

Title: CORRELATION OF NEONATAL BLOOD PRESSURE WITH MODE OF DELIVERY AND TYPE OF ANESTHESIA

Authors: Alfred T.C. Peng, M.D., Peter Palasota, M.D.; Haider H. Shamsi, M.D., Louis S. Blancato, M.D., Shital Pasricha, M.D.

Affiliation: Departments of Anesthesiology; Obstetrics and Gynecology, St. Luke's - Roosevelt Hospital Center, New York, N.Y.

Introduction: Abnormalities of BP can indicate hypovolemia, asphyxia or congenital anomalies. If measurement of BP is to become routine, we want to discern what, if any, is the contribution to neonatal BP by mode of delivery and anesthesia in the full term normal neonate. A large series of measurements on 1,265 neonates using a Dinamap oscillometer and Doppler ultrasound found that they are equally accurate and are almost identical to direct invasive intra-arterial measurement.¹

Methods: 4 groups were defined: 1) Vaginal delivery without anesthesia to serve as controls; 2) Vaginal delivery with epidural anesthesia; 3) Cesarean section with general anesthesia; and 4) Cesarean section with epidural anesthesia. Neonatal blood pressure and pulse was measured with a Dinamap R847 immediately after delivery, one hour and two hours after delivery. Temperature, apgar scores and umbilical blood gases were recorded within the first hour after delivery. Statistical analysis was performed with an unpaired Student's t-test.

Results: Babies born by vaginal delivery without anesthesia had a higher BP at birth (48.79 ± 6.91) and one hour (49.16 ± 5.32) than those delivered by C/S, however at two hours had a BP (43.54 ± 4.06) similar to the C/S groups (Fig.1). There was no statistical significance between either C/S group at any time. Vaginal delivery with epidural anesthesia resulted in higher BP at all times and was statistically significant at 2 hours (54.29 ± 21.9) $P < .05$. There was no statistical difference compared with other groups based on temperature, blood gases and apgar scores.

Discussion: The mode of delivery and type of anesthesia have a definite effect on neonatal BP. In the control group at birth and at one hour, high BP is reflective of fetal and maternal stress factors. In particular is the passage of maternal catecholamines across the placenta at birth as well as the stress of adaptation to the environment at 1 hour.^{2,3} BP at 2 hours in the control group was comparable to the two C/S groups and probably reflect a relative hypovolemia in the neonate. The two C/S groups had similar BP at birth and at two hours, however the difference seen at 1 hour was not statistically significant. Vaginal delivery with epidural anesthesia had strikingly higher BP throughout the study, indicating an improved uteroplacental blood flow and a sufficient degree of hydration associated with the type of anesthesia. The finding of comparable BPs in

the C/S groups where both epidural and general anesthesia are compared lead us to speculate that, despite adequate volume expansion, decreases in uteroplacental blood flow occur without causing hypoxia and acidosis in the fetus. Studies have shown a decrease in intervillous blood flow at 13% with epidural anesthesia and 35% with general anesthesia.⁴ This decrease in uteroplacental blood flow evident in our C/S groups was not seen in our vaginal delivery with epidural group due to the less extended sympathetic blockade. We conclude that mode of delivery and type of anesthesia directly affect the BP values in the healthy full term neonate.

References:

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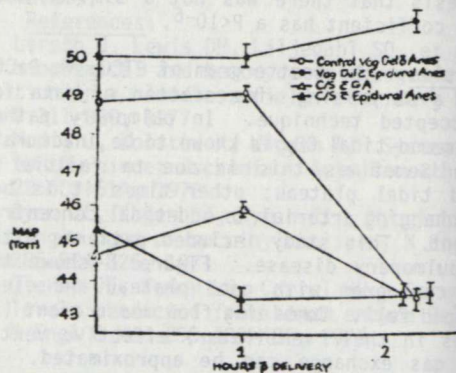


Fig. 1. Mean BP of the neonates in 4 different groups at the time of delivery and 1 and 2 hours after birth.

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