# Title: Clinical Significance of DVM and its Prevalence In pre-Gestational Diabetes Cases versus Normal Pregnancies

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**Introduction:** Pre-gestational diabetes mellitus (PGDM) affects outcomes of pregnancies and is a significant cause of fetal morbidity and mortality. In general chronic hypoxia, hyperglycemia and lactic acidosis result in increased intrauterine death. The placenta which is an important organ between mother and fetus has a significant role in fetal development mainly by gaseous exchange, provision of nutrients, hormonal excretion and maternal antibodies transmission. Delayed maturation of placental villi which is one of the findings associated with pre-gestational diabetes increases the rate of perinatal mortality. Delayed villous maturation (DVM) is a spectrum of placental disease characterized by decreased tertiary villous formation, reduced vasculosyncytial membrane formation, and, in its more severe forms, increased large bullous villi. In some series it has been associated with an increased risk of stillbirth in the late third trimester, but overall there are few data on its significance. Therefore, the delayed maturation of placental villi might be the main etiology for the increased risk of intrauterine death in certain cases. This study aimed at investigate the clinical significance of DVM and its prevalence in normal pregnancies in comparison to pre-gestational diabetes cases.

**Material and Methods:** In this prospective study after obtaining the ethics approval from the Research Council of Mashhad University of Medical Sciences 120 pregnant women who had inclusion criteria participated. Of 120 participants 60 pregnant women with pre-gestational diabetes (case group) and 60 healthy pregnant women (control group)signed constent form. Accordingly, 60 cases in their first gestational trimester and with a normal glucose tolerance test and no other medical condition were selected as controls. The diabetic cases had been fully followed and observed since the diagnosis of pregnancy including lab tests, insulin therapy, and routine blood glucose control. Precise and regular maternal and fetus care was also provided. All subjects experiencing any pregnancy complications were excluded from the study. During delivery the neonates were studied for weight, height, head circumference and any congenital anomalies. The placenta was also examined regarding weight, dimensions, number and shape of umbilical cord vessels, and any abnormal connections or calcification. At the end the placenta, cord and membranes underwent pathological examination, mainly for the maturation of placental villi, by a single experienced pathologist who was blinded to the glycemic status of the patients. The clinical data and microscopic and macroscopic pathologic features were compared between the two groups. Data were analyzed by using SPSS, version 11.5 and Chi Square and T Student tests. P value less than 0.05 was considered significant.

**Results:** Mean age of participants was 28.16 ± 4.70 years. Average weight between neonates in case group was 3815.83 ± 662.84 gram and in control group 3407.33 ± 498.44 gram and differences between two groups was significant (P=0.000), but the mean head circumference of neonates in case group was 35.15 ± 0.36 and in control group 35.11 ± 0.45 centimeter and differences between two group was not statistically significant (P=0.657). Placental diagonal in case group in 5% was less than normal , 70% was normal , 25% was more than normal and in control group in 8% was less than normal, 92% was normal and between two groups difference was significant (P <0.001). Umbilical diameter in case group in 17% was less than normal, 70% was normal, 13% was more than normal and in control group in 7% was less than normal, 93% was normal and between two groups difference was significant (P =0.001). Placental hyaline changes was seen in 72% of case group and 45% in control group and between two groups difference was significant (P =0.003). Placental vascular wall in78% of case group was abnormal and in all of control group was normal and between two groups difference was significant (P <0.001). Placental infarction was seen in 82% of case group and 37% of control group and between two groups difference was significant (P <0.001). Delayed placental maturation was seen in 79% of case group and 25% of control group and between two groups difference was significant (P <0.001). Vascular atherosis was seen 68% in case group and 41% in control group and between two groups difference was significant (P <0.001).Intra villous hemorrhage was seen in 80% of case group and was not seen in any of control group and between two groups difference was significant (P <0.001). Shape of placenta, placental calcification, umbilical artery and villous without any artery had no significant differences between two groups.

**Conclusion:** In this study placental development include placental diagonal , Umbilical diameter , Placental hyaline changes , Placental vascular wall, Placental infarction, Delayed villous maturation,Vascular atherosis and Intra villous hemorrhage had significant differences between Pre gestational diabetic women and normal pregnant women. It is highly recommended that future studies focus on possible clinical or ultrasound markers which may predict those at higher risk of developing placental DVM especially in a high risk-group such as women with PGDM.