

GESTATIONAL DIABETES INDUCED CHANGES IN THE EXPRESSION OF IGF-1 IN PLACENTAL TISSUE HISTOMORPHOMETRICAL AND IMMUNOHISTOCHEMICAL STUDY

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ABSTRACT : Insulin like growth factors are proteins with sequence similarity to insulin that participate in the growth and function of almost every organ in the body. IGF-1 is mainly secreted in the liver, stimulated by growth hormone (GH). Placental GH stimulates maternal secretion of IGF-I. This study aimed to assess the role and expression of insulin like growth factor in placental tissue in patients with GDM and its correlation to the fetal body weight, the concentration of IGF1 in placental tissue in healthy pregnancy and comparing it with patients with GDM. The study design consist of two group on diabetic group and patients with gestational diabetes. Forty pregnant women at third trimester between (37-40) weeks 20 samples for each group. The placental tissue samples from fetal, maternal and membranous parts were collected from mid-way between cord and periphery and processed for routine histological tissue preparation and immunohistochemical expression of insulin like growth factor 1 (IGF-1). The macroscopical results of placenta of control group showed dark-blue reddish appearance, which mostly regular oval-flat cake shaped, while the placenta of patient with gestational diabetes showed slightly larger flat cake shaped oval placenta with no specific criteria of differences from control group. Placental weight increased in GDM group compare with control group. Microscopic examination of normal placenta in control group showed different sizes of villi, these villi are separated by intra villous spaces filled with blood. The villi was found to be lined by trophoblastic cells in two layers, many darkly stained highly basophilic areas was seen in the villi representing the syncytial-knot. In GDM group, the villi show dramatic changes both in size and shape been more cylindrical and elongated, the syncytial knot showed more aggregation of darkly highly basophilic stained cells. Also increase in fibrosis and calcification compared to control group.

Insulin like growth factor1 (IGF-1) expression was localized mainly in the apical part of syncytiotrophoblast which was higher in GDM group than control group. This expression were found to have higher significant ($p < 0.001$) in maternal part (0.89 ± 0.009) pixel/ μ^2 than in fetal (0.79 ± 0.015) pixel/ μ^2 and membranous part (0.83 ± 0.02) pixel/ μ^2 in GDM group, while in control group the (IGF-1) expression were found to be higher ($p = 0.039$) in membranous part (0.52 ± 0.022) pixel/ μ^2 than in fetal and maternal part. In conclusion, its was found that IGF-1 expression in higher in GDM placental tissue than in control group and there was a significal different between fetal and maternal parts.

Key words : GDM, IGF-1, placenta, immunohistochemistry.

INTRODUCTION

Human placenta is a feto-maternal organ composed of the fetal part (also known as chorion) and the maternal part (also known as decidua). The chorion is composed of trophoblasts, cytotrophoblasts and syncytiotrophoblasts, whereas the decidua contains enlarged endometrial Stromal cells (epithelium) and leukocytes populations, thus suggesting that these two parts of placenta tissue are functionally different (Mezouar and Mege, 2018).

Gestational diabetes mellitus (GDM) is a serious pregnancy complication, in which women without previously diagnosed diabetes develop chronic

hyperglycemia during gestation. In most cases, this hyperglycemia is the result of impaired glucose tolerance due to pancreatic β -cell dysfunction on a background of chronic insulin resistance. Consequences of GDM include increased risk of maternal cardiovascular disease and type 2 diabetes and macrosomia and birth complications in the infant. There is also a longer-term risk of obesity, type 2 diabetes and cardiovascular disease in the child. GDM affects approximately 16.5% of pregnancies worldwide, and this number is set to increase with the escalating obesity epidemic (Plows *et al*, 2018).

Insulin-like growth factors 1 and 2 (IGF1, IGF2) are expressed in the placenta and are known to regulate fetal