SOME FACTS NOT GENERALLY UNDERSTOOD ABOUT OIL-Ether Colonic Anesthesia.

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Whenever any new anesthetic agent or method is introduced, of necessity some one surgeon's name stands out prominently in connection with it either as the originator or as assisting in establishing it upon a permanent basis by its successful application in a large number of cases. Thus, the name of the Mayos will always be associated with the drop method of administering ether; that of Dr. Martin Ware with ethyl chloride; those of Dr. Elsberg and Dr. Peck with endotracheal anesthesia. So, also, the name of Dr. Hubert Arrowsmith, of Brooklyn, will always be associated with oil-ether colonic anesthesia, he having now used it successfully in over two hundred consecutive cases. He employs this method exclusively for suspension laryngoscopy, bronchoscopy, esophagoscopy, etc.

Its principal advantage over local anesthesia in this field is that the patient does not "crawl" as the instrument is introduced, nor is the focus liable to disarrangement at any time. Dr. Cantle, of Mamaroneck, reports over one hundred successful cases operated upon under this method, the majority of the patients being children. Dr. Walter Lathrop, of Hazleton, Pa., has operated upon over one hundred consecutive cases of goiter under this method. The technique he employs is a distinct advancement, inasmuch as he never uses over six ounces, or over a 65 per cent. solution. Dr. Lumbard, of the Harlem Hospital, reports over one hundred and fifty cases in various operations. Other physicians report its satisfactory employment in fifty to one hundred cases, the total number now being considerably over a thousand.

It is now a well-recognized and approved method of anesthesia, and is so acknowledged by the many who have taken the trouble to thoroughly acquaint themselves with its technique. It is steadily gaining new adherents, but it still remains for some hospital to show its confidence in the method by adopting it either as a complete procedure or as a preliminary supplement to other methods.

The history, animal experiments, preparation of patients, physiology, technique, indications and contra-indications of oil-ether colonic anesthesia have been outlined by the writer and others in previous papers, and a review is therefore unnecessary. It is proposed at this
time to devote especial attention to certain factors which have been
overlooked heretofore, or have received only superficial attention,
and which consequently are but little understood. It is possible that
lack of understanding of these factors has retarded the general
adoption of this method more than anything else.

These factors are:
1. The total amount of ether given at one time.
2. Quantity used.
3. Temperature.
4. Toxicity.
5. Special indications.

1. It is necessary to give at one time the total amount as de-
termined by age, weight, and general condition of patient, in order
to establish the ether tension in the blood which is necessary to pro-
duce anesthesia. If given by the Murphy drop method, there is an
unnecessarily prolonged second stage, as there is not sufficient free
ether to establish anesthesia. This may not apply to children, or to
adults who have received sufficient morphine and chloroetone, or
other preliminary medication before the oil-ether administration.
It is a fallacy to presume that the total amount given to a patient is
immediately utilized. If this were so, there would be shock and
gradual recovery with every oil-ether administration. Shock is pro-
duced only when the administration is improperly conducted. When
oil-ether is given by fixed rules, now well understood, it is physically
impossible to shock the patient, either at the time of introduction
or during the anesthesia.

2. Quantity: The total amount used compares favorably with
that employed in all other methods of administering ether. Six
ounces of ether with two ounces of oil, given to a patient weighing
160 pounds or more, will last nearly three hours. As the plane of
anesthesia is constant, the patient is absorbing about two ounces of
ether per hour. Only one other form of anesthesia requires so
small an amount, i. e., intravenous anesthesia, which averages one
and a half ounces of ether per hour. The drop method is variously
reported as requiring from four to six ounces per hour; and the
endo-tracheal method requires six to eight ounces per hour, or more
than any other method.

After administering the oil-ether mixture, it is impossible at any
time to withdraw the oil and leave the ether; or to withdraw the
ether and leave the oil. Every molecule of ether is bound to a
molecule of oil, and this union is broken only when vaporization
occurs. In no other way can they be separated. When anesthesia
is established, it is automatically maintained by the ether separating
from the oil, according to certain inflexible physical laws. The amount of this vaporization per minute never varies. Therefore, it is impossible to have a deep anesthesia at one time and a light anesthesia at another, unless the anesthesia is deepened by rebreathing or lightened by an air-way tube. The anesthesia can be con-
ccluded at any time by placing a large rectal tube in position and massaging over the colon from right to left. If a mistake in judgment is made as to the amount, in the first place, it is manifested within fifteen minutes and is easily corrected at this time by withdrawing the unnecessary amount. Thus the administration is as
definitely under the control of the anesthetist at all times as if he were giving it by an inhalation method.

In order to be assured that the patient under oil-ether anesthesia is as safe as with any other method, one must thoroughly understand the physical laws already referred to. The accompanying charts,

made by Professor Baskerville, in the chemical laboratory of the College of the City of New York, illustrate these laws very clearly.

Regardless of the fact whether corn, cotton-seed, peanut, cod-liver, lanolin, soya bean, or olive oil is used, or whether it is a 25 or 50 or a 75 per cent. mixture, it will be seen that the rate of evap-
oration is constant. If, instead of a test-tube, the mixture is placed in a vessel with increased surface area, the evaporation is still constant, although the rate is increased. This fact insures a smooth, even anesthesia at all times.

