

Accuracy and Reliability of the Nova StatStrip® Glucose Meter for Real-Time Blood Glucose Determinations during Glucose Clamp Studies

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Abstract

Aims/Hypothesis:

The Andres clamp technique, which requires accurate and timely determination of glucose, utilizes the Beckman or Yellow Springs Instruments (YSI) glucose analyzers. Both instruments require maintenance, a dedicated operator, preparation of a plasma sample, and a duplicate measurement that takes ≥ 2 minutes. The Nova StatStrip glucose meter was evaluated for accuracy, reliability, and near-real-time availability of glucose.

Methods:

Blood samples from 24 patients who underwent 6-hour clamp studies and 12 patients who had a standardized meal tolerance test (SMT) were measured. Specimens were analyzed simultaneously and immediately upon collection by Beckman, YSI, and Nova.

Results:

Of 1004 data pairs for the Nova device versus Beckman, the Nova data points ranged from 32 to 444, while Beckman ranged from 42 to 412. The coefficient for the slope of Beckman versus Nova was 1.009 ($r = 0.978$). Using error grid analysis, the number and percentage of values for Nova were 976 (97.2%) in the A zone and 28 (2.8%) in the B zone. Of 399 data pairs for the Nova device versus YSI, the Nova data points ranged from 46 to 255, whereas YSI ranged from 47 to 231. The coefficient for the slope of YSI versus Nova was 1.023 ($r = 0.989$). All Nova readings fell in the A zone. Time required for final reading, in duplicate, was 15 seconds for Nova and 120–180 seconds for Beckman and YSI.

Conclusions:

The simplicity of Nova and its reliability, accuracy, and speed make it an acceptable replacement device for Beckman and YSI in the conduct of clamps, especially when perturbations require rapid glucose determination.

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Abbreviations: (EGA) error grid analysis, (PG) plasma glucose, (SMT) standardized meal tolerance test, (YSI) Yellow Springs Instruments

Keywords: Beckman, glucose clamp, glucose meter, plasma glucose, YSI

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