The Influence of Beta-Endorphins on Gestational Diabetes Development

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Abstract: *The relationship between beta-endorphin and insulin secretion in pregnant women was studied by means of radioimmunoassay technique. The study was carried out by determination of beta-endorphins in peripheral blood samples of 28 pregnant women with gestational diabetes. They consisted of two subgroups:14 women with insulin-independent and 14 with insulin-dependent disease. Beta-endorphin increase was found in both groups, according to the progression of gestation, significantly higher in the insulin-dependent group. Also, in the mentioned group, insulin administration caused a marked rise of beta-endorphins. Beta-endorphins, inhibiting insulin secretion, can influence gestational diabetes development. (Thai J Obstet Gynaecol 1993;5:15-18.)*

Key words: beta-endorphins, gestational diabetes

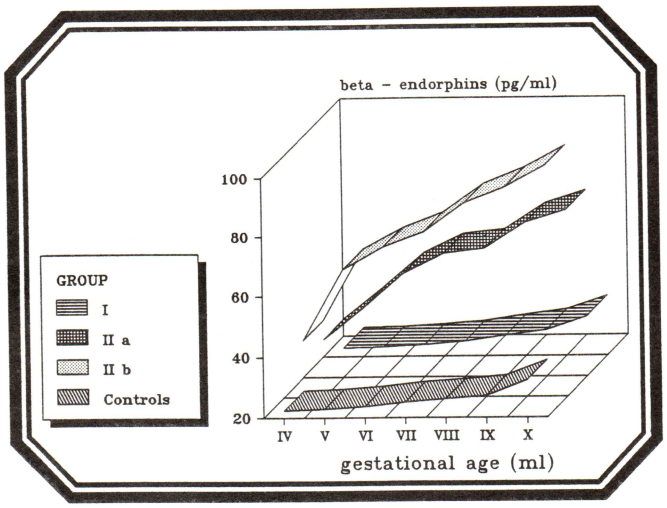
It has been shown that infusion of beta-endorphin (beta-EP) caused a significant rise of plasma glucose concentrations preceded by a significant release in peripheral glucagon levels. Beta-EP also inhibited glucose suppression of glucagon levels while the inhibition of insulin secretion was of biological relevance[1]. In normal volunteers infusion of beta-EP caused a clear-cut inhibition of insulin responses to a glucose pulse[2]. These data confirmed that beta-EP stimulates glucagon and inhibits basal and glucose-stimulated insulin secretion. In experimental conditions, it has been found that intravenous administration of small doses of beta-EP caused an immediate suppression of basal and glucose-stimulated insulin secretion[3]. However, up to now, the link between beta-EP concentrations in pregnant women's peripheral blood and gestational diabetes development still remains unresolved.

Materials and Methods

This study was performed in

the Department of Clinical Pathology, Clinic of Gynaecology and Obstetrics and Institute of Anatomy, University Clinical Center in Belgrade.

The investigations comprised 28 pregnant women, 14 with insulin-dependent and 14 with insulin-independent gestational diabetes. Fourteen women with physiologically normal pregnancy were used as controls. For each of them, beta-EP concentrations in peripheral blood samples were



Beta - Endorphins (pg/ml, mean)		Month of Gestation						
Group		IV	V	VI	VII	VIII	IX	X
I Insulin independent gestational diabetes		22.9	23.1	23.8	24.9	26.8	28.5	32.8
II Insulin dependent gestational diabetes	a) before insulin application	32.4	42.8	56.2	62.7	72.2	78.6	84.2
	b) after insulin application	38.8	62.2	69.6	74.8	84.5	89.9	97.2
III Controls		22.3	22.8	23.7	25.1	26.1	27.2	32.2

Fig. 1 Concentrations of beta-endorphin in peripheral blood samples of pregnant women.

determined early in the morning, under fasting, from the 4th until the 10th gestational month. The insulin-dependent group was tested before and 1 hour after subcutaneus insulin administration (10 IU of crystal insulin and 10 IU of insulin with medium protracted action).

Beta-EP determination in peripheral blood samples was based on radioimmunoassay techniques (RIA-Nichols Institute kits).

The obtained data underwent Student's t test statistical analyses.

Results

Immunoreactive beta-EP in peripheral blood of pregnant women was found to increase with the progression of gestation. This finding was particularly noted in insulin-dependent pregnant women. It has also been found that insulin caused a significant rise of beta-EP concentrations 1 hour after subcutaneus administration ($p < 0.01$) (Fig. 1). The maximal beta-EP concentration of 97.2 pg/ml was detected at the end of gestation in women with insulin-dependent diabetes, after insulin administration.

Discussion

Pancreas is found to be a very important source of many hormones and opioid peptides during fetal and neonatal lives[4].

In pregnancy maternal and fetal production of beta-EP gives an increase of its blood concentrations[5]. There is a putative bidirectional network carrying information between the endocrine and reproductive systems[6,7]. Pancreas is incorporated in the endocrine axis of hypothalamus, pituitary and gonadal glands. The production (secretion) of opioid peptides in human fetal pancreas is increased according to the progression of gestation[8].

This study indicates that serum concentrations of beta-EP rise during gestation, reaching the peak at the end of the 10th lunar month. Peripheral blood beta-EP levels did not significantly differ in insulin-independent patients in comparison with the controls, while the insulin-dependent ones presented significantly higher levels.

The obtained data also confirm that insulin, 1 hour after administration, causes a significant increase of beta-EP levels. So, by inhibiting insulin secretion, beta-EPs might be incorporated in the complex mechanism of gestational diabetes development.

Further research of the link between beta-EP and insulin secretion during gestation is necessary for reaching an exact view of gestational diabetes pathogenesis.

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