More ether : less chloroform / by Joseph E. Lumbard.

MORE ETHER; LESS CHLOROFORM

BY

JOSEPH E. LUMBARD, M.D.
NEW YORK

Reprinted from the MEDICAL RECORD
December 1, 1906

WILLIAM WOOD & COMPANY
NEW YORK

MORE ETHER; LESS CHLOROFORM.*

By JOSEPH E. LUMBARD, M.D.,
NEW YORK.
ANESTHETIST TO THE HARLEM HOSPITAL

THERE are few subjects to which a medical student gives less attention than that of anesthetics. Sir Frederick Treves said: "There is a widespread impression that to give chloroform is a minor act; the power comes with the diploma, and the significance is sometimes emphasized by the remark: 'Well, if a man cannot give chloroform, what can he do?'"

Ether and chloroform are still our chief anesthetics, and have been rivals for the surgeon's favor for more than half a century. Ether is often preceded by nitrous oxide or ethyl chloride, either of which renders the administration shorter, safer, and pleasanter.

Contrast the old way of strangling the patient into insensibility by the cone method, with practically no air, and that of using gas or ethyl chloride as a preliminary, and the patient knowing nothing of taking ether. A medical friend who had experienced both ways said he knew of no more striking illustration of hell and heaven than taking ether by the two methods mentioned.

Nitrous oxide is the safest and most agreeable anesthetic and it is by far too little understood and

*Read before the meeting of the Harlem Medical Association, October 3, 1906.

used. This is, perhaps, natural, as our medical colleges teach too little about it. Furthermore, it is not always easy to obtain, and the instrument for its proper administration is quite expensive.

I highly recommend it for simple operations, or those of short duration, or for painful examinations and dressings. It is not contraindicated when heart or lung disease is present, but it should not be employed in cases with arterial degeneration or with aneurysm. In young children under the age of five years ether is preferable. Its most important use in surgery at the present time is as a preliminary to ether. Given in this way, it greatly lessens the patient's suffering and is a time saving measure.

Ethyl chloride has been favorably known for many years as a local anesthetic, but for the past few years it has been used as a general anesthetic, and in many localities it is trying to displace nitrous oxide in general surgery, especially as a preliminary to ether. The inhalers for its administration are too numerous to mention.

For short operations, needing more prolonged and deeper narcosis than is usually obtained by nitrous oxide, ethyl chloride is of advantage. It is also better for children than nitrous oxide. It should not be used in cases where there is much thickening of the tissues of the neck, as in laryngitis. Its use is also contraindicated in neurotic and alcoholic patients. Although ethyl chloride is cheap and easy to carry around and administer, we should not lose sight of the most important fact that it is not as safe as nitrous oxide. Thos. D. Luke, Edinburgh, in the *Lancet,* May, 1906, reports 22 deaths, and W. J. McCardie, *British Medical Journal,* March 17, 1906, reports 38 deaths from its use.

For practical purposes we might say that ethyl chloride is to nitrous oxide as chloroform is to ether.

Other anesthetics and drugs sometimes used in combination with ether and chloroform are: Scopolamine, somnoform, morphine, and atropine. Scopolamine is usually given in doses of from 1-150 to 1-100 gr., combined with 1-8 to 1-4 gr. of morphine in from one to three doses, administered from one-half to one and one-half hours before the operation, preferably in divided doses. The long and disagreeable after-effects and the numerous deaths reported from its use will prevent the drug from becoming popular, although many French and German anesthetists continue to use it without hesitation and with reported good success.

Somnoform is merely a mechanical mixture of ethyl chloride (60 per cent.), methyl chloride (35 per cent.), and ethyl bromide (5 per cent.). It is more expensive, leaves a very disagreeable odor, and has an unpleasant effect upon the patient. It is not considered as safe as pure ethyl chloride.

A hypodermic injection of morphine from 1-8 to 1-4 gr., with or without atropine sulphate 1-150 to 1-100 gr., is often given from twenty to thirty minutes before operation in alcoholics and athletes.

Atropine is often used hypodermically in cases where the mucous secretions are excessive along the respiratory tract; also to stimulate the heart.

Ether.—As the usual modes of administering ether are well understood, I will refer only to two that are of value, but not generally recognized—namely, the drop method, and ether narcosis obtained by giving warm ether vapor per rectum.

The drop method should begin slowly, as with chloroform. The most simple and, to my mind, one of the best ways of giving it is by the open, continuous method, after the so-called surgical stage has been attained by gas-ether with the Bennett inhaler. Many fail in this method because they use too small

a mask, or do not constantly drop the ether. A mask is used similar to the Esmarch, but larger, and is covered with two thicknesses of stockinette; the ether is dropped constantly, from 120 to 150 drops per minute, until the face flushes or the patient feels drowsy; then extra gauze is applied and the ether continued until the patient is well under its influence; the extra gauze is then removed and the ether continued as before. This simple and safe method has much to recommend it. The patient's breathing and appearance are more natural than under any other method of anesthesia, his recovery is rapid, and disagreeable after-effects are usually absent.

