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Perspectives in Practice

Gestational Diabetes Mellitus Identification Based on Self-Monitoring of Blood Glucose

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ABSTRACT

In Sherbrooke, the gestational diabetes mellitus (GDM) Regional Committee proposed GDM screening during the first trimester for all pregnant women based on a 50 g glucose challenge test (50 g GCT) followed directly by capillary self-monitoring blood glucose (SMBG) at home. We evaluated implementation of committee's recommendations on the clinical trajectory of women receiving prenatal care at our institution. We analyzed data collected systematically by the Blood Sampling in Pregnancy clinic from 2008 to 2011. We evaluated the clinical trajectory of 7710 pregnant women to assess GDM screening/diagnoses and referral rates to the diabetes care centre (DCC) for education and treatment during both the first and second trimesters. The Canadian Diabetes Association glycemic treatment targets in women with GDM were used as diagnosis thresholds and DCC referral decisions: Fasting glucose of 5.3 mmol/L and postprandial 2 h glucose of 6.7 mmol/L. We found that pregnant women were 28.0±4.8 years old, and their body mass indexes were 24.5±5.5 kg/m^2. During the first trimester, 47% of women were screened for GDM, mostly (84%) using the 50 g GCT. Following SMBG, 5.7% were referred to the DCC. Only 32% of women with early GDM had >1 GDM risk factor. Thereafter, 67% of normoglycemic women screened during the first trimester were screened again during the second trimester. Among women screened during the second trimester, most screening was done using 50 g GCT, and 8.8% were referred to the DCC following SMBG. Implementation of 50 g GCT testing followed by direct home SMBG was well implemented in our area. The importance of early GDM screening and rescreening during the second trimester still needs to be emphasized.

Mots clés :
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RÉSUMÉ

À Sherbrooke, le Comité régional sur le diabète gestationnel (DG) a proposé d'effectuer le dépistage du DG chez toutes les femmes enceintes au cours de leur premier trimestre au moyen de l'épreuve d'hyperglycémie provoquée par voie orale de 50 g (HGPO 50 g) de glucose suivie directement de l'autosurveillance de la glycémie capillaire (ASGC) à domicile. Nous avons évalué la mise en œuvre des recommandations du comité sur la trajectoire clinique des femmes recevant des soins prénatals à notre établissement. Nous avons analysé les données recueillies systématiquement de 2008 à 2011par la Clinique de prélèvements pendant la grossesse. Nous avons suivi la trajectoire clinique de 7710 femmes enceintes pour évaluer le dépistage et les diagnostics du DG ainsi que les taux d'aiguillage vers le centre de soins aux diabétiques (CSD) en vue d'offrir l'éducation et le traitement au cours du premier et du deuxième trimestre. Les cibles thérapeutiques de la glycémie établies par l'Association canadienne de

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diabète pour les femmes souffrant du DG ont été utilisées comme seuils diagnostiques et comme outil de prise de décision pour l'aiguillage vers le CSD : glycémie à jeun de 5,3 mmol/l et glycémie de 6,7 mmol/l, 2 heures après un repas. Nous avons constaté que les femmes enceintes étaient âgées de 28,0 ± 4,8 ans et qu'elles avaient un indice de masse corporelle de 24,5 ± 5,5 kg/m^2. Au cours du premier trimestre, 47 % des femmes ont été soumises à un dépistage du DG, la plupart (84 %) l'ont été au moyen de l'épreuve d'HGPO 50 g. À la suite de l'ASGC, 5,7 % des femmes ont été orientées vers le CSD. Seulement 32 % des femmes souffrant d'un DG précoce avaient >1 facteur de risque de DG. Par la suite, 67 % des femmes normoglycémiques soumises à un dépistage au cours du premier trimestre l'ont été de nouveau au cours du deuxième trimestre. Parmi les femmes soumises à un dépistage au cours du deuxième trimestre, la plupart l'ont été au moyen de l'épreuve HGPO 50 g, et 8,8 % ont été orientées vers le CSD à la suite de l'ASGC. La mise en œuvre de l'épreuve d'HGPO 50 g suivie directement de l'ASGC à domicile a bien été appliquée dans notre région. Il convient encore de souligner l'importance du dépistage précoce du DG suivi d'un dépistage au cours du deuxième trimestre.

