
"Recognizing that the principles of prolonged narcosis in labor and general anesthesia for delivery are fundamentally dangerous for the baby, obstetricians in great numbers are filling the literature with reports of greater salvage of infants through management of labor and delivery with nerve conduction anesthesia through technics of local, pudendal and presacral block, spinal and continuous spinal, and saddleblock spinal anesthesia and caudal and continuous caudal analgesia. . . . In this report we have analyzed results in a significant number of deliveries from the U. S. Marine Hospital in New York, from the Philadelphia Lying-In Hospital and from the John Gaston Hospital in Memphis, Tenn. . . .

"Even though we were impressed with the total salvage of babies under the management of continuous caudal analgesia, certain dangers of the method have become apparent, and certain limitations from the obstetric point of view have presented themselves. These dangers and limitations in order of their significance are: 1. Primary intrauterine fetal anoxia as a result of the sometimes moderate to severe hypotension which develops in the mother from conduction nerve block of the vasomotor nerves. . . . 2. Arrested and prolonged labors as a result of too early administration of the analgesia before the processes of labor have become established, in desultory and false labors, and as a result of extension of the anesthetic levels through somatic segments higher than the sixth thoracic, and to prolonged dependent migration of the anesthetic solutions through the sievelike openings of the anterior sacral foramina involving Frankenhauser's ganglia. . . . 3. Increased incidence of occipitoposterior positions. In some series this incidence is almost doubled over that usually considered normal. . . . 4. Increased incidence of operative deliveries with a diminution in the incidence of spontaneous expulsion of the fetus. 5. Occasional direct transplacental fetal hypersensitivity to the local anesthetic used. . . .

"With these hazards constantly in mind, we have sought to supervise the labors and deliveries managed under this technic with careful surveillance of the mother and the infant. Since our own series of cases so managed is the first and largest series managed with continuous caudal analgesia, we have spent months in analyzing for the medical profession the effect of this technic on the fetal mortality in the hospitals reporting this study. We have divided this study into two main divisions in order to compare results from two geographic areas. In the Philadelphia series 87.6 per cent of the mothers were white and 12.4 per cent were Negro, while in the Memphis series 82.1 per cent were Negro and 17.9 per cent were white. The combined study involves an analysis of 7,893 births in 5,059 of which the mothers were delivered under continuous caudal analgesia and in 2,834 under some other method. . . .

"In a statistical analysis previously published by two of us, we analyzed the results of the delivery with continuous caudal analgesia of 2,516 mothers as compared with a control group of 1,024 mothers delivered with the usual anesthetics and sedatives. . . . Among those delivered by continuous caudal analgesia, the group of infants who had difficulty in breathing amounted to 3.6 per cent of the total, as com-
pared with 9.6 per cent of the control group. . . . In the caudal group 2.5 per cent of the infants required the use of a special agent to induce respiration as compared with 8.7 per cent in the control group. . . . In the caudal group there were 143 premature infants who were discharged alive from the hospital, and 48 such infants in the control group. Of the 143 premature infants in the caudal group, 13 or 9.1 per cent had a delay of more than two minutes before respiration began or had a special agent to induce respiration, as compared with 12 or 25 per cent in the control group. Of these premature infants who experienced difficulty in breathing, all except 3 in the caudal and 1 in the control group required a special agent to induce respiration. . . . A higher percentage of infants in the caudal group showed a net gain (in weight) during the first week of life, but, in terms of average ounces lost for all infants in the two categories, the differences between the caudal and control groups were small and not consistently in favor of either group. Among infants in the caudal group, stillbirths amounted to 0.1 per thousand live births, as compared with 24.8 per thousand in the control group. . . . Neonatal deaths were defined as those which occurred within the first week of life. . . . Deaths in the first week of life in the caudal group amounted to 11.5 per thousand live births, as compared with 20.8 per thousand in the control group. . . .

"Taking into account both stillbirths and neonatal deaths, the total loss of infants amounted to 20.6 per thousand live births in the caudal group, as compared with 45.6 per thousand in the control group. . . .

