IMPROVING THE MANAGEMENT TACTICS OF GESTATIONAL DIABETES MELLITUS CLINICAL RATIONALE AND CONTEMPORARY EVIDENCE

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Annotation: *This thesis examines evidence-based strategies for optimizing the clinical management of gestational diabetes mellitus, integrating current diagnostic criteria, glycemic target frameworks, pharmacological hierarchy, and postpartum surveillance protocols. Drawing on data from international clinical standards and controlled trials, the study substantiates that individualized, stepwise management - anchored in medical nutrition therapy, structured glucose self-monitoring, and appropriately timed insulin initiation - yields measurable improvements in maternal and neonatal outcomes and meaningfully reduces the risk of long-term metabolic sequelae in both mother and offspring.*

Keywords: *gestational diabetes mellitus, insulin therapy, oral glucose tolerance test, glycemic targets, medical nutrition therapy, macrosomia, postpartum surveillance, hyperglycemia in pregnancy, insulin resistance, perinatal outcomes.*

Today, gestational diabetes mellitus represents one of the most rapidly expanding metabolic complications of pregnancy, affecting approximately 14% of pregnancies globally - a figure that has risen sharply in parallel with the worldwide epidemics of obesity and type 2 diabetes mellitus. Direct economic costs attributable to gestational diabetes mellitus reach 1.6 billion United States

dollars annually in the United States alone, largely driven by complications encompassing hypertensive disorders, preterm delivery, and neonatal metabolic and respiratory consequences. Women diagnosed with gestational diabetes mellitus carry a lifetime risk of developing type 2 diabetes mellitus exceeding 50%, while their offspring face elevated susceptibility to obesity, hypertension, and impaired glucose regulation in childhood and early adulthood. Against this backdrop, the optimization of management tactics - spanning screening, glycemic control, pharmacological selection, and postpartum monitoring - constitutes a clinical and public health imperative of the first order.

The pathophysiological foundation of gestational diabetes mellitus lies in the progressive insulin resistance induced by placental hormones - principally human placental lactogen, progesterone, cortisol, and tumor necrosis factor alpha - which escalates across the second and third trimesters. In women whose pancreatic beta-cell reserve is insufficient to compensate for this physiological insulin resistance, relative insulin deficiency produces maternal hyperglycemia with well-characterized consequences for the fetoplacental unit. Neonates of women with gestational diabetes mellitus exhibited significantly higher birth weights (mean 3,689 grams versus 3,143 grams in controls), with increased incidence of neonatal hypoglycemia in 17% of cases compared with 4.2% of controls, and neonatal intensive care unit admissions occurring in 20.2% of gestational diabetes mellitus cases versus 5.3% of controls. These perinatal outcome differentials underscore why adequate glycemic management throughout gestation is not merely a metabolic objective but a direct determinant of neonatal safety. Screening and diagnostic accuracy constitute the first determinant of management quality. The one-step approach using a 75-gram, two-hour oral glucose tolerance test at 24 to 28 weeks of gestation, as recommended by the International Association of

Diabetes and Pregnancy Study Groups and endorsed by the World Health Organization, provides superior sensitivity compared with the sequential two-step screening method, particularly for identifying cases of early gestational diabetes mellitus. Between 30% and 70% of gestational diabetes mellitus is diagnosed in early pregnancy - defined as hyperglycemia before 20 weeks of gestation - and early gestational diabetes mellitus is associated with worse pregnancy outcomes compared with late-diagnosed cases, underscoring the clinical importance of first-trimester glucose assessment in high-risk women.

Once diagnosis is established, the foundational intervention is medical nutrition therapy, which consists of individualized dietary modification targeting carbohydrate distribution, total caloric adequacy relative to gestational body mass index, and avoidance of rapidly absorbed glycemic loads. Structured physical activity of moderate intensity complements nutritional management by enhancing peripheral glucose uptake through insulin-independent mechanisms. Lifestyle behavior change is an essential component of management of gestational diabetes mellitus and may suffice as treatment for many individuals, with insulin to be added only when glycemic goals cannot be achieved through lifestyle modification alone. Glycemic targets endorsed by the American Diabetes Association for gestational diabetes mellitus include fasting plasma glucose below 5.3 millimoles per liter, one-hour postprandial glucose below 7.8 millimoles per liter, and two-hour postprandial glucose below 6.7 millimoles per liter - targets that, when consistently achieved, are associated with normalization of large-for-gestational-age birth weight risk.

Optimizing gestational diabetes mellitus management requires integration of early screening, individualized glycemic targets, insulin-first pharmacological protocols, and structured postpartum metabolic surveillance. Future work should validate region-specific management algorithms for

resource-limited clinical settings, addressing both diagnostic accessibility and long-term maternal and offspring follow-up.

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