PREMEDICATION AND ANESTHESIA IN OBSTETRICS:
PRACTICAL ASPECTS

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The purposes of this paper are twofold: first, to give consideration to some of the essential principles basic to any plan of premedication and anesthesia in obstetrics; second, to present the practical aspects of the problem as experienced at the Boston Lying-in Hospital.

Premedication in obstetrics has at least the following functions to perform: first and foremost it must meet the desires and welfare of the mother and her baby; second, it must meet the requirements of the obstetrician, and third, the objectives of the anesthesiologist.

The patient's welfare is met by the assurance that all that is done for her and her baby is for the best. This aspect of the problem should be instituted early in the antepartum period with the object in mind of removing the fear and apprehension engendered by generations of ignorance, misconception and false teaching. Ideally, premedication should produce psychic sedation and amnesia for the mother during the entire period of labor and delivery. The agents selected should permit the mother to rest between contractions and so build up her functional reserves. The technics should be flexible but give rapid and pleasant induction. The recovery period should be devoid of discomfort or hazards for mother and baby, yet offer the mother a pleasant and peaceful emergence from the entire event.

The obstetrician would be satisfied if adequate premedication or basal narcosis permitted him to practice a conservative policy in the conduct of labor. By and large, the obstetrician prefers an unconscious patient who will remain perfectly still irrespective of the required duration, position, or extent of the obstetrical procedure required for delivery. He prefers muscular relaxation to a degree and extent required for the particular obstetrical procedure planned. He desires that postpartum symptoms should be few or absent. From this viewpoint due regard must be given to the complicating factors presented during the antepartum period in the unitary plan of premedication and anesthesia.

The anesthesiologist requires the use of agents and technics that meet the needs of mother, baby, and obstetrician. Prevention of hy-
poxia, or anoxia, in obstetrics should be axiomatic (1). Perfection must be our ideal (2). The amnesic, analgesic, and anesthetic agents and techniques should possess a wide margin of safety for both mother and baby, regardless of gestational age and age of viability. Newborn infants of 2 pounds birth weight or less have only about one chance in a hundred of survival. Heavy premedication of the mother would eliminate even this small chance. The selected drugs and techniques should be able to reduce the reflex excitability of the mother without essentially changing fetal reflex irritability. Reduction of maternal reflex excitability by premedication necessarily produces greater comfort and safety during the induction and emergence phases of anesthesia (3). The agents and techniques should possess sufficient potency to permit the use of highly oxygen-enriched atmospheres, allow flexibility of moment to moment control of depth of maternal narcosis, and provide a means of control of pulmonary ventilation. The agent or technic should not more deeply depress the vital functions of respiration and circulation than that desired state of reflex obtundation sought for in the case of the parturient. Neonatal vital functions should not be altered (4). The minute-volume pulmonary ventilation should not be decreased. The most potent depressant of cell-irritability is oxygen-want. Consequently, oversedation and asphyxia, whether from depression or obstruction of respiration, are to be avoided. At the same time the agents and techniques should not interfere with the homeostatic mechanisms and reflexes that play so important a part in respiratory control. The agent or technic should not be a cause for increased obstetrical operative frequency, prolongation of labor, or complications of labor. The agent or technic should not constitute a cause for increased bleeding. From the anesthesiologist's view-point the greatest offenders are respiratory obstruction and indiscriminate use of vasopressor drugs. The means of restoring blood volume should be available constantly. In this regard there is no true substitute for whole, compatible blood.

No technic or agent should be employed which will diminish local uterine circulatory conditions, such as blood flow to the uterus and placenta. The fetus is not an air-breathing animal. In fact, the administration of oxygen to the mother often has a dramatic effect on the fetal heart rate and rhythm. This procedure alone may permit the completion of a normal delivery without the hazard of fetal anoxia. Ideally, the agents should be eliminated unchanged and selectively retained on the maternal side of the uteroplacental barrier but without interference of uteroplacental functions.