"The Memphis Study is composed of 2,626 consecutive births of which 1,271 live and stillbirths were managed with continuous caudal analgesia, 324 were managed with spinal and continuous spinal analgesia, 375 cases were managed with general anesthesia and 577 cases with no form of anesthesia. . . . Among all infants in the caudal group, stillbirths amounted to 18.4 per thousand live births . . . this rate is twice that of the Philadelphia study and is explained by the high percentage of Negro patients in this group who have shown a greatly increased stillbirth rate. Yet there were 56.3 stillbirths per thousand live births in the general anesthesia group. This was more than twice the 24.8 stillbirths per thousand live births in the Philadelphia series delivered in the control group. The stillbirth rate for deliveries under spinal anesthesia of 43.2 per thousand live births was also high. . . . The stillbirth rate for deliveries under no anesthesia of 80.4 per thousand live births was alarming. It emphasizes the dangers of uncontrolled, tumultuous labor as a cause of intrauterine anoxia. Pressure trauma of rigid maternal musculature against the soft tissues of the infant (particularly the premature infant) is dangerous. The premature infant not only suffers from the anoxia of the tumultuous contractions of precipitate labor, but is not vigorous enough to withstand the rigidity of a mother's musculature of the birth canal and perineum when she, because of pain, is accentuating the traumas of birth through voluntary muscular straining with sometimes convulsive force. . . . The high neonatal mortality of 63.6 per thousand live births in this group suggests irreparable trauma compared with the low neonatal mortalities of 18.4 and 16.9 in the caudal and general groups, respectively.

"It should be pointed out that the general anesthesia group was comprised of mothers who came to the hospital late in labor and were so close to delivery that no time was available for the administration of a regional nerve block anesthetic. On the whole this
group contained a larger number with uncomplicated labor and delivery than the other groups. Yet in the spinal anesthesia group the neonatal mortality was 29 per thousand live births and in the group with no anesthesia and with tumultuous labor the neonatal mortality was 34.9 per thousand live births even after all infants under 3 pounds in this latter group were excluded. Because of the unexpected high combined stillbirth and neonatal mortality in the spinal anesthesia group of 74.2 per thousand live births, this group was examined more minutely. . . . In the full term infants this combined stillbirth and neonatal mortality of 47.7 per thousand live births compared unfavorably with the 15.0 in the caudal group. Also in the premature group the combined stillbirth and neonatal mortality of 220 per thousand live premature infants compared unfavorably with the 174 in the caudal group. The combined neonatal and stillbirth rate in the group with no anesthesia was 25.2 for full term infants and 377 for premature infants weighing 3 pounds or more at birth. These high rates make us seriously question the safety of those methods which withhold pain relief during labor and delivery. . . . In this paper we have presented the stillbirth and neonatal mortality rates in the various anesthetic groups. We are not drawing any further conclusions at this time.” 5 references.

J. C. M. C.


Pentothal sodium-procaine hydrochloride combined in a single solution was administered intravenously to over 500 cases. The mixture was used for extra sedation during spinal anesthesis; to guard against cardiac arrhythmias during general anesthesia, particularly during cyclopropane anesthesia; in combination with gas; alone as an analgesic in cases where no relaxation was required; and in the relief of postoperative pain. The author's personal observations and impressions were reported.

The preparation of the solution to be used at operation was as follows: 1 to 2 Gm. of pentothal sodium and 0.5 to 1 Gm. of procaine hydrochloride were added to a liter of 5 per cent glucose in normal saline. A 1 per cent solution of procaine in normal saline was used when the dilute solution was not sufficient to prevent arrhythmias. The maximum amount of pentothal used at an operation was usually 2 Gm. If more sedation was required, other measures were used.

The preparation of the solution used for postoperative pain was as follows: 0.5 Gm. of pentothal sodium and 0.5 to 1 Gm. of procaine hydrochloride were added to a liter of fluid.

The dilute solution of pentothal-procaine was found to improve and, frequently, to prevent cardiac arrhythmias during general anesthesia. When cyclopropane was used, less gas was required to maintain anesthesia. Postoperative pain was relieved in most cases and less opiate was necessary when procaine had been used. There were no ill effects to the patient. 11 references.

R. C. T.


In a series of 285 cesarean sections curare was used as an adjunct to various anesthetic agents in an effort to decrease the amount of the anesthetic drug necessary. In 201 of these cases