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A model for diabetes prediction five years after gestational diabetes Ignell C, Anderberg E, Ekelund M, Berntorp K Department of Clinical Sciences, Malmö, Lund University, Sweden UNIVERSITY

Conclusions

- BMI is an important and modifiable risk factor of diabetes after gestational diabetes (GDM).
- The prediction model rendered 86 % correct classifications of diabetes 5 years after GDM.
- As a concept to be used in counselling, a function sheet with a line diagram is proposed to illustrate the effects of weight on individual diabetes risk after GDM (Figure 2).

Introduction

Gestational diabetes mellitus (GDM) is a major risk factor for subsequent diabetes. A five-year follow up after GDM was performed to elucidate factors associated with diabetes and to explore the possibility of constructing a model for diabetes prediction postpartum.

Subjects and Methods

Five years after GDM a 75-g oral glucose tolerance test (OGTT) was performed in 362 women, excluding women already diagnosed with diabetes at a 1–2 year follow-up visit or later (*n*=45). All but 21 women had results from follow-up at 1–2 years, while 84 women were lost from that point. WHO criteria from 1999 were used.

Results of univariate regression analysis of women with NGT at 1–2 and 5-years vs women diagnosed with diabetes at 1–2 year follow-up or later.

Table 1

| | R ² | OR (95% CI) | p |
|--|----------------|-------------------|---------|
| Non-European ethnicity (y/n) | 0.21 | 7.09 (3.52-14.46) | <10-7 |
| First grade DM heredity (y/n) | 0.09 | 3.14 (1.69-5.84) | < 0.001 |
| Age at delivery (years) | 0.06 | 1.10 (1.03-1.17) | 0.005 |
| Pregnancy | | | |
| Glucose (mmol/L), OGTT 2-h | 0.16 | 1.91 (1.41-2.58) | <10-4 |
| Diagnosis early gestation (y/n) | 0.10 | 5.24 (2.10-13.10) | < 0.001 |
| Insulin treatment (y/n) | 0.15 | 8.25 (3.30-20.64) | <10-5 |
| 1-2 years after pregnancy | | | |
| Deliveries >3 (y/n) | 0.06 | 5.08 (1.69-15.29) | 0.004 |
| BMI (kg/m2) | 0.40 | 1.28 (1.19-1.37) | <10-10 |
| CI, confidence interval; NGT, normal glucose tolerance; OR, odds ratio, R ² , pseudo R-square by Nagelkerke | | | |

Figure 1

Results

Five years after GDM, 28/362 (8%) women were diagnosed with diabetes and 187/362 (52 %) had normal glucose tolerance (NGT). Among the latter, 139/187 (74 %) also had NGT at 1–2 year follow-up.

In univariate regression analysis, using NGT at 1–2 and 5 years as the reference, diabetes at 1–2 year follow-up or later (*n*=73) was clearly associated with easily assessable clinical variables, such as BMI at 1–2 year follow-up, OGTT 2-h glucose concentration during pregnancy and non-European ethnicity (p<10⁻⁴), see Table 1.

ROC curve of the prediction model of diabetes 5 years after GDM.

Area under the curve was 0.91 (95 % confidence interval 0.86–0.95).

A calculated optimal cut-off of 36.4 % yielded a sensitivity of 82.1 % and a specificity of 88.0 % in this population.



Figure 2

Individually predicted risk of diabetes 5 years after GDM versus weight of a European woman with a height of 1.75 meters, a OGTT 2-h plasma glucose concentration of 10 mmol/L in pregnancy, and a weight of 90 kg resulting in: 60 % risk of diabetes with a constant weight, declining to a 24 % risk with a weight loss of 20 kg.

A prediction model based on these variables resulted in 86 % correct classifications. The ROC curve with results are given in Figure 1.





To confirm understanding and enforce active engagement, an appeal of interaction with the diagram was added (brown).

Your weight versus predicted risk of diabetes

Circle your current weight and draw an arrow to your desired weight. Put a cross each month to logg your progress towards your goal.