The premedicants and anesthetic agents should not cause exaggeration of reflexes of the autonomic nervous system, particularly the traction reflexes. This group of reflexes results from tugging, pulling, or distending the visceral structures or birth canal. They are related also to the suddenness and strength of the stimuli. They become evi-
dent by stimulation or alteration of respiration, adduction of vocal cords, and contraction of the abdominal wall with expulsion of the viscera. No physician can predict what imbalance of reflex disturbances will occur in a given patient from a particular premedicant or anesthetic agent. This group of disturbing reflexes (5), however, may definitely be minimized by employing combined regional and inhalational procedures.

The agents and technics should produce neither neonatal apnea nor asphyxia, whether due to narcotic or hypoxemic depression of the fetal controls of respiration. The drugs should be devoid of undesirable reactions and side-effects to both mother and baby, irrespective of the state of maturity or immaturity of the fetus. The agents should selectively depress the salivary and secretory functions of the respiratory tract without altering its ciliary function.

The agents or technics should not alter the pattern of uterine contractions (6). A mental graph of uterine contractions and their relation to pain-perception may be arrived at by correlating the maternal responses with palpation of the uterus. The more typical of such mental graphs are represented in figure 1.

The premedics should permit exact control of the selected dose and administration by any route desired. There is a wide individual variation in tolerance of the premedics. These agents should diminish general metabolism and thus lessen the requirements of anesthetic agents. When regional analgesic agents are employed to complete the delivery, the premedics used should have the capacity of preventing toxic reactions (7). The premedics should permit the accomplishment of a rapid induction and controllable maintenance of anesthesia.

These important functions in obstetrical premedication and anesthesia must be accomplished without coincident undesirable depression of the vital functions of both mother and baby. The essential functions must be accomplished without interference of the natural forces and protective mechanisms of labor. The ideal method of delivery is still a well-conducted normal labor.
The ideal agents or technics are not yet available to accomplish these objectives despite publications in lay journals. Premedication and anesthesia in obstetrics are still controversial subjects even among the experts. It is more judicious to explore all the possibilities of a given combination of preanesthetic and anesthetic drugs and technics rather than to attempt frequent changes. We would like to emphasize that the knowledge, experience, skill, judgment, and attention of the members of the obstetrical team rather than the drug-combination or technic of administration are the real determinants of the degree of safe relief to the parturient and her child (3).

During the past fifteen years the Boston Lying-in Hospital has taken an active part in developing a routine that would secure a high degree of amnesia with safety to the mother, produce a minimum effect on the newborn, and meet the requirements of the personnel at this hospital. Our most successful methods (8) include the use of scopolamine. We use scopolamine hydrobromide in average doses 1/100 to 1/200 grain, by various parenteral routes, repeating the smaller dosages every two hours.

We believe scopolamine to have the following advantages in obstetrics:

1. It is the best amnesic available.
2. It produces psychic sedation with its accompanying relief of apprehension and anxiety, as well as dreamless sleep.
3. It prevents sweating and produces dryness of mucous membranes of the respiratory tract, often to a degree better than that produced by atropine. Whether scopolamine or atropine has more specific, selective, action on particular functions of the vagus in the human being, remains to be answered. In any case, a dry, unobstructed respiratory tract is distinctly advantageous.
4. It has the capacity of preventing some of the untoward physiologic reactions, for instance, the vagal type of carotid sinus syndrome (bradycardia, lowered arterial tension, and decreased pulse pressure).
5. It can relieve bronchospasm and in many instances laryngospasm.
6. It may increase maternal respiration. It is effective in combatting the respiratory depression produced by the more potent cortical depressants, such as morphine and its derivatives.
7. Scopolamine primarily depresses the motor rather than the sensory side of the brain. This is presumed to be the rationale for its use in relieving the rigidity and tremors as seen in the postencephalitic syndromes.
8. The effect of scopolamine on cardiac rate is not as apparent clinically as is that of atropine (9), (14).
9. Clinically we have seen no demonstrably ill effects on fetal or neonatal vital functions.

10. Scopolamine can be administered by any route. Its maximum effects may be expected in three-fourths to one hour, when given subcutaneously; in one-half to three-fourths hour when given intramuscularly, in one-fourth to one-half hour when given intravenously. By the last route a considerable effect is often seen in five minutes. The duration of its desirable effects is about two hours.

