Hospital, and dental surgeon to the Royal Dental Hospital of London, for kind permission to use the method at his clinics. The apparatus is marketed in England by Messrs. Cottrell and Co., 15, Charlotte Street, London, W.1.

REFERENCES

- ¹ Polus, J.: *Revue Stomat. Belge*, No. 1, 1932; v. Liebermann: *Deutsche Med.*, No. 45, 1932; Hauberisser, E.: *Zahn. Rund.*, No. 15, 1932; Borchardt, M.: *Ibid.*, No. 13, 1933; *ibid.*, No. 3, 1934; Antonini, J.: *Nuova Rassegna di Odont.*, No. 5, 1932.
² Tomlinson, H. H.: *Dental Record*, lili, No. 12.

Clinical Memoranda

AN UNUSUAL CASE OF DIPHTHERIA

Cases of diphtheria of the vulva are noted in the literature¹ of this disease, but the following case presents circumstances unusual enough to merit a record.

A girl of 7 years was brought to Dr. B. R. Nisbet, medical officer of health for Kilmarnock, on November 12th, 1933, suffering from a purulent vaginal discharge, which had become evident the previous day. Although smears showed the absence of gonococci, the clinical symptoms were so strongly suggestive of vulvo-vaginitis that he sent the child on November 15th to the venereal diseases ward of Heathfield Hospital, Ayr, for observation and treatment.

On admission, the patient was noted to have a purulent vaginal discharge with redness of the vulva and several small circular excoriations of the labia majora. No membrane was visible. The day following admission the patient complained of a sore throat and was feverish, and inspection of the fauces revealed typical diphtheritic membrane on both tonsils. A direct examination of the swab clinched the diagnosis, and 16,000 units of diphtheria antitoxin were given at once.

Smears of the vaginal discharge similarly examined showed pus cells, Gram-positive bacilli, and mixed coccal forms, but no gonococci. Cultures of the throat and vaginal secretion both showed typical Klebs-Loeffler bacilli, and the culture of vaginal pus was sent to Glasgow Public Health Laboratory for a further test of the organisms. These were reported virulent in the guinea-pig.

With rest and the ordinary toilet of the vulva, the patient recovered and was discharged well on January 27th, 1934, the undue length of her stay in hospital being on account of a persistent slight cardiac irregularity in convalescence.

Associated Features.—Immediately faucial diphtheria was diagnosed Dr. Nisbet was informed, and he has since supplied me with the following interesting data. On November 16th, 1933, a further case of faucial diphtheria was notified from a house in the same block of the tenement wherein the girl resided, and was removed to hospital. On December 1st a

brother of the patient was similarly dealt with. On December 5th another brother of the patient was found to have a positive nasal culture, and still another case of diphtheria was discovered in the same tenement.

This case appears to have been one of primary vulval diphtheria with secondary infection of the throat. I am indebted to Dr. Nisbet for his assistance in amplifying the report.

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OBSTRUCTION OF THE OESOPHAGUS BY THE BEARD

The novelty of this cause of oesophageal obstruction is, I think, worthy of record.

Some two years ago a man called upon me in an emergency with the history that some food had lodged in his throat, preventing all further attempts at swallowing. His wife, who accompanied him, was necessarily the spokeswoman, because it transpired that the patient had been subjected to complete laryngectomy (for carcinoma) some eighteen months previously in London. The man had made a splendid recovery, and breathed normally through the stump of his trachea at the root of the neck.

Indirect inspection of his funnel-shaped deep pharynx showed a bolus of meat, which I removed. As the swallowing was not relieved, a further examination revealed another mass of meat, which I proceeded to pull up. During this act, to the amazement of both the patient's wife and myself, the meat was accompanied by a thick, twisted, slimy tuft of long black hairs, which we both hauled up for at least twelve inches. By further vigorous (and rather painful) traction it eventually came away in our hands, and the small remains slipped back into the man's throat. After this the act of swallowing was quite normal.

For a short time it was difficult to account for such an unusual occurrence, but it soon dawned on me that this patient had had a plastic operation performed on the front of his neck to close a pharyngeal fistula subsequent to laryngectomy, with the result that he was now growing part of his beard in the gullet.

I do not know the subsequent history of the case, but believe that x-ray therapy was suggested as a depilatory. The alternative, of course, would be periodical clipping of the hairs through an endoscope.

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DUODENAL ULCER IN A 10-YEAR-OLD CHILD

Duodenal ulcer in a child of this age is a comparatively rare condition. The following is the record of a recent case.

The patient, a girl aged 10, was seen in the out-patient department, and gave the following history. Off and on for the past six months she had had pain in the region of the stomach. The pain was present when she awoke in the morning, was relieved by a hot drink, and, at times, persisted throughout the morning. The school teacher allowed her to go home for a hot drink when the pain was severe. The bowels were regular, and there was no vomiting. On examination there was tenderness under the right costal margin, and opaque meal examination showed well-marked seven-hour gastric retention and an absence of any duodenal filling. Unfortunately a test meal was not given.

The child was admitted to hospital without any definite diagnosis having been made. The pyloro-duodenal region, the gall-bladder, and the appendix were under suspicion; we had also to bear in mind the possibility of some form of abdominal tuberculosis. Under avertin and local anaesthesia the abdomen was opened through a right paramedian incision and the following pathology disclosed: gall-bladder normal; mobile caecum; appendix normal externally, but the mucous membrane of the tip was bluish red; large duodenal ulcer, palpable and visible in the first part of the duodenum. The hepatic surface of the duodenum was

¹ Medical Research Council. *Diphtheria* (1923), p. 230.