Translation of Personalized Decision Support into Routine Diabetes Care

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Abstract

Objective:

The aim of this study was to evaluate the impact of personalized decision support (PDS) on metabolic control in people with diabetes and cardiovascular disease.

Research Design and Methods:

The German health insurance fund BKK TAUNUS offers to its insured people with diabetes and cardiovascular disease the possibility to participate in the Diabetiva® program, which includes PDS. Personalized decision support is generated by the expert system KADIS® using self-control data and continuous glucose monitoring (CGM) as its data source. The physician of the participating person receives the PDS once a year, decides about use or nonuse, and reports his/her decision in a questionnaire. Metabolic control of participants treated by use or nonuse of PDS for one year and receiving CGM twice was analyzed in a retrospective observational study. The primary outcome was hemoglobin A1c (HbA1c); secondary outcomes were mean sensor glucose (MSG), glucose variability, and hypoglycemia.

Results:

A total of 323 subjects received CGM twice, 289 had complete data sets, 97% (280/289) were type 2 diabetes patients, and 74% (214/289) were treated using PDS, resulting in a decrease in HbA1c [7.10 ± 1.06 to $6.73 \pm 0.82\%$; $p < .01$; change in $HbA1c_{t0-t12\ months}$ -0.37 (95% confidence interval -0.46 to -0.28)] and MSG (7.7 ± 1.6 versus 7.4 ± 1.2 mmol/liter; $p = .003$) within one year. Glucose variability was also reduced, as indicated by lower high blood glucose index ($p = .001$), Glycemic Risk Assessment Diabetes Equation ($p = .009$), and time of hyperglycemia ($p = .003$). Low blood glucose index and time spent in hypoglycemia were not affected. In contrast, nonuse of PDS (75/289) resulted in increased HbA1c ($p < .001$). Diabetiva outcome was strongly related to baseline HbA1c ($HbA1c_{t0}$; $p < .01$) and use of PDS ($p < .01$). Acceptance of PDS was dependent on $HbA1c_{t0}$ ($p = .049$).

Conclusions:

Personalized decision support has potential to improve metabolic outcome in routine diabetes care.

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