Title: PLASMA AND CEREBROSPINAL FLUID ENDORPHIN LEVELS DURING PREGNANCY.

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Introduction. Plasma levels of beta-endorphin (β-EP) and its precursor, beta-Lipotropin (β-LPH), increase in women during labor.(1) In animal experiments endorphins have been linked with the modulation of pain threshold during pregnancy.(2) For these reasons it has been proposed that the elevated plasma levels of β-EP and β-LPH during labor in women may have relevance to explanations of the psychological responses to human pregnancy and parturition. However, behavorial effects should correlate more closely to cerebrospinal fluid (CSF) levels of β-EP than with peripheral (plasma) levels. We therefore undertook to measure directly CSF levels of immunoactive β-EP (iEP; = β-EP + β-2LPH) in women during successive stages of pregnancy and labor and to compare these levels with those in plasma specimens drawn concurrently. We also assayed simultaneous samples of umbilical artery and umbilical vein plasma for iEP to ascertain the relative fetal and placental contributions of this material.

Methods. Fifty healthy women provided informed consent for this study. Lumbar CSF and/or blood were obtained at the time of administration of spinal anesthesia in non-pregnant women undergoing minor gynecologic surgery (NP, n=8) and in three groups of pregnant women: women at 16-20 weeks gestation admitted for cervical circlage (C, n=6), women having elective cesarean section at term (T, n=21), and women at term in active labor for 6 to 8 hours (L, n=15). In addition, simultaneous arterial and venous blood specimens were drawn from doubly-clamped segments of umbilical cords of 5 women who delivered vaginally and of 6 who had elective cesarean section. In no instance, had any woman received any medication excepting antacids prior to sampling of blood or CSF.

Results. The differences in CSF levels of iEP between non-pregnant women and the three groups of pregnant subjects were not significant (Table 1).

Table 1

IMMUNOACTIVE BETA-ENDORPHIN IN GYNECOLOGIC AND OBSTETRIC PATIENTS

Group	CSF	Plasma	Umbilical artery	Umbilical vein
Non-pregnant	36.5 ± 15.8	63.5 ± 18.2	--	--
Circlage (16-20 weeks gestation)	60.1 ± 10.3	--	--	--
Elective Cesarean	57.5 ± 8.4	64.0 ± 12.2	168.0 ± 46.5	65.7 ± 13.7
Active Labor	48.5 ± 8.3	110.8 ± 30.3	89.6 ± 47.7	58.8 ± 47.3

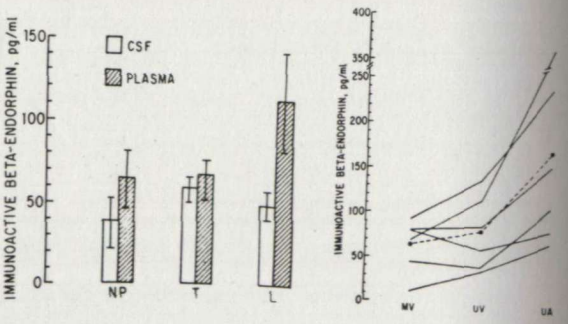
Values are means ± SEM expressed as pg/ml of beta-endorphin.

Plasma levels of iEP were the same in non-pregnant women as in patients at term prior to the onset of labor; however, after 6 to 8 hours of active labor, plasma levels of iEP rose two-fold (Figure 1). The difference between plasma and CSF levels of iEP in women during labor was highly significant ($P < 0.01$).

Umbilical artery levels of iEP exceeded those in umbilical vein in infants delivered by cesarean section without labor ($P < 0.025$, as well as in infants delivered vaginally ($P < 0.05$). Figure 2 depicts maternal plasma, umbilical artery, and umbilical vein levels of iEP in six subjects having elective cesarean section.

Discussion. The present study provides novel evidence that during labor, plasma and CSF levels of iEP are dissociated. A preliminary report by Budiamal et al (3), examining levels of β-EP in four women prior to elective cesarean section and one woman an hour after delivery by an unspecified route, also showed no correlation between levels of β-EP in plasma and CSF. An explanation for markedly elevated plasma β-EP without corresponding rises in spinal fluid β-EP levels may be that the β-EP of plasma and CSF are produced at different locations and have different physiological functions.

Our result of higher levels of iEP in umbilical artery than umbilical vein is also interesting. This might be related to possible fetal pitutary production of iEP but placental manufacture, or possible placental degradation cannot be excluded. Further studies are needed to clarify the factors influencing fetal and placental influences upon umbilical cord levels of iEP.



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3. Budiamal LR, et al: Anesthesiology 1981; 55:A322.