

Preface

Gestational diabetes (GDM), or glucose intolerance first identified during pregnancy, is a disease of our times. While diabetes as a disease has been recognized for thousands of years, GDM is a relatively new condition that has been identified as recently as the nineteenth century. Recognition of the full impact of GDM is only possible because of the declines in maternal and child mortality, increases in obesity and chronic disease, and increased delivery of prenatal care, GDM screening, and infertility services that are unique to modern society.

One of the reasons that GDM fascinates us is that it represents the intersection of both the mother's and her child's health trajectory, and the management of it can affect not only perinatal health but also the development of disease even decades into the future. Our understanding of these relationships has grown over the past several decades, fed by progress made in other areas of diabetes research, particularly genetics, diabetes prevention in high-risk populations, and inflammatory biomarkers.

This book is our attempt to summarize the exciting developments in our understanding of this unique entity. Our book begins with an overview by Dr. Jack Kitzmiller, who guides us through the changing face of GDM over the past several decades. His chapter delves into the randomized trials published over the past several years and the diagnostic strategies advocated as recently as 2009. This overview is followed by a detailed description of the landmark Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study, unique in its size and international setting. The current state of GDM screening worldwide is summarized by Dr. Agarwal, who provides a comprehensive overview of the several coexisting guidelines.

The next section discusses the current burden that GDM poses and the reasons why we expect that GDM will affect ever larger portions of the population. Dr. Lawrence discusses the prevalence of GDM and its overlap with diabetes which preceded pregnancy. Dr. Zhang gives a detailed summary of risk factors for GDM, informed by her extensive work in cohort studies, most notably the Nurses' Health Study. Importantly, GDM is not a "western" condition but has increasing importance for rapidly industrializing countries. Drs. Yang and Shou discuss how GDM has increased in China, a matter of particular concern considering the million-plus births which occur in China annually.

Our understanding of the genetics and pathophysiology of GDM has grown rapidly over the past decade. The role of the placenta, a powerful but still poorly understood endocrine organ, is discussed by Drs. Desoye and Hiden in their chapter. Drs. Buchanan and

Xiang review their key insulin clamp studies in GDM women, which furthered our understanding of the overlap between GDM and type 2 diabetes. Drs. McCurdy and Friedman discuss their work on insulin resistance during GDM, particularly in skeletal muscles. Drs. Knopp and colleagues review their lipid work and also introduce several exciting new findings regarding the evolution of lipids during pregnancy. The coexistence of hypertensive disorders of pregnancy and carbohydrate intolerance of pregnancy has long been recognized and is summarized by Drs. Sibai and Habli in the following chapter.

As the number of women with GDM increases, so do perinatal comorbidities. Dr. Nicholson reviews obesity during pregnancy and its impact on perinatal complications, particularly for the GDM pregnancy. Her chapter is followed by a detailed discussion of the other obstetrical complications that accompany GDM by Drs. Kjos and Guberman. Dr. Dabelea reviews how GDM can have longer-term complications through “imprinting” in the intrauterine environment, exemplifying how GDM continues to affect child health even years after delivery.

Thus, we have set the stage for current management options of GDM, both during and after pregnancy. Drs. Artal, Zavorsky, and Catanzaro discuss current exercise recommendations and studies illustrating the strength of evidence behind physical activity limitations during pregnancy. Drs. King and Sacks extend this to a valuable review of the myriad recommendations regarding nutrition and weight management during the GDM pregnancy. This section on management is accompanied by Dr. Langer’s chapter on pharmacologic treatment options, both regarding oral medications and insulin.

GDM was first defined by O’Sullivan and Mahan by maternal diabetes risk, and Dr. Kim discusses this risk and other factors contributing this risk in the next chapter. Dr. Hedderson reviews the interaction between hormonal and non-hormonal family planning with GDM in the following chapter. Dr. Gunderson discusses the fascinating literature regarding breast-feeding, a behavior that affects chronic disease risk decades into the future, even when engaged in over only several months.

Interventions to prevent GDM and to target GDM for future diabetes prevention are few. Dr. Chasan-Taber reviews her own work on GDM prevention during pregnancy, followed by Dr. Ferrara and Dr. Ehrlich, who review intervention science for diabetes prevention in GDM women.

Our book concludes with a discussion of where key medical organizations stand on management of GDM. The lack of uniformity across organizations leaves room for improvement. Consensus would aid in a more effective plan to address the many health implications raised by GDM and the multiple areas for future research raised in these chapters.

There are several obvious problems caused by the lack of uniform GDM definitions, tracking, and management recommendations. Given the extensive overlap between GDM and diabetes, the advances in diabetes pathophysiology, epidemiology, and healthcare delivery could serve as a template for further development of GDM infrastructure. In the United States, the fragmentation of health care and its accompanying variation in GDM screening strategies hamper the compilation of a large cohort of GDM women. Globally, this fragmentation is accompanied by variation between countries. In turn, this has hampered genetic studies, which require larger numbers particularly for genome-wide association work. National tracking systems or registries are currently limited regarding their

sensitivity and specificity for GDM, and more work should be done to refine these tools. It has also limited our understanding of how future diabetes develops in these women and their children. Cohort studies which acknowledge the onset of time between GDM development and future disease are difficult, but could be modeled on prospective cohort studies that have examined cardiovascular risk. Such studies would need to follow children as well as mothers.

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