This method is highly recommended for children and old people. Miss Alice Magaw, anesthetist to Drs. Charles and William Mayo of Rochester, Minn., has used it exclusively in over 14,000 cases without any deaths or serious results. Even the struggling and feeling of strangulation rarely occur by this method. For a dropper I recommend a wick made of gauze or cotton, and placed alongside the cork in the original ether can. It is simple and convenient and always easy to obtain.

Rectal etherization was first attempted by Dr. Pirogoff in 1847. Drs. Robert F. Weir and William T. Bull tried it in several cases in 1884, but with only partial success. Drs. John H. Cunningham and F. H. Lehay of Boston, Mass., have obtained most excellent results with this method and have a record of over one hundred cases. The first important preliminary to this method is that the patient must be on a low diet for two or three days before the operation. A saturated solution of magnesium sulphate, two ounces, should be given twice before the operation. Sufficient time should elapse between the doses, so that the effects of one may be obtained before the other is given. As many enemata should

be given as are necessary to make the rectum clean. Breakfast before the operation should consist of two ounces of beef tea. The rectum must be entirely emptied of all liquids and gases. A bottle with a capacity of 34 ounces, containing 29 ounces of ether, is placed in a bath of warm water of from 80° to 90° F. A rectal tube is then introduced from ten to fourteen inches and the warm ether vapor is pumped into the rectum until the patient is well narcotized. The apparatus resembles the Junker inhaler, except that the bottle is larger and the outgoing tube connects with the rectal tube. Two or three compressions of the bulb per minute will usually suffice. This method affords the surgeon a free field in operations upon the head, face, mouth, nose, throat, ear, and neck, and is also of value in patients suffering from lung trouble. The absence of the ether inhaler in operating on the head, face, and neck not only lessens the technical difficulties of the operator, but also the chances for sepsis. The patient is easily affected, there is no sense of suffocation, less ether is used, the stage of excitement is absent, and recovery is more rapid and less disagreeable. Patients who have taken ether by inhalation and per rectum prefer the latter method. There are no disadvantages, excepting in some cases a few colicky pains.

Another advantage of this method is that the rectal administration of ether takes the place of chloroform, which has always been used almost exclusively for head surgery. Ether is safer, and the anesthetist is out of the surgeon's way.

The objections to ether are its irritability to the air passages, the nausea and vomiting, and the cerebral excitement. Ether, as is well known, is inflammable, but if used below the level of the artificial light there is practically no danger. Another

objection is the possibility of causing ether pneumonia. These are all minimized by the preliminary use of nitrous oxide, and by the drop method; also by the rectal method. Washing out the stomach after giving ether greatly lessens, and oftentimes completely does away with, postoperative vomiting. The lavage should be immediately after the operation, before the patient regains consciousness. The drop method will greatly lessen the possibility of pneumonia, and I have never heard of its occurring in cases of narcotization by the rectal route. Ether pneumonia is claimed to be caused by the anesthetist and not by the anesthetic.

The advantages of ether are: (1) The first and all important advantage is its safety. (2) It is stimulating, whereas chloroform is depressing. This can well be demonstrated when you have a flagging pulse under chloroform, and change to ether. (3) Ether will stand more abuse than chloroform, which is a great advantage when one is obliged to have a novice administer the anesthetic. (4) Ether usually gives warning of approaching danger, which chloroform seldom does. (5) The practical working range of ether is much wider and there is less fear of accident from an overdose than when chloroform is used.

In this connection it may be said that more than 65,000 persons have been etherized at the Massachusetts General Hospital and the Boston City Hospital, and as far as can be ascertained there has not been a single death due solely to the anesthetic. (See G. W. Gay, International Textbook of Surgery, p. 421.) In New York City, according to the records of the Board of Health, communicated to me officially by Chas. J. Burke, M. D., the Assistant Registrar, from 1901 to 1905 the deaths from chloroform numbered 40; from ether 21. Considering the

immensely larger number of etherizations, this shows very forcibly how much safer ether is as an anesthetic.

The contraindications of ether are: (1) Protracted operations about the mouth, jaw, nose, and pharynx. The contraindications in these cases can be overcome by the rectal method. (2) All operations requiring the use of the actual cautery. (3) Any acute pulmonary irritation, or advanced or acute renal disease. However, the use of ether cannot be excluded by any hard and fast rule.

Chloroform.—When chloroform is given by the open mask method the patient should always have plenty of air. Our English friends go as far as to say that the mask never should touch the face. The Junker inhaler is often used in head surgery. Its principal advantage is that the vapor is pumped through a tube through the mouth or nose. Chloroform is not inflammable, and were it not for its dangers it would be an almost ideal anesthetic. Chemically, it is very sensitive. Light plus air may change it. It should be used from the original bottle. Dust will change chloroform, but not ether.

