

NITROUS OXIDE AND OXYGEN CONTINUOUS ANALGESIA
AND ANESTHESIA WITH REBREATHING, IN OBSTET-
RICS. TECHNIC OF ADMINISTRATION AND
SUMMARY OF RESULTS*

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THE WORLD-WIDE propaganda on painless childbirth and twilight sleep formed a nucleus for a greater future for motherhood than was anticipated. That the world is growing weaker and wiser is clearly demonstrated in obstetrics, childbirth becoming a more difficult problem in each generation, with the expectant mother well versed through the press and magazines of the advancement of the scientific methods of relief to be had by merely demanding them. We no longer believe that labor pains do not hurt and the old maxim of letting nature take its course in the sense in which it has always been applied in obstetrics, is a thing of the past. The demand for better obstetrics and safer analgesia and anesthesia must be respected. Today nitrous oxide is accepted as the safest analgesia and anesthetic for this purpose.

My personal experience with nitrous oxide and oxygen in obstetrics has been limited to private practice and dates from March 4, 1917. During this period I have kept complete records of each individual case, including the number of child in order of birth, urinary findings during pregnancy if abnormal, pituitrin if any, amount used and time given, time of beginning and termination of administration of the analgesia, ether used if any, amount of nitrous oxide used, calculations being on the basis of one hundred gallons for every two and one-half hours of continuous administration, lacerations if any, instrumental, difficult or abnormal labors, postpartum hemorrhage if any, condition of child, patient's version of entire procedure relative to amount of pain experienced, presence or absence of exhaustion following delivery, comparative flow of milk and results other than normal between date of delivery and date of last call.

There are a number of factors necessary to insure success in this work as with any other. The most important are, first, that the physician be a trained obstetrician; second, he must be thoroughly familiar with the technic of the administration of nitrous oxide and oxygen and must be able to differentiate between the stage of mild and deep analgesia and anesthesia, and must be able to interpret every sign and

*Read at the joint meeting of the Midwestern Association of Anesthetists and the National Anesthesia Research Society, at Kansas City, Mo., October 24-26, 1921.

symptom with the patient as his guide, and an apparatus that will deliver known quantities of the gases and capable of changing proportions in any quantity quickly. Third and equally important, the intelligence and the physical and mental attitude of the patient. I insist upon an early engagement, a specimen of urine every ten days previous to the sixth month, and weekly thereafter, and the usual physical examination and suggestions.

During this antepartum period the doctor and patient become acquainted, confidence is established, and the nature of the analgesia is explained with much stress laid upon the importance of cooperation before and during delivery. This greatly helps to overcome the fright and lack of confidence resulting from the usual neighborhood advice.

One of the greatest advantages of nitrous oxide in obstetrics is that it can be given at the home as well as the hospital. Personally, I prefer the delivery at home whenever possible. The expense is lessened, with less fear and more contentment, with home comforts and surroundings. The sanctity of the joys of the birth are not interrupted by the embarrassment caused by the presence of strangers and strange surroundings.

By insisting upon being notified when the first symptoms of labor make their appearance, preliminaries are early arranged. My equipment consists of a fiber case, made especially for me, which carries one tank of oxygen and two tanks of nitrous oxide, a Gwathmey portable outfit, an obstetrical bag with complete equipment, and a nurse.

No preliminary narcosis is used except in a case of rigid os. Early in the first stage of labor, when the os has softened and dilated one and one-half to two inches in diameter, and sometimes less, I begin the analgesia, after again reassuring the patient of her safety and comfort, explaining the necessity of cooperation and describing the symptoms and sensations she is going to experience.

The position of the patient is prone, on the right side of the bed, the patient being properly sterilized and draped. The right hand is inserted in a sterile glove; and with my left hand I manipulate the machine, which has a long rubber tubing with the breathing bag and Gwathmey face piece at the other end. My nurse is trained in fitting the face piece on the face to exclude all outside air, and manipulating the rebreathing valve and the face control. Before beginning, the face control is closed until the bag is about one-half to two-thirds filled with the mixture of approximately 95 per cent of nitrous oxide and 5 per cent of oxygen. We begin with this mixture and continue until a stage of analgesia is reached with whatever changes are necessary in the mixture. Within from two to four minutes the patient is completely anesthetized, in which condition she is allowed to remain for from five to ten minutes. This is done for two reasons, first to estab-

lish a blood saturation of the gases which, when once established, renders the patient more acutely susceptible to any necessary changes of the mixture from time to time as labor progresses. The other reason is that in 90 per cent of all the cases under the effect of the nitrous oxide and oxygen, more so than any other anesthetic I have ever used, the os rapidly dilates, so that usually in from two to fifteen minutes, the first stage of labor terminates. At this time, the sac is ruptured and if indicated, a hypodermic of 5 m of pituitrin is given and the progress of labor is painlessly hastened. In place of the contractions and expulsive power being lessened and at longer intervals, as is sometimes the case with chloroform and ether, and always with scopolamin-morphine narcosis, they are more than doubled or trebled, the second stage being complete usually in from one-fourth to one-sixth the time of labor under any other circumstances, except instrumental or surgical.

In a short time the mixture required for the individual is found and is seldom changed until just before the termination of the second stage, when analgesia is deepened to nearly or complete anesthesia. The usual precautions are taken to prevent lacerations and at this time, I have sterile gloves on both my hands and the gases are not changed until the termination of this stage, when my nurse or myself, closes the nitrous oxide valve and opens wide the oxygen, allowing the mother to inhale pure oxygen for one to two minutes. The cord is then cut, and the mask is removed from the face of the patient.

