EE228

Complications of Diabetes and the Cost Effectiveness of Continuous Glucose Monitoring in Patients with Type 1 Diabetes

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Background

Type 1 diabetes mellitus (T1DM) is a chronic condition that can cause significant complications. Although exogenous insulin is available to manage T1DM, many patients struggle to maintain proper blood sugar levels, which can result in hypoglycemia or ketoacidosis. Continuous glucose monitoring (CGM) technology has transformed T1DM management by providing instant glucose readings. These readings are wirelessly transmitted to a receiver or smartphone, which enables more effective diabetes management and better control of blood sugar levels.

Objective

Our objective was to determine the cost-effectiveness of real-time continuous glucose monitoring (RT-CGM) compared to non-continuous or self-monitoring (NCGM) in patients with T1DM in the United States

Methods

Using data from recently published randomized controlled trials and meta-analyses, we populated a decision analysis tree considering RT-CGM and N-CGM with three main outcomes: controlled glycemic status, hyperglycemia, and hypoglycemia.

The data used to populate the tree included the following: probability of each outcome, costs associated with the utilization of each technology, costs of outcomes including complications, and costs of typical treatment of T1DM.

All analyses were conducted using Microsoft Excel.

Results

Figure 1. Decision analysis tree considering RT-CGM and N-CGM and the probability of three main outcomes: normoglycemia, hypoglycemia and hyperglycemia.

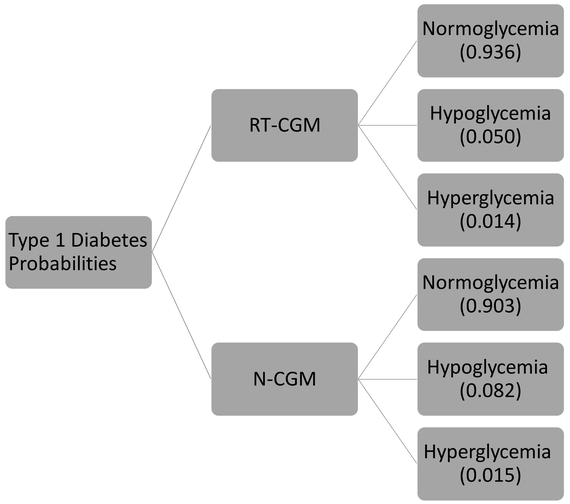


Figure 2. Incremental Cost-Effectiveness Plane RT-CGM versus N-CGM

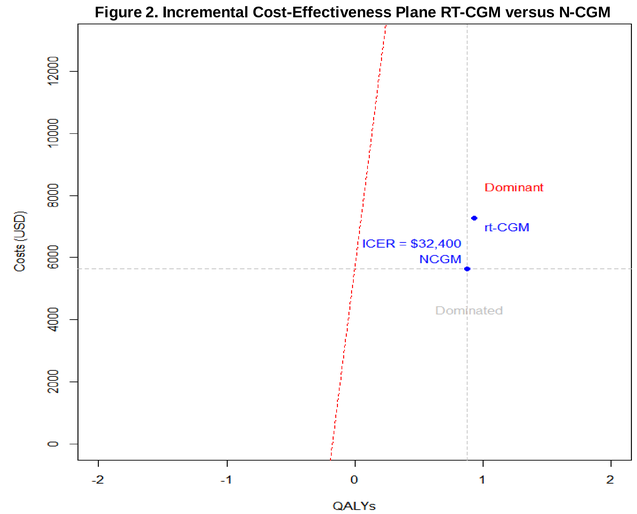
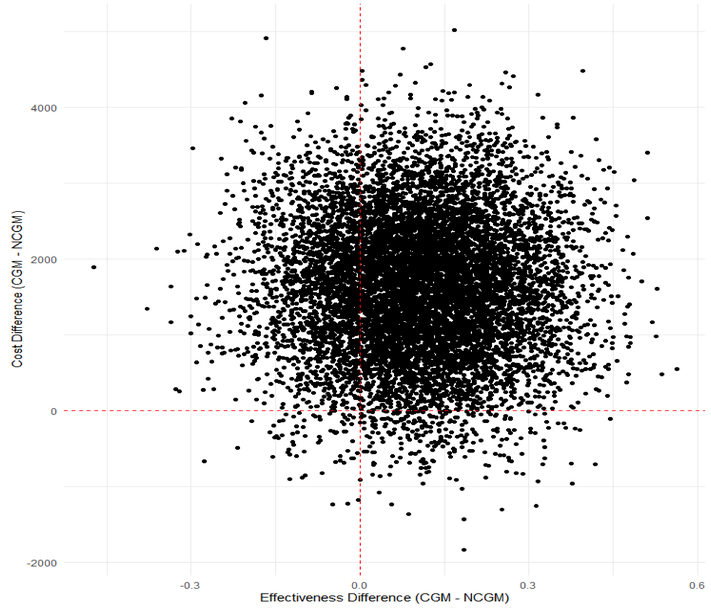


Table 1. Cost Effectiveness Results for RT-CGM vs N-CGM

Outcomes	RT-CGM	N-CGM	Difference
Quality Adjusted life years (QALY)	0.93 (CI: 0.90-0.96)	0.88 (CI:0.85-0.91)	0.05
Total Costs (USD)	$7,265 (CI: $7,047-$7,483)	$5,645 (CI: $5,476-$5,815)	$1,620
ICER			$32,396/QALY

Figure 3. Incremental Cost Effectiveness Scatter Plot of RT-CGM and N-CGM.



Conclusion

RT-CGM can be considered a high value technology compared to NCGM because it improved glucose control and reduced the occurrence of hypoglycemia. Considering a willingness-to-pay threshold of $50,000/QALY, RT-CGM is cost-effective for the control of T1DM

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