

## Intraoperative Accuracy of a Point-of-Care Glucose Meter Compared with Simultaneous Central Laboratory Measurements

Boris Mraovic, M.D., Eric S. Schwenk, M.D., and Richard H. Epstein, M.D., C.P.H.I.M.S.

### Abstract

#### **Background:**

Concerns have been raised about the use of point-of-care (POC) glucose meters in the hospital setting. Accuracy has been questioned especially in critically ill patients. Although commonly used in intensive care units and operating rooms, POC meters were not approved by the Food and Drug Administration for such use. Data on POC glucose meter performance during anesthesia are lacking. We evaluated accuracy of a POC meter in the intraoperative setting.

#### **Methods:**

We retrospectively reviewed 4,333 intraoperative records in which at least one intraoperative glucose was measured using electronic medical records at a large academic hospital. We evaluated the accuracy of a POC glucose meter (ACCU-CHEK® Inform, Roche Pharmaceuticals) based on the 176 simultaneous central laboratory (CL) blood glucose (BG) measurements that were found (i.e., documented collection times within 5 minutes). Point-of-care and central lab BG differences were analyzed by Bland-Altman and revised error grid analysis (rEGA).

#### **Results:**

Mean POC BG was  $163.4 \pm 64.7$  mg/dl [minimum (min) 48 mg/dl, maximum (max) 537 mg/dl] and mean CL BG was  $162.6 \pm 65.1$  mg/dl (min 44 mg/dl, max 502 mg/dl). Mean absolute difference between POC and CL BG was 24.3 mg/dl. Mean absolute relative difference was 16.5% with standard deviation 26.4%. Point-of-care measurements showed a bias of 0.8 relative to the corresponding CL value, with a precision of 39.0 mg/dl. Forty (23%) POC BG values fell outside the Clinical and Laboratory Standards Institute guideline and 3.4% POC measurements fell in zones C and D of the rEGA plot.

#### **Conclusions:**

The tested POC glucose meter performed poorly compared to a CL analyzer intraoperatively. Perioperative clinicians should be aware of limitations of specific POC glucose meters, and routine use of POC glucose meters as sole measurement devices in the intraoperative period should be carefully considered.

*J Diabetes Sci Technol* 2012;6(3):541-546

**Author Affiliation:** Department of Anesthesiology, Jefferson Medical College, Thomas Jefferson University, Philadelphia, Pennsylvania

**Abbreviations:** (AIMS) anesthesia information management system, (BG) blood glucose, (CL) central laboratory, (CLSI) Clinical and Laboratory Standards Institute, (FDA) Food and Drug Administration, (ICU) intensive care unit, (MAD) mean absolute difference, (max) maximum, (min) minimum, (OR) operating room, (POC) point-of-care, (rEGA) revised error grid analysis, (SD) standard deviation

**Keywords:** accuracy, blood glucose, diabetes mellitus, glucose meter, intraoperative, point-of-care

**Corresponding Author:** Boris Mraovic, M.D., Department of Anesthesiology, Jefferson Medical College, Thomas Jefferson University, 111 South 11th Street Suite G8290, Philadelphia, PA 19107; email address [boris.mraovic@jefferson.edu](mailto:boris.mraovic@jefferson.edu)