11. Scopolamine appears to be less toxic than atropine and has a larger margin of safety (9).

Its chief disadvantages from our point-of-view are:

1. It lacks analgesic potency.
2. On occasion it produces edema of eyelids, lips, or uvula.
3. It has the cortical effect of producing excitement and over-activity in about 40 per cent of obstetrical cases. We (10) have found no essential difference in this respect between the levorotatory and racemic forms, nor between the ampules and the tablets. We now employ fresh tablets of scopolamine hydrobromide.

To potentiate the advantages of scopolamine and lessen or obtund its disadvantages we have resorted to the use of various pharmacologic agents. Briefly our experience may be summarized in table 1.

### TABLE 1

<table>
<thead>
<tr>
<th></th>
<th>Effects on mother</th>
<th>Effects on infant</th>
<th>Avg. length of labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per cent</td>
<td>Per cent</td>
<td>Per cent</td>
<td>Per cent</td>
</tr>
<tr>
<td>Early period.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morphine (11)</td>
<td>30</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td>Middle period.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barbiturates (11)</td>
<td>86</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>Later period.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demerol (8)</td>
<td>72</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Present period.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apomorphine (12)</td>
<td>90</td>
<td>0</td>
<td>3.7</td>
</tr>
</tbody>
</table>

* These two items refer to nonpremedicated cases.

In table 1, labor is recorded as the time when uterine contractions begin to exert an effect on the cervix, either dilation or effacement. For patients admitted late in the first stage of labor, the time when regular five-minute contractions began is taken as the time of onset of labor.

In the series “Present Period” small doses of seconal are used early in labor.
The difference between 100 per cent and the items "Amnesia" plus "Failure" is accounted for as having analgesia with more or less amnesia.

The item excitement 3.7 per cent under apomorphine ("Present Period") could readily be reduced to nil. The House-Officer at the Boston Lying-in Hospital is permitted to order premedication and in the rush of a busy clinic statistical perfection in this item is difficult of attainment.

In a previous study (11) at this hospital it was reported that in a control series without supplementary anesthesia 1.9 per cent of infants did not breathe immediately on delivery. Our present series (12) includes those receiving supplementary anesthesia.

In the barbiturate series, nembutal was the chief derivative employed and the chief offender.

We (10) believe the barbiturates have the following advantages as premedicants in obstetrics:

(1) They potentiate the amnesic effect of scopolamine. In our experience the combination of barbiturate and scopolamine as amnesics is about 15 per cent more effective than the combination of demerol and scopolamine. (2) The barbiturates are psychic sedatives. They appear to act more on the sensory areas of the brain than does scopolamine. (3) The barbiturates may add to the analgesic effect of scopolamine. (4) The routine use of barbiturates and scopolamine in our clinic has actually been accompanied by a lower stillbirth and neonatal death rate. (5) They frequently facilitate induction and maintenance of anesthesia as well as decrease the quantity of agent required for completion of delivery. (6) They aid in increasing the resistance to toxic manifestations when regional anesthetic agents of the procainetype are employed.

We are of the opinion that the present classification of the barbiturates should be reexamined in the light of their actions on the human being. For example, amytal, nembutal, and seconal have different times of onset of action, duration of effect, and untoward effects even when administered by the same route and at a given dosage range. This is probably correlated with the mechanisms of detoxification and elimination of these barbiturates when administered to the mother in obstetrical premedication.

