

A Review of Current Evidence with Continuous Glucose Monitoring in Patients with Diabetes

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Abstract

Devices that measure glucose on a near-continuous basis may provide a better insight into glycemic profiles, allowing patients with diabetes to make therapeutic adjustments to improve metabolic control, thereby reducing the risk of diabetic complications. Motivated and technologically adept patients with brittle diabetes, hypoglycemia unawareness, diabetic pregnancy, or who use pumps might benefit.

Current evidence of continuous glucose monitoring (CGM) on health outcome in patients with diabetes is critically reviewed. No data are available on chronic complications or mortality. Therefore, surrogate endpoints need to be investigated, particularly HbA1c, number of hypo- and hyperglycemic episodes, time within normal, high, or low glucose concentrations, glycemic variability, and quality of life.

Randomized controlled trials (RCTs) using CGM in a retrospective way did not show metabolic improvement. In contrast, most RCTs applying real-time CGM showed a decrease in HbA1c, reduced glycemic variability, and a diminished number and length of hypo- and hyperglycemic events. Using accurate, real-time CGM devices improves quality of life by reducing the fear of unexpected hypoglycemic events. These beneficial effects were observed despite the fact that in most studies no clear treatment algorithm based on CGM results was provided to the patients. However, most trials were too short in duration, with a variable use of CGM, and were performed in small study samples.

In conclusion, real-time CGM systems can improve metabolic control, reduce hypoglycemic episodes, and improve quality of life. Whether this holds true for longer time periods and in the majority of patients remains to be proven. In the long term, CGM might help to reduce chronic diabetes complications and perhaps also mortality, thereby reducing health care costs.

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Abbreviations: (CGM) continuous glucose monitoring, (GW2B) GlucoWatch G2 Biographer, (ICU) intensive care unit, (RCT) randomized controlled trial, (RT) real time, (SMBG) self-monitoring of blood glucose, (STS) short-term system

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