Chloroform should be administered very gradually; pushing it is dangerous, and it is here that the accidents attending its use are most frequent. The patient is restless; the surgeon is ready to operate; the anesthetist, perhaps a junior, without proper training or experience, fearing the displeasure of the surgeon, pushes the chloroform; in fact, oftentimes he is told to do so; the patient breathes deeply and you get the toxic effects of the drug and sometimes a fatal issue. Most deaths from chloroform have occurred during the first few minutes of its administration, and this is one reason why it should not be used for the removal of adenoids or other short operations, as is commonly done.

The advantages of chloroform are that it has an agreeable odor; it is less irritant to the air passages than ether; it is less apt to cause nausea and vomiting; it occupies less space, which is an advantage in the army and navy service, and it is not so expensive to buy or administer.

Its one great disadvantage, which overshadows all the points in its favor, is the danger attending its use. In spite of this, it will always be the leading anesthetic in warm countries, as ether boils at 96° F., and is not practical for use excepting by the closed method in such climates.

Chloroform is usually preferred in patients with renal or pulmonary disease, in brain surgery, and in tracheotomy. Probably its greatest field of usefulness is in obstetrics. Here the element of fear, which has been so well described by Dr. John Bodine,* is practically *nil,* as the patient welcomes anything that will put an end to her labor pains.

When chloroform is indicated, care and proper management in its administration greatly lessen its dangers. It is contraindicated in cases of fatty heart, in lymphatic conditions, and in adenoids.

Chloroform certainly has its field of usefulness, but I think it is often used where ether could and should be more safely substituted. This is especially true in the two very common operations for adenoids of the pharynx and curettage of the uterus. Dr. T. D. Luke reports 30 deaths from 1897 to 1903 from chloroform administered for adenoid operations.

Comparative merits of ether and chloroform.— Ether is slower in its effect, less pleasant to inhale, more bulky, and more expensive; it is inflammable, sometimes irritating to the air passages, and is often

*International Clinics, Vol. III, Twelfth Series.

followed by nausea and vomiting; however, it usually gives warning of danger, and is safe under ordinary circumstances.

On the other hand, chloroform is quicker in its effect, pleasant to take, less irritating to the mucous membrane, less bulky and less expensive; it is not explosive, and usually causes less nausea and vomiting; it does not always give warning of danger, and is not always safe.

The merits of each case must be carefully considered when selecting the anesthetic, and neither chloroform nor ether should be used exclusively. Ether, however, being the safer, should always have the preference when it is not contraindicated. After all is said, it is experience that counts more than the anesthetic, or the apparatus that is used.

In order to ascertain the views of one hundred surgeons throughout the United States, I sent to each one a letter, of which the following is a copy:

August 18, 1906.

Dear Doctor:—

I am endeavoring to ascertain the relative favor in which ether and chloroform are now held by the general surgeons in this country, and with that purpose in view I have taken the liberty of sending you, among others, a copy of the following list of questions. The replies to these will be embodied in a paper on "More Ether; Less Chloroform," which I expect to read before the Harlem Medical Association of New York on October 3, 1906.

1. Which anesthetic do you prefer in general surgical work? (a) Ether? (b) Chloroform?

2. Which method of administration?

3. As preliminary to the use of ether, do you prefer (a) Nitrous oxide? (b) Ethyl chloride?

4. In your opinion, do you think anesthetics and

their method of administration receive proper attention in the curriculum of our medical colleges?

5. How many deaths have come under your observation from the administration of (a) Ether? (b) Chloroform?

Thanking you in advance for your courtesy, I am

Yours very truly,

Seventy nine answers were received from the following surgeons in twenty-three States: Robert Abbe, W. S. Bainbridge, Carl Beck, J. A. Blake, J. A. Bodine, G. E. Brewer, Leroy Broun, J. D. Bryant, W. B. De Garmo, H. B. Delatour, C. N. Dowd, Ellsworth Eliot, Jr., C. A. Elsburg, J. F. Erdmann, R. Guiteras, Frank Hartley, H. A. Haubold, I. S. Haynes, J. W. Hearn, J. J. Higgins, L. W. Hotchkiss, L. J. Ladinski, W. G. Le Boutillier, H. Lilienthal, S. Lloyd, W. H. Luckett, Willy Meyer, Robert T. Morris, A. V. Moschcowitz, L. S. Pilcher, J. D. Rushmore, H. Roth, Parker Syms, M. W. Ware, Joseph Wiener, Jr., Robert F. Weir, and J. A. Wyeth, New York; Lewis L. Basher and Stuart McGuire, Richmond, Va.; F. E. Butts and G. W. Crile, Cleveland; A. E. Cabot, D. W. Cheever, G. W. Gay, F. W. Harrington, M. H. Richardson, and J C. Warren, Boston; William H. Carmalt, New Haven; John B. Deaver, Richard H. Harte, J. W. Hearn, and Edward Martin, Philadelphia; W. H. Doughty, Augusta, Ga.; Duncan Eve, Nashville; Leonard Freeman and C. A. Powers, Denver; F. N. Gerrish and Seth Chase Gordon, Portland, Me.; John M. Gile, Hanover, N. H.; W. S. Halsted, Baltimore; Thomas W. Huntington, San Francisco; Edward J. Ill, Newark, N.J.; Robert W. Johnson and Howard A. Kelly, Baltimore; A. F. Jones, Omaha; W. McD. Martin, Mobile; Archibald MacLaren, St. Paul; Chas. H.

