Is there a link between beta-endorphin and diabetes in pregnancy?

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Summary: The possible influence of both beta-endorphin and insulin secretion on diabetes development in pregnant women was studied by means of radioimmunoassay technique (RIA-Nichols Institute). 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 independence, and 14 with insulin-dependent disease. Beta endorphin increase was found in both groups, according to the progression of gestation, and the rise was significantly higher in the insulin-dependent group. At the same time, insulin application caused a marked growth of beta-endorphins in insulin-dependent group. Beta-endorphins, inhibiting insulin secretion, can influence gestional diabetes development.

Key words: Beta-endorphins; Gestational diabetes.

INTRODUCTION

It has been shown that infusion of beta-endorphin (beta-EP) has caused a significant rise in plasma glucose concentrations preceded by a marked release in peripheral glucagon levels. Beta endorphin also inhibited glucose supression of glucagon levels while the inhibition of insulin secretion was of biological relevance ([1]). In normal volunteers infusion of beta endorphin caused a clear-cut inhibition of insulin responses to a glucose pulse ([2]). These data confirmed that beta-endorphin 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-endorphin concentrations in pregnant women's peripheral blood and gestional diabetes development still remains unresolved.

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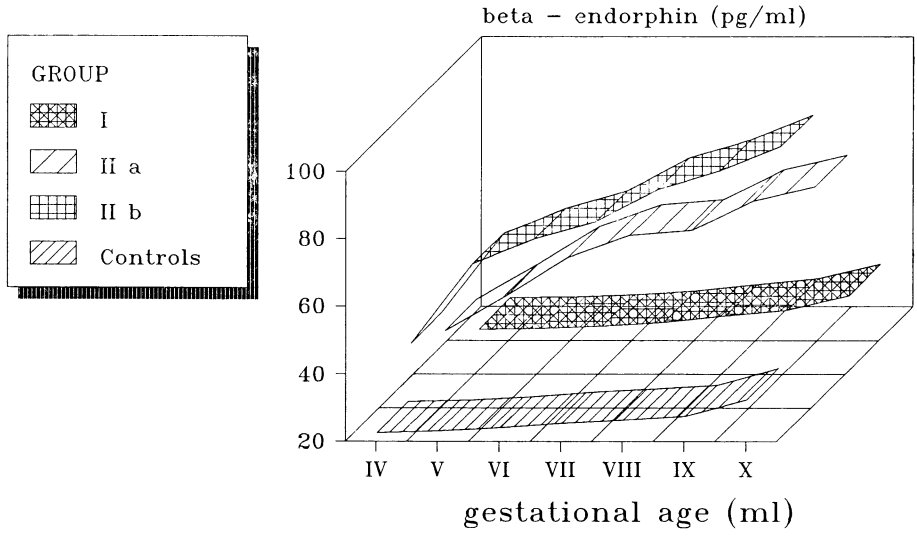
MATERIALS AND METHODS

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



Beta - Endorphin (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	54.2	60.7	62.2	71.1	75.3
	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. — Concentration of beta-endorphin in peripheral blood samples of pregnant women.

samples were determined early in the morning, under fasting, from 4th until 10th gestational month. The insulin-dependent group was tested before and 1 hour after subcutaneous insulin application (10 IU of cristal 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 data obtained underwent Student's T test statistical analysis.

RESULTS

Immunoreactive beta-EP in peripheral blood of pregnant women was found to increase with the progression of gestation.

This finding was noted particularly in insulin-dependent pregnant women. It was also found that insulin caused a significant ($p < 0.01$) beta-EP concentration rise 1 hour after subcutaneus application (fig. 1). The maximal beta-endorphin concentration was detected at the end of gestation in women with insulin-dependent diabetes, after insulin application - 97.2 pg/ml.

DISCUSSION

The pancreas has been found to be a very important source of many hormones and opioid peptides during fetal and neonatal life ([4]).

During normal pregnancy blood concentration of beta-EP increases on account of its production both in the mother and fetus ([5]). There is a putative bidirectional network carrying information between the endocrine and reproductive systems ([6, 7]). The pancreas is incorporated in the endocrine axis of the hypothalamus, pituitary and gonadal glands. The production (secretion) of opioid peptides in the human fetal pancreas increases according to the progress of gestation ([8]).

This study indicates that the serum concentration of beta-endorphin rises during gestation, reaching the peak at the end of 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 data obtained also confirm that insulin, 1 hour after application, causes a significant increase of beta-endorphin levels. By inhibiting insulin secretion beta-endorphins might be incorporated in the complex mechanism of gestational diabetes development.

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

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