Introduction

Gestational diabetes mellitus (GDM) is a metabolic condition associated with short- and long-term complications for both the mother and the offspring (1), including higher risk for obesity and diabetes later in life (2). Adequate screening for and treatment of GDM prevent complications (3,4). The Canadian Diabetes Association (CDA) recommends universal screening for GDM during the second trimester, whereas women with more than 1 risk factor for GDM should be screened as early as possible during pregnancy (5,6). Other clinical associations have promoted differing recommendations, leading to long-standing uncertainties and debates in obstetric practices.

In Sherbrooke, a group of experts, including primary care physicians, nurses, obstetricians, fetal-maternal health specialists, dietitians and endocrinologist (see list at the end of the article), have formed a GDM Regional Committee to agree on and disseminate original clinical guidelines. The committee recommended that pregnant women who screen positive (1 h glucose ≥7.2 mmol/L, cut-off selected based on American Diabetes Association [ADA] guidelines to increase sensitivity [7]) on a 50 g glucose challenge test) (50 g GCT) are asked to perform self-monitoring blood glucose (SMBG) tests at home 4 times per day for a week, and they are instructed to not modify their usual diets and physical activity levels. If more than 50% of the values are above the CDA clinical glycemic thresholds (either fasting ≥5.3 mmol/L or postprandial 2 h glucose ≥6.7 mmol/L), women are identified as having GDM and are then referred to the diabetes care centre (DCC) for specific GDM education and treatment, including physical activity and nutrition counselling. After 2 weeks of continuing SMBG under lifestyle therapy, women are seen by an endocrinologist to achieve optimal glycemic control by continuing their lifestyles and making decisions about additional pharmacologic treatment, when indicated (insulin being the most commonly used).

The rationale of the committee was that women should be treated based on the real-life glycemic daily profiles, which should be used for reference and comparison, and that they should avoid the 75 g oral glucose tolerance test (75 g OGTT) that many find cumbersome. Another strong message from the committee was to promote GDM screening during the first trimester for all pregnant women, given that hyperglycemia from the start of pregnancy is associated with higher risk for obstetric and neonatal complications. This recommendation was based on the fact that an increasing number of women are at risk for unknown glucose intolerance or diabetes existing prior to pregnancy because women of reproductive age are pregnant at older ages and commonly show excess weight. Recommendations for using SMBG for identification of GDM and the emphasis on screening early in pregnancy were based on the consensus of the experts involved in the regional committee, mainly clinicians plus a few clinical researchers. The summary of our clinical recommendations for GDM screening is presented in Figure 1.

Since July 2007, the new methods of GDM screening, diagnosis and follow up have been made possible with the support of the Blood Sampling in Pregnancy (BSP) clinic located in the Centre Hospitalier Universitaire de Sherbrooke (CHUS), which was created and is supported by a combination of research, institutional and industry funding. The BSP clinic offers clinical services devoted to pregnant women; staff were trained to teach and interpret SMBG and specialized in pregnancy-related clinical care. The BSP clinic personnel, in partnership with endocrinologists, also ensured close follow up for glycemic control and adequate management of women with GDM.

We evaluated the impacts of the implementation of the GDM committee's recommendations and the creation of the BSP clinic on the clinical trajectories of pregnant women receiving prenatal care at the CHUS for GDM screening, identification and treatment. These analyses may inform the Canadian medical community and public health decision makers about GDM screening and management.

Methods

This is a descriptive study based on the BSP clinical database over the period between January 2008 and December 2011. The BSP staff prospectively and systematically collected information about demographic characteristics and relevant personal medical histories using standardized forms with intent of quality-of-care evaluation of our services and potential resources for clinical research purposes. Approximately 90% of the pregnant women of the Eastern Townships come to the BSP clinic, which is located within the clinical research centre of the CHUS. The CHUS is the fourth largest hospital in the province of Quebec and the only place where women deliver in our area, independent of whether they are followed by family medicine physicians or obstetricians. The clinical database included all women presenting to the BSP clinic, where the staff collected maternal ages, pregestational (self-reported) weights and heights, ethnic backgrounds, personal histories of risk factors for GDM and family histories of diabetes. Prepregnancy body mass index was calculated (weight in kg/height in m^2). We also recorded the results of the tests performed for GDM screening and/or diagnostic reasons, including the 50 g GCT and/or the standard 75 g OGTT, as well as the post 50 GCT SMBG diagnostic status and follow up, and the referrals to the DCC for education, counselling and treatment. The study protocol was reviewed and accepted by the Comité d'éthique de la recherche en santé chez l'humain du CHUS.

Statistical analyses

We first evaluated all women screened during their first trimesters (defined as <14 weeks of gestation); we estimated the proportion screened and the test used for screening. Among women who showed positive screenings during their first