Mayo and Wm. J. Mayo, Rochester, Minn.; John B. Murphy, A. J. Ochsner, and N. Senn, Chicago; Roswell Park, Buffalo; H. H. Mudd, St. Louis; Manning Simons, Charleston, S. C.; F. D. Smyth, Memphis; Bacon Saunders, Ft. Worth, Texas; H. C. Tinkham, Burlington, Vt.; A. Vander Veer, Albany, N. Y.; G. E. Vaughan, Washington, D. C.

The following is a summary of the answers received:

Question 1. Sixty-seven preferred ether; 7 chloroform; 1 anesthol; 4 were noncommital.

Question 2. In the case of ether, 38 used the drop method; 16 the Bennett inhaler; 11 the cone; 8 the Allis inhaler; 1 the Blake inhaler. If chloroform were used, 11 preferred the drop method, 1 the vapor method.

Question 3. Forty-eight nitrous oxide; 3 ethyl chloride; 3 morphine hypodermically; 1 morphine and scopolamine hypodermically; 1 A.-C.-E. mixture; 1 anesthol occasionally; 20 nothing or noncommittal.

Question 4. Sixty-eight answered in the negative.

Question 5. Ether, 53 deaths; chloroform, 91 deaths.

The answers to these questions are most interesting and of very great importance. They show that there has come to be an almost universal consensus of opinion in favor of ether, excepting under very special circumstances. Considering that chloroform is so much easier of administration and has less inconveniences, this is a very striking tribute to the safety of ether. The collected statistics show that a revolution has been effected in this matter in the last twenty-five years. While there used to be many men who preferred chloroform, now these are but few. Of all who have answered the question di-

rectly, 67 prefer ether, 7 prefer chloroform, 1 anesthol, and 4 are not committal.

The question of a preliminary to the use of ether now interests every surgeon without exception. A few years ago no one thought of the strangling of the patient; now everyone considers this sufficient to justify going to considerable expense and trouble in order to prevent it. Within the next five years no one will think of administering ether without having some method of preliminary narcosis. This is a decided humanitarian advance.

All are agreed that enough attention is not paid to the teaching of the administration of anesthetics in our medical schools. I should not say all, because there are a few men who consider that sufficient attention is paid to the subject under their own supervision. They only serve to emphasize the fact that personal care in the training of anesthetists is needed if they are to be capable of assuming this important duty. His diploma alone justifies no man in giving an anesthetic unless he has had considerable experience.

Some of the expressions of opinion in this matter are so strong that I have felt that I am justified in quoting them. Dr. Robert Abbe says: "Judging by the flower of the graduates after passing examinations and entering hospital service, they show dangerous ignorance." Dr. Joseph D. Bryant says: "No, nor in hospitals, either." Dr. Joseph B. Higgins says: "Students know absolutely nothing about it." Dr. J. B. Murphy says: "I not only never had a death, but never saw one. In Mercy Hospital, where I do most of my operating, the ether is administered entirely by a Sister of the Order of Mercy. Occasionally I use a Bennett evaporator in the Presbyterian Hospital. There the work is in charge of a physician who makes a specialty of

anesthetics. I very much prefer, however, to have a woman, and preferably not a physician.

Of course, I did not expect very frank confessions with regard to the number of deaths that take place and have taken place from various anesthetics. The declaration of Dr. Luke that chloroform maintains its popularity among physicians in Scotland, because there are no coroner's inquests, is extremely interesting and suggestive. The answers to this question show that both ether and chloroform have their dangers, unless properly and very carefully administered.

Conclusions.—(1) Ether is more generally used than chloroform, because it is safer.

(2) The drop method of administering ether is very popular.

(3) Nitrous oxide is preferred as a preliminary to ether by nearly all who have used it under favorable circumstances.

(4) Medical colleges do not place enough importance upon anesthetics and their administration.

(5) If more ether and less chloroform were used, we certainly would have fewer deaths.

1925 Seventh Avenue. (Graham Court.)