We (10) believe the chief disadvantages of the barbiturates as premedicants in obstetrics to be first, the nonpredictability of some of the effects of this group of drugs. Of these effects, the most serious is the development of pulmonary complications, particularly pulmonary edema. The clinical picture is that of stertorous respiration, dyspnea, laryngeal spasm, bronchospasm, increased bronchial secretions with bubbling râles throughout the lung fields, diminution of minute-volume respiratory ventilation, cyanosis, tachycardia, and fall in blood pressure.
level. This urgent situation may occur during labor or delivery. Our method of treatment is discontinuance of anesthesia, extreme lateral head-down position to drain the pulmonary edema fluid, suction (laryngeal, tracheal or bronchial with insertion of proper airways), continuous flow of oxygen, preferably under slight pressure during the inspiratory phase, venesection of 500 cc. of blood if the right heart appears overloaded, and administration of picrotoxin if the incident occurs during the first stage of labor. Moderate dyspnea is almost the rule during late pregnancy; in fact, increased congestion in the pulmonary vascular bed is demonstrable by the roentenogram. In the case of preeclampsia, one of the most dreaded of complications is known to be the development of pulmonary edema. In the obstetrical patient an agent such as nembutal may produce these changes in the vital functions in as small a dose as 3 grains. In fact, in our studies with barbiturates, pentobarbital (nembutal) was accompanied by respiratory complications twice as often as the other barbiturates. The only fatal cases occurred with the use of nembutal. Table 2 shows the incidence of respiratory complications, and deaths occurring in the barbiturate series. We have discontinued the use of nembutal in favor of seconal, a shorter acting barbiturate, or sodium-amytal when a longer acting barbiturate is desired.

**TABLE 2**

<table>
<thead>
<tr>
<th>Barbiturates Used with Scopolamine in Labor (10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
</tr>
<tr>
<td>All barbiturates</td>
</tr>
<tr>
<td>Pentobarbital (Nembutal)</td>
</tr>
<tr>
<td>Seconal; sodium amytal (Alone or combined)</td>
</tr>
</tbody>
</table>

A second disadvantage to the barbiturates, particularly when they are combined with scopolamine, is the occurrence of excitement and overactivity, especially in the patient with elevated reflex-irritability. To control this undesirable effect, in the past, we resorted to the use of paraldehyde, ether-in-oil rectally, or other potent cortical depressants. More recently we have met this problem by the use of apomorphine in subemetic doses.

A third disadvantage to the barbiturates, as previously employed at the Boston Lying-in Hospital, was the occurrence of transitory apnea at birth in about 20 per cent of the babies.

Briefly, the method of administration in each of the respective plans of premedication is as follows:
I. **Early Period.** Morphine sulfate, 1/6 grain, at start and not repeated. Scopolamine, 1/150 grain, given forty-five minutes later and repeated as necessary to dull the sensorium.

II. **Middle Period.** Barbiturates: nembutal, 4 1/2 to 6 grains, repeated in three to four hours in doses of 1/2 to 3 grains if indicated. Scopolamine, 1/150 grain, given forty-five minutes after initial dose and repeated as often as necessary.

III. **Later Period.** Demerol administered intramuscularly in doses of 100 mgs. every four hours; scopolamine, 1/100–150 grain, as initial dose with the first dose of demerol; subsequently in doses of 1/200 grain every two hours as indicated.

IV. **Present Period.** Seconal, 1 1/2 to 3 grains, by mouth or rectum following the admission enema; for psychic sedation. When the patient is making progress and begins to mind her pains, administer: scopolamine hydrobromide; apomorphine hydrochloride, each 1/100 grain, intramuscularly three-fourth to one hour later and repeated every two hours thereafter administered intramuscularly; scopolamine, 1/150 grain; apomorphine, 1/50 grain. Apomorphine in doses of 1/100 to 1/50 grain at fifteen to thirty minute intervals may be used when indicated.

The distribution of anesthetic agents and technics, under the present period, employed for the completion of the different types of deliveries was recently reported (12), and is shown in table 3.

<table>
<thead>
<tr>
<th>Agent and technic</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalational technics:</td>
<td></td>
</tr>
<tr>
<td>Ether (open drop)</td>
<td>72</td>
</tr>
<tr>
<td>Gas, oxygen, ether and/or vinethane</td>
<td>61</td>
</tr>
<tr>
<td>(closed carbon dioxide absorption)</td>
<td>11</td>
</tr>
<tr>
<td>Regional technics using procaine (spinal or local)</td>
<td>24</td>
</tr>
<tr>
<td>None. All pelvic deliveries. Premedication only</td>
<td>4</td>
</tr>
</tbody>
</table>

It is interesting to note the effects of premedication, with and without supplementary anesthesia to complete the delivery, on the irritability of the newborn. Most of the problem cases were in groups 2 and 3 in table 4.

