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ORIGINAL ARTICLE

Blood Glucose Meters Employing Dynamic Electrochemistry Are Stable against Hematocrit Interference in a Laboratory Setting

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Abstract

Background:

Hematocrit (HCT) is known to be a confounding factor that interferes with many blood glucose (BG) measurement technologies, resulting in wrong readings. Dynamic electrochemistry has been identified as one possible way to correct for these potential deviations. The purpose of this laboratory investigation was to assess the HCT stability of four BG meters known to employ dynamic electrochemistry (BGStar and iBGStar, Sanofi; Wavesense Jazz, AgaMatrix; Wellion Linus, MedTrust) in comparison with three other devices (GlucoDock, Medisana; OneTouch Verio Pro, LifeScan; FreeStyle Freedom InsuLinx, Abbott-Medisense).

Methods:

Venous heparinized blood was immediately aliquoted after draw and manipulated to contain three different BG concentrations (60–90, 130–160, and 280–320 mg/dl) and five different HCT levels (25%, 35%, 45%, 55%, and 60%). After careful oxygenation to normal blood oxygen pressure, each of the resulting 15 different samples was measured six times with three devices and three strip lots of each meter. The YSI Stat 2300 served as laboratory reference method. Stability to HCT influence was assumed when less than 10% difference occurred between the highest and lowest mean glucose deviations in relation to HCT concentrations [hematocrit interference factor (HIF)].

Results:

Five of the investigated self-test meters showed a stable performance with the different HCT levels tested in this investigation: BGStar (HIF 4.6%), iBGStar (6.6%), Wavesense Jazz (4.1%), Wellion Linus (8.5%), and OneTouch Verio Pro (6.2%). The two other meters were influenced by HCT (FreeStyle InsuLinx 17.8%; GlucoDock 46.5%).

Conclusions:

In this study, meters employing dynamic electrochemistry, as used in the BGStar and iBGStar devices, were shown to correct for potential HCT influence on the meter results. Dynamic electrochemistry appears to be an effective way to handle this interfering condition.

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Abbreviations: (BG) blood glucose, (GDH) glucose dehydrogenase, (GOx) glucose oxidase, (HCT) hematocrit, (HIF) hematocrit interference factor, (MARD) mean absolute relative difference

Keywords: blood glucose, dynamic electrochemistry, hematocrit, interference, patient self-monitoring

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