

DATE : APRIL 22, 1980  
 TITLE : DURATION OF EFFECT OF MEPERIDINE ON NEONATAL NEUROBEHAVIOR  
 AUTHORS : R. Hodgkinson, M.D., and F.J. Husain, M.D.  
 AFFILIATION: Department of Anesthesiology, The University of Texas Health Science Center at San Antonio,  
 The Robert B. Green Hospital, 527 North Leona, San Antonio, Texas 78207

**Introduction.** Our concept of the consequences to the neonate of maternally administered drugs in labor have changed in the past decade. Previously, it was found that the effects disappeared in the first few hours following birth. Neonatal neuro-behavioral tests have shown that there is still drug effect for 2 or more days following delivery. (1) (2) In this study, a modified Early Neonatal Neuro-behavioral Scale (E.N.N.S.) (1) was used to assess the effects of 100 mg or more of meperidine on neonatal neurobehavior in the first 5 days of life.

**Methods.** All babies were delivered by cesarean section under epidural anesthesia consisting of 20 ml of 0.75% bupivacaine. The mothers of 50 babies had received at least 100 mg (105 ± 21 mg) of meperidine intravenously (meperidine group) while the mothers of the other 50 babies had not received meperidine (non-meperidine group). The proportion of mothers receiving epidural analgesia with chloroprocaine during labor was 16% in the meperidine group and 72% in the non-meperidine group. Otherwise, there was no material difference in respect to the babies' birth weight, the duration of labor or the mothers' age, weight and height between groups. Neurobehavior was assessed on days 1 through 5 during the hour before feeding by 1 investigator unaware of whether the babies had been exposed to meperidine or not. The E.N.N.S. was modified to make it more sensitive by converting it into an 8 point scale. To obtain similar groups for comparison only normal babies of over 2500 grams in weight and with Apgar scores of at least 6 at 1 minute and 9 at 5 minutes were included.

**Results.** Since neurobehavioral scores are on a ranking (ordinal) scale, the score for each test was classified as above or below the median score for all babies for each of the five days. Since the median score was a fraction, no scores fell on the median itself. Table 2 shows the percentage of babies having a higher than median score in the non-meperidine group on days 1 through 5. The percentage of babies in the meperidine group having a score higher than the median can be obtained by subtracting the scores in Table 2 from 100.

**Discussion.** On days 1 and 2 the non-meperidine group of babies gave a greater percentage of scores higher than the median particularly in respect to overall score, tone, alertness and decremental score. The degree of significance ranged from  $p < .02$  to  $< .001$ . On day 3 the overall score and the decremental score were higher in the non-meperidine group ( $p < .05$ ). On days 4 and 5 there were no consistent statistically significant differences between the 2 groups. The 2 scores in which  $p < .05$  were probably chance results due to the large number of chi-square tests performed. It is concluded that there were neurobehavioral changes due to meperidine on days 1 and 2 after birth. Some effect is evident on day 3, but on days 4 and 5 neurobehavioral testing

revealed no differences between groups.

#### References.

1. Scanlon JW, Brown WU Jr., Weiss, JB, et al.: Neurobehavioral responses of newborn infants after maternal epidural anesthesia. *Anesthesiology* 40: 120-126, 1976.
2. Brackbill Y, Kane J, Manniello RL, et al.: Obstetric premedication and infant outcome. *Am J Obstet Gynecol* 118:377-379, 1974.

TABLE 1. PATIENTS DESCRIPTION (Mean ± S.D.) and PERCENTAGE RECEIVING EPIDURAL ANALGESIA FOR LABOR

	MEPERIDINE GROUP	NO MEPERIDINE GROUP	
Birth Weight	3321	3311	(±407)
Duration of Labor	12.1(±3.5)	11.6	(±4.1)
Percentage Receiving Epidural Analgesia	16%	72%	
Mothers' Age	21 (±5.1)	22	(±6.3)
Mothers' Weight (Kg)	71.7(±11.0)	76.6	(±8.7)
Height (cm)	160 (±4 )	161	(±3 )
Meperidine Dosage	105 (±21 )	-0-	

TABLE 2. PERCENTAGE OF NEONATES IN THE NON-MEPERIDINE GROUP THAT HAD A HIGHER THAN MEDIAN SCORE ON DAY 1 THROUGH DAY 5

	DAY				
	1	2	3	4	5
Overall	66***	62**	60*	42	48
Pinprick	60*	58	48	44	50
Tone	64***	62**	46	58	56
Rooting	58	60*	50	42	52
Sucking	60*	58	48	40*	52
Moro	58	58	50	56	58
Sound	50	56	52	46	42
Placing	62**	52	42	50	56
Alertness	70****	62	58	50	40*
Decrement	62**	64**	60*	48	52

\*  $p < .05$

\*\*\*  $p < .01$

\*\*  $p < .02$

\*\*\*\*  $p < .001$