Association between the rs4753426 polymorphism in \( MTNR1B \) with fasting plasma glucose level and pancreatic \( \beta \)-cell function in gestational diabetes mellitus

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ABSTRACT. We investigated the association between rs4753426 single nucleotide polymorphisms in the melatonin receptor 1B (\( MTNR1B \)) gene and the risk of developing gestational diabetes mellitus (GDM). A total of 516 gravidas (186 with GDM and 330 non-diabetic controls) were enrolled in the study. Genotype and allele frequencies of rs4753426 in the \( MTNR1B \) gene were detected by DNA sequencing. Fasting plasma glucose and fasting insulin levels were measured to calculate the homeostasis model assessment for insulin resistance (HOMA-IR) and for \( \beta \)-cell function. Three genotypes (CC, CT, and TT) were found in both groups. The frequencies of CC, CT, and TT genotypes for the GDM group were 70.97, 22.58, and 6.45% vs 53.03, 39.70, and 7.27% in the control group, respectively. Significant differences were observed in genotype frequencies between groups (\( P < 0.05 \)). T and C allele frequencies in the GDM group were 17.74 and 82.26%, respectively, and in the control group were 27.12 and 72.88%, respectively. Significant differences in T and C allele frequencies
were found between groups (P < 0.05). In the GDM group, the C allele was associated with increased fasting plasma glucose level and reduced pancreatic β-cell function (P < 0.05). There were no significant differences in total cholesterol, triglyceride, low-density lipoprotein, high-density lipoprotein concentration, or HOMA-IR between groups (P > 0.05). The single nucleotide polymorphism rs4753426 in MTNR1B may be a susceptibility gene locus for GDM, and the C allele may contribute to the increased fasting plasma glucose level and reduced pancreatic β-cell function.

**Key words:** Diabetes mellitus; Genetic susceptibility; Pregnancy; Melatonin receptor; MT2; Single nucleotide polymorphisms