The work of Baskerville is invaluable in assisting in the placing of oil-ether colonic anesthesia upon a firm and scientific basis. In connection with clinical experience, the charts prove conclusively that while the total amount of the mixture is within the body, the patient is as safe from an overdose as if it were in a container out-
side of the body. The assurance these charts convey makes unnecessary any auxiliary containing apparatus.

3. Temperature: All the text-books on pharmacology, physiology, and surgery, state that in anesthesia produced by ether there is a general lowering of the body-temperature. As loss of heat is one of the factors that enters into surgical shock, and as surgeons have noted that the oil-ether-colon is cold even through a rubber glove, the question might be asked whether a possible temperature loss might not be an added element of danger. Furthermore, is not this method directly opposed to the theory underlying the administration of warmed anesthetics?
Paradoxical as it may sound, the patient under oil-ether colonic anesthesia inhales a warm, moist vapor at all times. When the ether is taken up by the small blood-vessels surrounding the colon, it is carried thence through the liver by the greater circulation, and on to the heart; from there it is pumped into the lungs. By the time the anesthetic has reached the lungs it is moistened and thoroughly warmed to the body temperature. There is no irritation to the lungs, and mucus and saliva are usually absent.

The frigid condition in the colon is caused by the evaporation of ether from the oil, and is the principal factor in the automatic
regulation of the anesthetic. When the anesthesia is once established, the temperature of the ether-containing colon varies as follows: As the mixture approaches body temperature, ether vapor is given off, which cools the mixture and retards evaporation. This process recurs automatically until all the ether has parted from the oil. During this time, the temperature of the patient remains normal, as determined by a thermometer placed in the mouth or axilla. The skin is warm to the touch; the color of the face suggests thorough oxidation all the time. The cold, clammy sweat, often noticed with ether given by other methods, does not occur with oil-ether.

4. Toxicity: Quiet respiration (so natural that not even the alae of the nose move, indicating that there is no strain upon the respiratory center at any time), normal pulse, and good color during the anesthesia indicate that no toxic condition exists.

If the mixture is withdrawn and the anesthesia so terminated, the anesthetic stage merges into one of deep sleep, from which the patient gradually awakens as from a natural slumber. The absence of nausea and vomiting in the large majority of cases, with no change in the urine or blood; the fact that ether vapor colonic anesthesia was used clinically by Sutton and Brewer for patients with impaired organs; and the further fact that oil-ether colonic anesthesia is now being used in one hospital only in desperate cases in which inhalation anesthetics might be dangerous, would indicate that there is less toxicity in connection with this form of anesthesia than with the usual inhalation methods.

5. Special indications: On the other hand, for certain subjects and operations, oil-ether colonic anesthesia is the safest and best method, considered from every point of view. It is especially indicated for the very obese, regardless of the nature of the operation, both on account of the narrowed air-passages of these individuals with consequently more or less trouble with all inhalation methods, and because of the affinity of fats for ether.

It is the best of all methods in the surgery of the upper air-passages. Here the anesthetist can assist the surgeon by using a suction apparatus for blood, without at the same time lightening the anesthesia by withdrawing ether vapor, as would be the case with all inhalation methods, except endo-tracheal anesthesia. It is preferable to this last mentioned method, as, in the writer’s opinion, this method should never be used except when positive pressure in the lungs is needed.

In a suspension laryngoscopy, bronchoscopy, and gastroscopy, the patient under oil-ether anesthesia is further safeguarded by having a
clear passage for the exit of the ether vapor at all times. This airway, while acting as an additional safeguard to the patient, does not lighten the anesthesia sufficiently to cause trouble. The introduction of the instrument absolutely insures against the possibility of the anesthesia being deepened.

A general hospital could readily utilize a salvarsan apparatus for the routine administration of this method. The apparatus could easily be connected to the rectal catheter placed in situ. Directions could be given to administer the mixture in such a way that the anesthesia would fall a little short of the third or surgical stage, and this could always be supplemented by a few drops of ether on a mask to get the required anesthesia. It is obvious that the partial analgesia so secured forms the best preparation for local anesthesia. A number of patients could thus be prepared in succession and the time of surgeons, physicians, and nurses in the operating-room would be conserved, while the waiting patients themselves would be spared the mental distress and strain now so common.

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From a study of the fifty-eight cases recorded in the literature since 1885, and from his own two cases of sarcoma of the tongue, Coughlin does not believe that the affection is more frequent in young children and that it may be pre-natal in origin. As a matter of fact, the records in the cases studied by him show that it is more frequent in adults. In but ten of the cases was there a history of previous trauma of the tongue, irritation from broken teeth, etc. The site of predilection seems to be on the right side and towards the base and usually on the upper surface. Of the fifty-eight cases, nineteen were of the spindle-cell variety; the others were round-cell sarcomata. The symptomatology consists of soreness, the feeling of the presence of a foreign body, bleeding, accumulation of mucus. Treatment should be operative and as early as possible.