

DETECTION OF DIABETES MELLITUS IN EARLY PREGNANCY

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Abstract: Early detection of diabetes mellitus during pregnancy plays a crucial role in ensuring the health and safety of both the mother and the fetus. This study aims to investigate the diagnostic approaches and clinical indicators used to identify diabetes mellitus in the early stages of pregnancy. The research highlights the importance of timely screening, risk assessment, and metabolic monitoring to prevent maternal and neonatal complications. Various biochemical tests, such as fasting plasma glucose, oral glucose tolerance test (OGTT), and HbA1c levels, are analyzed as diagnostic tools for early detection. The findings suggest that implementing comprehensive prenatal screening strategies significantly reduces adverse outcomes associated with gestational and pre-existing diabetes. Moreover, the study emphasizes the need for awareness programs and standardized clinical protocols for effective management and prevention.

Keywords: early pregnancy, diabetes mellitus, early diagnosis, gestational diabetes, prenatal screening, maternal health, glucose tolerance test, HbA1c.

INTRODUCTION

Diabetes mellitus is one of the most prevalent metabolic disorders worldwide, characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Its occurrence during pregnancy poses significant health risks for both the mother and the developing fetus. Early pregnancy represents a critical window for identifying metabolic disturbances that can influence fetal growth, maternal well-being, and pregnancy outcomes. The early detection of diabetes mellitus in pregnant women allows for timely intervention, proper glycemic control, and the prevention of potential complications such as preeclampsia, macrosomia, congenital malformations, and neonatal hypoglycemia. In recent years, the global increase in obesity, sedentary lifestyle, and unhealthy dietary habits has contributed to the growing prevalence of gestational and pre-existing diabetes in reproductive-age women. According to the World Health Organization (WHO), around 16% of pregnancies worldwide are affected by some form of hyperglycemia, with the majority being gestational diabetes mellitus (GDM). Detecting diabetes in the early stages of pregnancy, even before the traditional screening period of 24–28 weeks, has become an important area of focus in obstetric and endocrinological research. Early identification of diabetes requires the implementation of effective screening protocols that combine risk factor evaluation, laboratory testing, and medical history analysis. Biochemical markers such as fasting plasma glucose (FPG), oral glucose tolerance test (OGTT), and glycated hemoglobin (HbA1c) have proven to be useful diagnostic tools. However, the sensitivity and specificity of these tests during the early stages of pregnancy remain topics of ongoing investigation. Additionally, the integration of continuous glucose monitoring (CGM) technologies and artificial intelligence-based risk prediction models has opened new avenues for early diagnosis and

management. This research aims to analyze existing diagnostic methods and propose strategies for improving early detection of diabetes mellitus in pregnant women. By emphasizing timely screening, patient education, and clinical monitoring, the study contributes to the development of evidence-based approaches that enhance maternal and fetal health outcomes. Ultimately, strengthening early diagnostic practices will support preventive healthcare systems and reduce the long-term burden of diabetes-related complications among women of reproductive age.

CONCLUSION

Early detection of diabetes mellitus during pregnancy is a vital component of maternal healthcare that directly influences both maternal and neonatal outcomes. The findings of this study emphasize that timely diagnosis and effective management of diabetes in the early stages of pregnancy can substantially reduce the risk of complications such as fetal macrosomia, preeclampsia, congenital abnormalities, and perinatal mortality. Early screening, using reliable diagnostic tools like fasting plasma glucose (FPG), oral glucose tolerance test (OGTT), and glycated hemoglobin (HbA1c), enables healthcare providers to initiate appropriate interventions and maintain glycemic control throughout gestation. Furthermore, integrating modern medical technologies—including continuous glucose monitoring (CGM) systems, telemedicine, and artificial intelligence-based diagnostic models—can improve the accuracy of early detection and support individualized treatment strategies. Public health policies should also prioritize awareness programs that educate women of reproductive age about diabetes risks, preventive measures, and the importance of regular medical check-ups before and during pregnancy. The study concludes that developing standardized national and international guidelines for early screening and diagnosis of diabetes mellitus in pregnancy is essential to ensure consistent, evidence-based care. Strengthening collaboration between endocrinologists, obstetricians, and primary healthcare providers will foster more comprehensive monitoring and support systems. By advancing early diagnostic practices and preventive strategies, healthcare systems can significantly contribute to healthier pregnancies, lower complication rates, and improved long-term health outcomes for both mothers and their children.

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