<table>
<thead>
<tr>
<th>Agents</th>
<th>Immediate spontaneous respiration with immediate or shortly delayed cry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premedication alone, i.e.,</td>
<td>100</td>
</tr>
<tr>
<td>1. Seconal, scopolamine and apomorphine</td>
<td>97</td>
</tr>
<tr>
<td>2. Premedication and procaine</td>
<td>91</td>
</tr>
<tr>
<td>3. Premedication and gas, oxygen, ether (vinethene)</td>
<td>91</td>
</tr>
<tr>
<td>4. Premedication and ether</td>
<td>91</td>
</tr>
</tbody>
</table>
PREMEDICATION AND ANESTHESIA IN OBSTETRICS

The following case histories typify the course of premedication and anesthesia as employed at present at the Boston Lying-in Hospital.

Case 1. A 40 year old primipara was admitted to the hospital with a prenatal course complicated by numbness of right arm and class III cardiac status (13). She had a history of rheumatic fever in 1934 without sequelae. A recent roentgenologic study showed no evidence of cervical rib. At entry here gestational age was thirty-nine and one-half weeks by dates.

12:07 a.m. Admitted with slight bloody show, not in active labor, with membranes intact, showing ankle edema. Rectal examination revealed cervix dilated one tight finger with vertex presenting at spines.

12:30 a.m. The patient received routine preparation and enema.

1:30 a.m. Mild contractions appeared. Fetal heart rate 140 and remained regular.

1:55 a.m. Seconal, 3 grains, rectally, given for psychic sedation. Uterine contractions occurring every three to four minutes, lasting thirty to forty seconds.

3:00 a.m. Cervix one loose finger dilated and partly effaced. Given scopolamine and apomorphine each 0.6 mg., intramuscularly.

3:15 a.m. Emesis once.

4:00 a.m. Given scopolamine 0.45 mg. and apomorphine 1.2 mg. intramuscularly, followed by slight nausea but no emesis.

5:00 a.m. Patient restless with pains only. Sleeping quietly during intervals between contractions; latter occurring every five minutes and lasting forty seconds.

6:00 a.m. Patient restless with pains only and easily controlled. Given scopolamine 0.45 mg. and apomorphine 1.2 mg., intramuscularly.

7:00 a.m. Cervix dilated one and one-half fingers; well effaced. Vertex at one finger below spines. Patient restless with contractions only.

7:55 a.m. Given apomorphine 1.2 mg., intramuscularly. Becoming more cooperative with contractions and resting soundly between contractions.

8:15 a.m. Contractions every three minutes, lasting forty-five seconds. Resting peacefully between contractions; stirring with contractions. Given scopolamine 0.45 mg. and apomorphine 1.2 mg., intramuscularly.

9:20 a.m. Contractions every two minutes; duration forty-five seconds. Fetal heart rate 140 and regular. Patient moderately restless with pains; given apomorphine 1.2 mg., intramuscularly.

9:45 a.m. Cervix fully dilated. Patient’s restlessness decreased.
Given apomorphine 1.2 mg., intramuscularly. Quiet and cooperative in twenty minutes.

10:35 a.m. Pushing with contractions; resting well between contractions. Memory poor. Given apomorphine 1.2 mg., intramuscularly. Moved to delivery room from labor room.

11:04 a.m. Uneventful induction with inhalation anesthesia using open drop ether. Prepared and draped for delivery. Delivered a 7 pound 7 ounce infant by Ritgen’s maneuver. Baby cried immediately on delivery, having immediate spontaneous respiration. Intact placenta and membranes delivered in six minutes. The umbilical cord was moderately loose around the baby’s neck and could be slipped over its head readily. Type of delivery: Primiparous normal delivery with a median episiotomy repaired.

The next day the patient remembered only the first injection. She had a vague memory of smelling ether but recalled no other incident, even though she was a high-strung, apprehensive, elderly primipara. Amnesia and analgesia were very satisfactory. Both mother and baby were discharged home in good condition on the tenth postpartum day, after a normal convalescence.

Case 2. A 22-year old primipara was admitted at term with uneventful prenatal course. On entry to the hospital she had an upper respiratory infection with cough, and a gain in weight of 35 pounds.