During the entire procedure there is partial rebreathing, the bag being kept from one-half to two-thirds full, as near as possible. In nervous or excitable patients, a few breaths of air are given from time to time, when needed, as indicated by rapid, deep breathing, a tendency to excitement or cyanosis. Cyanosis is avoided throughout and semi-consciousness is maintained, likewise the ability of the patient to respond quickly to suggestions at all times.

The immediate family is allowed to be present, but they are requested to remain quiet, as the patient is instructed that I will be the only one to prompt her and that she should respond quickly each time. The result is that she bears down or remains quiet at my command.

The placenta is delivered under analgesia, as are repairs of the perineum made if any laceration.

The type of the individual must govern the depths of the analgesia and her susceptibility and acceptability, physiologically and mentally, must be recognized and respected. The hysterical primipara is difficult to handle where the analgesia is begun before she has had enough hard pains to make her appreciate the difference. I have found, as yet, no contraindications for nitrous oxide in obstetrics when properly administered.

Rebreathing plays an important part in anesthesia and analgesia in

major and minor surgery as well as obstetrics, a fact that has been denounced in no mild terms until a few years ago, on account of numerous postoperative and postpartum, disagreeable and dangerous symptoms that resulted from lack of knowledge of its application, effect and control. By close observation, the amount of rebreathing suited to the individual is soon discovered and the result is a smoother maintenance, more comfort to the patient, and economy of the gases. There is less tendency to shock, less depression and a lessened postpartum exhaustion.

During my first year I conducted my cases with interrupted analgesia, the patient taking three or four deep breaths of a 95 per cent-5 per cent mixture, just before the onset of each pain, holding the last one and bearing down as long as possible. The disagreeable feature of this was that I had failures because I was unable, in some cases, to "beat the pain." Unless the analgesia is established before the height of the contraction, the effect is lost. I observed in the hospitals while giving gas-oxygen anesthetics for major and minor surgical procedures that a great many cases could be carried from one-half to two and three hours on a light anesthesia or deep analgesia by continuous administration with partial rebreathing, and it occurred to me that this method should be applicable in obstetrics. It has proved successful in 94 per cent of my obstetrical cases in the last three and one-half years.

The total number of deliveries during this four and one-half years were 238, of which 121 were primiparae and 117 multiparae; of the babies, 132 were boys and 106 were girls; 218 cases delivered at home and 20 cases in hospitals. Ages of the primiparae were from 16 to 39 years with average of 22.8 years. The following table contains further details of interest.

	PRIMIPARAE	MULTIPARAE
Total average time of delivery	1 hour, 13.4 min.	31.2 min.
First year, with interrupted administration, average time	1 hour, 47.3 min.	40 min.
Second year, with continuous administration, average time	1 hour, 15.1 min.	39.1 min.
Third year, continuous administration, average time	1 hour, 19 min.	29 min.
Last one and one-half years	1 hour, 6.6 min.	26.4 min.
Abnormal presentations—face	4	1
2 of primiparae delivered instrumentally, and 2 by version: multip. normal.		
Abnormal presentations—breech	7	3
Instrumental to perineum	7	2
Instrumental complete	4	
Instrumental, high application	3	
Rigid cervix	3	
No relief from pain		11
Ether at delivery		39
Over 10 days in bed		5

One phlebitis developed fifth day, right leg, recovery complete in four weeks
 One 12 days, 3rd degree laceration, face presentation, 12½ lb. child, rupture of sac 4 days previous to delivery, instrumental.
 Two—pyosalpinx, with temperature 104°, with chills, 36 and 38 hours after delivery. Recovery at 5 and 8 weeks.
 One hemorrhage during and after delivery from laceration, recovery 2 weeks.
 Postpartum hemorrhage None
 Stillbirths 2
 Macerated fetus, premature, 6½ and 7 mo. 2
 Atrophy of cord 1
 Full term that died within 10 days; One, congenital hemophilia, 7 hours. One, anencephalus, 2 hours.
 Full term that received oxygen after birth. All lived. 6
 Types of pathological conditions existing in the mothers were pulmonary tuberculosis, hemiplegia, asthma, cardiac lesions, nephritis, diabetes, high blood pressure.

SUMMARY

I find less cyanosis in the babies but have been unable to get a record of the difference of loss of weight. Absence of postpartum hemorrhage, less surgical shock, less postpartum exhaustion, noticeable by the patients themselves where one or more deliveries have been made previously, with and without other anesthetics. No maternal deaths, greatly lessened first and second stage and more comfort to the mother and a greater satisfaction to the patient and family. Saving of time for the obstetrician.

MURPHY BUILDING.

INDICATIONS AND CONTRAINDICATIONS FOR THE USE OF PITUITARY EXTRACT IN OBSTETRICS*

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IN THE Department of Obstetrics and Gynecology at the University Hospital pituitary extract has been used since the year 1911 without any very serious accidents directly attributable to the drug. It has been administered for the induction of labor, during labor, and also during the puerperium. In 1914 Seeley analyzed forty cases from the clinic and, although much has since been learned, the conclusions which he reached are for the most part still accepted as correct. In 150 additional cases an attempt has been made to elaborate on and extend the use of this drug.

The preparation used during the majority of our experiments is "pituitrin" manufactured by Parke, Davis & Company, of Detroit. Occasionally it has been necessary to substitute "pituitol," a Hollister-

*Abstract read before the Section on Gynecology and Obstetrics, Michigan State Medical Society Annual Meeting, May 24-26, 1921, Bay City, Michigan.