

THE EFFECT OF DELIVERY METHOD ON SECRETION PATTERN AND DISSOCIATION PHENOMENON OF ADRENOCORTICOTROPIC HORMONE AND CORTISOL IN PARTURIENTS

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Introduction: The permanent stress stimulates development of adaptive mechanisms by which the human organism keeps its integrity. Childbirth is one of the biggest physical and psychological demands for adaptation and is an intensive stress event. Physiological changes that occur during pregnancy and new factors originating from the placenta modify the regulatory mechanisms of the hypothalamic-pituitary-adrenal axis as an important part of stress response system. Role of ACTH is considered to be necessary for the function of the adrenal cortex, however examples of ACTH-cortisol dissociation indicates the importance of ACTH-independent regulatory mechanisms. It seems that they are responsible for the precise adjustment of the highly sensitive neuroendocrine system, adapting its response to the physiological needs of the organism.

Objective: The aim of this study is to analyse levels, dynamics and patterns of changes in concentrations of free salivary and total plasma cortisol and plasma ACTH in the mothers whose pregnancy terminated vaginally or by caesarean section, as well as to determine the occurrence of ACTH-cortisol dissociation in parturients.

Materials and Methods: The study included 30 parturients divided into two groups depending on the way of delivery (15 caesarean sections, 15 vaginal delivery). Approval for the study and use of human and archival material was obtained from the Ethical Committee of KCV. Three samples of blood and saliva in defined time points (1h before delivery, 2h after delivery, at 10 p.m. on the day of parturition) were collected from each parturient. Using automated systems Elecsys 2010 and Architect c8000 concentrations of ACTH, total cortisol and CRP were determined from blood samples, and free cortisol from saliva. Data were statistically analyzed using Microsoft Office - Excel and SPSS 21.0 software and results were presented in form of tables and charts.

Results: The subjects of the two groups were matched by age, height, weight, weight gain, BMI, weight and length of the newborn, gestational age and parity. In women delivered by caesarean section, average cortisol levels in saliva (51.96 nmol/l) and plasma (908.77 nmol/l) had peak 2h after parturition, while the highest average value of ACTH was obtained in first sample (50.21

pg/ml) and then was decreasing progressively. This difference in the pattern of secretion of cortisol and ACTH was considered as dissociation. In the group of vaginally delivered women, salivary cortisol (245.1 nmol/l), plasma cortisol (1831.27 nmol/l) and ACTH (180.98 pg/ml) had maximal average values in the first sample and secretion was characterized by a declining pattern of concentration. Significant correlation between salivary and plasma cortisol concentrations were found in the overall sample ($p < 0.01$). The relative changes in plasma cortisol levels were significantly lower comparing to changes of salivary cortisol. In women delivered vaginally all values of cortisol and ACTH in the first sample were significantly higher than the reference, whereas in women delivered by caesarean section they did not differ significantly from the reference values for pregnant women. CRP values were significantly increased in both groups but there was no difference depending on the delivery method.

Conclusions: The results of this study indicate the differences in the pattern of secretion of ACTH and cortisol depending on the delivery method. Vaginal delivery causes intense and relatively short-lived response of the neuroendocrine system - levels of ACTH and cortisol showed a decreasing trend with a significant degree of mutual influence. In women delivered by caesarean section is observed the dissociation of ACTH and cortisol in terms of decline of ACTH concentrations accompanied by an increase in cortisol levels during delivery. This indicates the presence of ACTH-independent factors affecting the adrenocortical activity level. The true nature of this phenomenon cannot be clarified by the applied research methodology.

Keywords: cortisol, ACTH, dissociation, delivery, pattern.