6:40 a.m. On admission the patient was having contractions every ten minutes; her pains had begun at 4:00 a.m. Membranes had ruptured at 6:00 a.m. On rectal examination the cervix was found to be one loose finger dilated, partly effaced, with the vertex presenting at one and one-half fingers above the spines.

8:00 a.m. Preparation and enema completed. Contractions every five minutes and lasting thirty seconds. Fetal heart rate was 140 and remained regular.

9:55 a.m. Cervix dilated 2 fingers. Given seconal, 3 grains per rectum.

11:55 a.m. Cervix dilated 3 fingers; vertex at spines; contractions every two and one-half minutes of forty-five seconds’ duration. Patient becoming restless with pains; emesis once. Given scopolamine and apomorphine each 0.6 mg., intramuscularly.

1:00 p.m. Cervix dilated to 4 fingers. Patient quite restless with pains only. Given scopolamine 0.45 mg. and apomorphine 1.2 mg., intramuscularly.

2:30 p.m. Cervix fully dilated.

2:40 p.m. Patient restless with pains; cooperative. Given scopolamine 0.45 mg. and apomorphine 1.2 mg., intramuscularly.
3:00 p.m. Patient mobilizing forces with contractions; cooperative; resting well between contractions, and quieter with contractions. Moved to delivery room.

3:45 p.m. Head on perineum but not crowning. Full dilatation over two hours.

4:15 p.m. Spinal analgesia administered readily, using 70 mg. of procaine, slow injection rate, 3 cc. of cerebrospinal fluid, at third lumbar interspace; clear fluid, free flow; uneventful. Level at dermatome tenth dorsal. Previous injection of epinephrine sulfate 25 mg., intramuscularly. Patient experienced no change in blood pressure, pulse pressure, or pulse rate. Prepared and draped for delivery.

4:40 p.m. Delivered of an infant with pilonidal sinus by low forceps through a median episiotomy. Infant cried immediately on delivery and had immediate spontaneous respiration.

The next day the patient remembered the first injection only. She had a complete loss of memory for labor, administration of anesthesia, and delivery. She felt well and the upper respiratory infection was markedly improved under this form of premedication; an observation frequently noted in patients presenting prepartum upper respiratory infection. Postpartum course was satisfactory. Mother and baby discharged in good condition, home, on the tenth postpartum day.

Case 3. A 21-year old primipara was admitted with normal prenatal course, gestational age of forty-one weeks. She had an acute upper respiratory infection on admission.

9:45 p.m. Admitted to labor room, having no uterine contractions but with membranes having ruptured at 8:00 p.m. On rectal examination the cervix was found to be one and one-half fingers dilated, partly effaced with vertex presenting one and one-half fingers above the spines. Fetal heart rate was 140 and regular.

10:30 p.m. Given routine preparation and enema. Uterine contractions realized six hours later.

4:45 a.m. Uterine contractions every five minutes, lasting forty-five seconds. Cervix dilated one and one-half fingers. Fetal heart rate 144 per minute and regular.

7:40 a.m. Cervix, 2 fingers dilated; vertex stationed one and one-half fingers above spines. Fetal heart rate 140 per minute and regular.

10:00 a.m. Given seconal 3 grains orally.

11:15 a.m. Cervix effaced; 2 fingers dilated. Vertex at spines.

11:30 a.m. Patient getting restless with pains; contractions every three to four minutes and lasting forty-five seconds. Fetal heart rate 140 per minute and regular. Given scopolamine and apomorphine each 0.6 mg., intramuscularly.
12:30 p.m. Cervix two and one-half fingers dilated; vertex at spines; L.O.T. Resting between contractions; awakened with contractions. Given scopolamine 0.45 mg. and apomorphine 1.2 mg., intramuscularly.

2:30 p.m. Cervix 3 fingers dilated. Resting with pains. Given scopolamine 0.45 mg. and apomorphine 1.2 mg., intramuscularly.

3:45 p.m. Resting well with pains but unconscious mobilizing forces of labor with contractions. Fetal heart rate 140 per minute and regular. Mother’s pulse rate 90 per minute, respirations 22, and blood pressure 120 mm. systolic and 70 mm. diastolic. Crowning. Moved to delivery room.

