1. Accuracy of Two Point-of-Care Devices in Detecting Elevated Serum Creatinine in Individuals at Risk for Mesoamerican Nethropathy

Miranda Dally, University of Colorado, Denver

Abstract:
Purpose: The purpose of this analysis was to assess the accuracy of two point-of-care creatinine devices, the i-STAT handheld (Abbott, Princeton, NJ, USA) and the StatSensor Xpress (Nova Biomedical, Waltham, MA, USA) in comparison to venipuncture creatinine measures. Additionally, we explored how accurate a previously calculated correction factor for the StatSensor Xpress performed in two independent studies.

Methods: There were 213 paired i-STAT and venipuncture samples collected from a community study in Nicaragua in 2015-2016. An additional 267 paired StatSensor Xpress and venipuncture samples were collected, 158 from a community setting in Nicaragua and 109 from a Guatemala sugarcane worker cohort. Pearson correlation coefficients, Bland-Altman plots, and no intercept linear regression models were used to assess agreement between point-of-care devices and blood samples. The previously calculated correction factor of 0.78 was applied to the StatSensor Xpress data and was compared to the paired blood samples.

Results: The i-STAT performed the most accurately, overestimating creatinine by 0.07 mg/dL (95% CI: 0.02, 0.12) with no evidence of proportional bias. The StatSensor Xpress performed well at low levels of creatinine (Mean (SD): 0.87 (0.19)). Due to proportional bias, the StatSensor Xpress performed worse in the Nicaragua community setting where creatinine values ranged from 0.31 to 7.04, suggesting a correction factor of 0.66 was needed. The previously calculated correction factor of 0.78 performed well with the Nicaragua data when the data was restricted to creatinine ≤ 2.59 mg/dL (Adjusted difference: 0.06 mg/dL; 95% CI: 0.03, 0.09) .

Conclusions: These data suggest that the StatSensor Xpress is less accurate as the values of measured creatinine increase, a consideration when using the point-of-care device for screening individuals at risk for Mesoamerican Nephropathy. The i-STAT handheld is an accurate field alternative to lab tested serum; however, in low-resource settings other considerations such as cost and ease of use must be considered when conducting field research.

Contributing Authors: Miranda Dally, Jaime Butler-Dawson, Juan Jose Amador, Damaris Lopez Pilarte, Alexandra Gero, Joe Kupferman, Dave Friedman, Benjamin Griffin, Lee Newman, Daniel Brooks

This work was supported by the Doris Duke CharitableFoundation (Dr Friedman is a recipient of the Clinical ScientistDevelopment Award), a Satellite Healthcare Foundation CoplonAward, the Comite Nacional de Productores de Azucar (CNPA),and funds from Beth Israel Deaconess

Medical Center. Thefunders had no role in study design; collection, analysis, andinterpretation of data; writing the report; and the decision tosubmit the report for publication.

Financial Disclosure: Drs Brooks and Amador and Ms. Lopez-Pilarteare conducting a study supported in part by a giftfrom Los Azucareros del Istmo Centroamericano (AICA) to BostonUniversity School of Public Health for research on chronic kidneydisease in Central America.This evaluation was supported in part by Pantaleon; the Chancellor, CU Anschutz; Centers for Disease Control and Prevention (CDC) (U19 OH01127) and National Institutes of Health (NIH) (R21 ES028826). University of Colorado and Pantaleon are separate, independent organizations. University of Colorado employed appropriate research methods in keeping with academic freedom, based conclusions on critical analysis of the evidence and reported findings fully and objectively. The terms of this arrangement have been reviewed and approved by the University of Colorado in accordance with its conflict of interest policies.

Third International Workshop on Chronic Kidney Diseases of Uncertain/Non-Traditional Etiology in Mesoamerica and Other Regions

March 20 – 22, 2019

San José, Costa Rica

https://tools.niehs.nih.gov/conference/ckd_2019

CENCAM

SALTRA
PROGRAMA SALUD, TRABAJO y AMBIENTE EN AMÉRICA CENTRAL

IRET

UNA
UNIVERSIDAD NACIONAL
COSTA RICA

NIH National Institutes of Health