Development of an online risk calculator to predict durability of good glycaemic control with sulfonylurea and thiazolidinedione therapy: a MASTERMIND stratified medicine study

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Aim: Personalised medicine aims to target patients with the most effective treatment based on their characteristics. Sulfonylureas (SU) and thiazolidinediones (TZD) are second-line Type 2 diabetes therapies, but there is little guidance as to which therapy is best for which individuals. We aimed to develop a risk calculator to predict durability of good glycaemic control for these therapies based on simple clinical characteristics.

Methods: We developed survival models using data from the RECORD trial (n = 1,079 randomised to SU, n = 1,096 TZD). Failure of good control was defined as two consecutive HbA1cs > 7.5%. Models were replicated in routine clinical data (Clinical Practice Research Datalink (CPRD), n = 23,490).

Results: With SU, males maintained good glycaemic control for longer compared to females (p = 0.001). With TZD, female sex (p < 0.001) and higher baseline body mass index (BMI) (p = 0.04) were associated with extended glycaemic control. For both therapies lower baseline HbA1c (p < 0.001), older age (p < 0.001) and longer diabetes duration (p < 0.01) were associated with good glycaemic control for longer but to different degrees. Results were similar in CPRD.

Findings translated into clinically significant differences between therapies: For a female age 65 years with diabetes duration three years, baseline HbA1c 8%, BMI 35kg/m^2, predicted time with good control is 1.1 years greater with TZD over SU (3.9 years (95% CI 3.7–4.1) vs 2.8 years (95% CI 2.5–3.1), p < 0.001).

Conclusions: A simple risk calculator can predict durability of good glycaemic control with SU and TZD therapy. Extending this to include other drug effects and

newer medications could help clinicians apply a comprehensive personalised approach to Type 2 diabetes therapy for individual patients.