

FreeStyle Mini™ Blood Glucose Results Are Accurate and Suitable for Use in Glycemic Clamp Protocols

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Abstract

Objective:

We assessed the accuracy of the FreeStyle Mini™ (FSM) meter for use in glycemic clamp and meal protocols in comparison with the HemoCue Glucose 201 DM Analyzer (HemoCue) and the YSI 2300 STAT Glucose Oxidase Analyzer (YSI).

Methods:

Seven volunteers with type 2 diabetes mellitus, 35–69 years old, underwent a frequently sampled meal test and a graded hyperglycemic test, on two separate days, with one of the volunteers undergoing each test twice. Samples for glucose measurements were obtained from arterialized venous blood. A total of 420 samples (with glucose levels ranging from 63 to 388 mg/dl) were available for comparison. On average, 10 measurements were available for every 5 mg/dl increment in glucose level in the range of 130–310 mg/dl. Blood glucose measurements were done on each sample with the FSM, HemoCue, and YSI.

Results:

FreeStyle Mini blood glucose values correlated closely with the YSI readings. Of the FSM measurements, 99.0% were within the Clarke error grid zone A; 51.3%, 84.7%, and 96.2% of the FSM readings were within 5%, 10% and 15% of the YSI values, respectively. The FSM was significantly more accurate than the HemoCue (84.7% vs 76.6% of results within 10% of the YSI results; $p = .0038$). The mean average relative difference of the FSM (5.8%) was also significantly lower than that of the HemoCue (6.8%; $p = .0013$).

Conclusions:

The FSM provides accurate results and constitutes a suitable alternative for bedside blood glucose measurements in experimental procedures, helping to reduce sample size, turnaround time, and cost.

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Abbreviations: (FSM) FreeStyle Mini™, (HemoCue) HemoCue Glucose 201 DM Analyzer, (ISO) International Organization for Standardization, (MAD) mean absolute difference, (MARD) mean average relative difference, (SD) standard deviation, (T2DM) type 2 diabetes mellitus, (YSI) Yellow Springs Instruments 2300 STAT Glucose Oxidase Analyzer

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