Design of a Decision Support System to Help Clinicians Manage Glycemia in Patients with Type 2 Diabetes Mellitus

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Abstract

Objective:

We sought to develop a computerized clinical decision support for clinicians treating patients with type 2 diabetes mellitus (T2DM).

Methods:

We designed, developed, and tested a computer-assisted decision support (CADS) system using statistical analyses of self-monitoring of blood glucose data, laboratory data, medical and medication history, and individualized hemoglobin A1c goals. A rule-based expert system generated recommendations for changes in therapy and accompanying explanations.

Results:

A clinical decision support system (CADS) was developed that considers 9 classes of medications and 69 regimens with combinations of up to 4 therapeutic agents. The preferred sequences of regimens can be customized. The program is integrated with a "comprehensive diabetes management system," electronic medical record systems, and a method for uploading data from memory glucose meters via telephone without use of a computer or the Internet. The software provides a report to the clinician regarding the overall quality of glycemic control and identifies problems, e.g., hypoglycemia, hyperglycemia, glycemic variability, and insufficient data. The program can recommend continuation of current therapy, adjustment of dosages of current medications, or change of regimen and can provide explanations for its recommendations. If the user rejects the recommendations, the program will recommend alternative approaches. The CADS also provides access to Food and Drug Administration-approved prescribing information, guidelines from professional organizations, and selections from the general medical literature. The system has been extensively tested with real and synthetic data and is ready for evaluation in multicenter clinical trials.

Conclusion:

A clinical decision support system to assist with the management of patients with T2DM was designed, developed, tested, and found to perform well.

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