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**„Analysis of leptin concentration in the blood serum of women giving birth and in the umbilical blood from properly developing pregnancies and pregnancies with selected complications”**

**Streszczenie w języku angielskim**

**Introduction and research goal:** Leptin is a protein substance with hormonal properties. It fulfills an important role in regulation of metabolism, immunological reactions and reproductive functions. Pleiotropic character of its influence and fluctuations of its concentration throughout pregnancy are reasons to believe it might be a marker of some pathological states adversely affecting pregnancy. The goal of this research was the analysis of leptin concentrations in the blood serum of women giving birth and in the umbilical blood from physiologically-standard pregnancies and pregnancies with selected complications, as well as description of differences in concentrations in the presence of selected factors.

**Material and methods:** The research encompassed a group of 379 women hospitalized and giving birth in Saint Sophia Specialist Hospital in Warsaw and Praga Hospital in Warsaw in the period from January 2015 till June 2017. The control group consisted of 194 health women in physiologically-standard pregnancy. Research group consisted of 185 pregnant women including 61 women with gestational diabetes mellitus, 39 with hypothyreosis, 36 with pregnancy induced hypertension, 25 with a diagnosis of intrauterine growth restriction and 24 with pregnancy-related intrahepatic cholestasis. Clinical data on the women's health state was derived from a survey and, retrospectively, from their case histories. The sample material gathered for leptin concentration analysis consisted of two independent components: fetus- and placenta-derived material. The analysis was performed using ELISA.

**Results:** Average leptin concentration ( $\pm$ SD) in the blood of women giving birth after a physiologically-standard pregnancy was 37,17 ng/ml ( $\pm$ 28,07). Reference range for this average was 33,19-41,14 ng/ml. Average leptin concentration in the umbilical blood from physiologically-standard pregnancy was 14,78 ng/ml ( $\pm$ 15,97). Reference range for this average was 12,52-17,04 ng/ml. Average leptin concentration in the umbilical blood is less than half of

the average leptin concentration in the blood of control group women ( $p=0,00$ ). Leptin concentration in women's blood serum was correlated with leptin concentration in umbilical blood in physiologically-standard pregnancies ( $r=0,37$ ;  $p=0,00$ ). The group of pregnant women with pregnancy-induced hypertension was observed to have significantly higher leptin concentration than the healthy control group. Average leptin concentration in the blood serum of hypertensive women in the third trimester of pregnancy was  $61,04$  ng/ml ( $\pm 28,07$ ). Average leptin concentration in the umbilical blood in the same group was  $24,02$  ng/ml ( $\pm 27,98$ ). Significantly higher leptin concentrations were detected in the blood of women in pregnancies complicated by diabetes ( $48,65$  ng/ml  $\pm 35,44$ ), hypothyreosis ( $48,13$  ng/ml  $\pm 31,09$ ), or intrauterine growth restriction ( $52,73$  ng/ml  $\pm 30,49$ ). No statistically significant difference in leptin concentration levels was detected between physiologically standard pregnancies and pregnancies affected by intrahepatic cholestasis. In diabetes-affected pregnancies significantly higher leptin concentrations in the umbilical blood were observed ( $26,67$  ng/ml  $\pm 27,98$ ). In the case of pregnancies affected by intrauterine growth restriction the average concentration was significantly lower ( $7,97$  ng/ml  $\pm 4,46$ ) in comparison with the average for physiologically standard pregnancies. The research detected no statistically significant difference between leptin concentration levels in pregnancies affected by pregnancy-related intrahepatic cholestasis and those affected by hypothyreosis. In pregnancies affected by pregnancy-induced hypertension, average leptin concentrations in umbilical blood were found to be statistically higher in cases of natural births than in cases of c-section assisted births ( $p=0,01$ ). In diabetes-affected pregnancies average leptin concentrations were statistically higher for natural births than for c-section ones ( $p=0,02$ ). Statistically significant negative correlation was found between leptin concentrations in umbilical blood and the newborn's weight at birth affected by intrahepatic cholestasis ( $p=0,03$ ). Statistically significant correlation between leptin concentration in umbilical blood and a newborn's weight at birth was also found for physiologically-standard pregnancies ( $p=0,00$ ), pregnancies affected by pregnancy-induced hypertension ( $p=0,04$ ), diabetes-affected pregnancies ( $p=0,04$ ), and pregnancies affected by hypothyreosis ( $p=0,03$ ).

**Conclusions:** Women in pregnancies complicated by diabetes, pregnancy-induced hypertension, intrauterine growth restriction and hypothyreosis have higher leptin concentrations than women in physiologically-standard pregnancies. The research points to differences in leptin concentration having predictive value in diagnosis of some pregnancy-complicating conditions, although there is a need for further research into the matter.