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Title : NEONATAL NEUROBEHAVIORAL EFFECTS OF INHALATION ANALGESIA FOR DELIVERY

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Introduction. Inhalation analgesia is used commonly to provide pain relief during the second stage of labor. Compared with regional anesthesia, inhalation anesthesia produces significant neonatal neurobehavioral effects. The possible neurobehavioral effects of subanesthetic doses have not yet been reported. Nitrous oxide is the most commonly used inhalation analgesic in obstetrics. Enflurane produces similar analgesia but has the advantage of being administered with a higher concentration of oxygen. We compared the neurobehavioral status of infants following nitrous oxide or enflurane analgesia.

Methods. After informed consent and approval from the Committee on Human Research were obtained, the mothers of the infants were randomly divided into three groups. Group I (n = 21) received no inhalation agent; Group II (n = 23) received enflurane (0.3 to 0.8 per cent) and oxygen; and Group III (n = 18) received nitrous oxide (30 to 50 per cent) and oxygen. Each group was similar with respect to maternal age; parity; gestational age; method of delivery; parturient medication; administration of local anesthetic; and, in Groups II and III, the duration of analgesia administered prior to birth. Infants were tested at 15 min and at 2 and 24 hr of age using the ABS Neurological and Adaptive Capacity Score,¹ and at 2 and 24 hr using the Scanlon Early Neonatal Neurobehavioral Scale (ENNS).² Umbilical cord blood samples were obtained at birth for blood gas analysis.

Results. There were no significant differences in neurobehavioral status among the three groups. At 15 min of age, 78 per cent of the control babies, 77 per cent of

the nitrous oxide babies, and 83 per cent of the enflurane babies had high ABS scores. In all three groups, the ABS scores tended to be lower at 2 hr of age, but by 24 hr, almost 90 per cent of the babies in each group had high scores. The percentages of babies with high ENNS scores at 2 and 24 hr of age were also similar for all three groups. The Apgar scores of all babies were 8 or greater at 5 min of age. Neither nitrous oxide nor enflurane was associated with a higher incidence of acidosis when compared with control. Infants who were acidotic (umbilical artery pH 7.10 to 7.25) at birth did not score significantly lower with either the ABS or the ENNS tests. There was no apparent synergism between inhalation analgesics and systemic medication administered to the mothers. Babies from mothers receiving narcotics within 6 hr of birth, and either nitrous oxide or enflurane for delivery, did not have lower scores than babies whose mothers had received narcotics without inhalation analgesia.

Discussion. We conclude that neither enflurane nor nitrous oxide analgesia adversely affects neonatal neurobehavioral status at 15 min, 2 hr, or 24 hr of age.

References

1. Amiel-Tison C, Barrier G, Shnider SM: A new neonatal neurological scoring system. XI World Congress of Obstetrics and Gynecology, Tokyo, October 1979 (abstract)
2. Scanlon JW, Brown WU Jr, Weiss JB, et al: Neurobehavioral responses of newborn infants after maternal epidural anesthesia. *Anesthesiology* 40:121, 1974.