3:50 p.m. Prepared and draped for delivery. Patient delivered of a normal infant by Ritgen’s maneuver, without supplementary anesthesia. The infant cried immediately on delivery and had immediate spontaneous respiration. Placenta delivered in five minutes by simple expression; perineum intact.

The next day the patient remembered receiving but one injection. She had a complete blackout of memory following her first dose of scopolamine and apomorphine. She felt “swell,” and her “cold” had improved. Her postpartum course was uneventful. Both mother and baby were discharged well on the tenth postpartum day.

A study of 500 consecutive cases under the present regimen of premedication and anesthesia are being reported elsewhere (12). The stillbirths and neonatal deaths occurring in this series of cases are accounted for in the following protocols.

**Protocol I. Stillbirths (5 cases or 1 per cent of series)**

<table>
<thead>
<tr>
<th>Case Number</th>
<th>Causative factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>117535. .</td>
<td>Macerated fetus. Twin 2; breech delivery</td>
</tr>
<tr>
<td>117848. .</td>
<td>Macerated fetus. Erythroblastosis; hydroptic type</td>
</tr>
<tr>
<td>117853. .</td>
<td>Macerated fetus. No fetal movements felt for 10 days prior to delivery (breech)</td>
</tr>
<tr>
<td>118020. .</td>
<td>Macerated fetus. No fetal movements felt nor fetal heart heard on admission</td>
</tr>
<tr>
<td>118705. .</td>
<td>Twin 2. Placenta and cord smaller than that of twin 1; velamentous insertion of cord</td>
</tr>
</tbody>
</table>

**Protocol II. Neonatal Deaths (10 cases or 2 per cent of series)**

<table>
<thead>
<tr>
<th>Case Number</th>
<th>Causative factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>117423. .</td>
<td>Died seventy minutes after birth. Twin 2. Prematurity; polycystic kidney</td>
</tr>
<tr>
<td>117586. .</td>
<td>Died on 5th day. Erythroblastosis foetalis</td>
</tr>
<tr>
<td>117615. .</td>
<td>Died two hours after birth. Erythroblastosis foetalis</td>
</tr>
<tr>
<td>118309. .</td>
<td>Died thirty-one hours after birth. Erythroblastosis foetalis and intracranial hemorrhage</td>
</tr>
<tr>
<td>118373. .</td>
<td>Died on 7th day. Prematurity; premature separation of placenta</td>
</tr>
<tr>
<td>118458. .</td>
<td>Died in fifteen minutes. Prematurity; breech delivery. Respiration never established</td>
</tr>
<tr>
<td>119227. .</td>
<td>Died on 18th day. Congenital heart disease</td>
</tr>
<tr>
<td>119228. .</td>
<td>Died on 3rd day. Erythroblastosis foetalis. Kernicterus</td>
</tr>
<tr>
<td>119230. .</td>
<td>Died in twenty minutes. Cardiac hypertrophy with multiple defects of heart structure; atelectasis. Cord tightly about neck</td>
</tr>
<tr>
<td>119285. .</td>
<td>Died on 4th day. Erythroblastosis foetalis; kernicterus</td>
</tr>
</tbody>
</table>
All the cases in both of the foregoing groups were examined also by our pathologists. The fetal and neonatal deaths are explainable by the pathologic state presented at the time of birth or the congenital defects found at postmortem examination. There is no reason to implicate the maternal amnestic, analgesic, or anesthetic agents or technics employed. Premedication and anesthesia are neither etiologic factors nor contributing causes to either group. There were no maternal deaths in this series.

Conclusions

In conclusion, I would like to stress that the degree of pain relief accomplished with safety to mother and baby is dependent, among other factors, on the response of the individual mother and her fetus; and the environment in which the natural forces of labor are managed. The practice of meddlesome obstetrics with all the grief that is implied becomes reduced when the principles of obstetrical amnesia, analgesia, and anesthesia are scientifically considered and artfully applied. The experience, judgment, skill, and attention of the team of obstetrician, anesthesiologist, and their co-workers are of utmost importance.

References