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To investigate whether benchtop auto-analyzers (AAs) and arterial blood gas (ABG) analyzers, for measuring electrolyte levels of patients admitted to intensive care units (ICU), are equal and whether they can be used interchangeably” Pant et al (2017).

Abstract:

OBJECTIVE: To investigate whether benchtop auto-analyzers (AAs) and arterial blood gas (ABG) analyzers, for measuring electrolyte levels of patients admitted to intensive care units (ICU), are equal and whether they can be used interchangeably.

**MATERIALS AND METHOD:** This study was conducted on 98 patients admitted to the ICU of the Institute of Medicine, Kathmandu, Nepal between 15 October and 15 December 2016. The sample for AA was collected from the peripheral vein through venipuncture, and that for ABG analyzer was collected from radial artery simultaneously. Electrolyte levels were measured with ABG analyzer in the ICU itself, and with benchtop AA in the central clinical biochemistry laboratory.

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**RESULTS:** The mean value for sodium by AA was 144.6 (standard deviation [SD] 7.63) and by ABG analyzer 140.1 (SD 7.58), which was significant ( $p$ -value  $<0.001$ ). The mean value for potassium by AA was 3.6 (SD 0.52) and by ABG analyzer 3.58 (SD 0.66). The Bland-Altman analysis with the 95% limit of agreement between methods were -4.45 to 13.11 mmol/L for sodium and the mean difference was 4.3 mmol/L and -1.15 to 1.24 mmol/L for potassium and the mean difference was 0.04 mmol/L. The United States Clinical Laboratory Improvement Amendments accepts a 0.5 mmol/L difference in measured potassium levels and a 4 mmol/L difference in measured sodium levels, in the gold standard measure of the standard calibration solution. The passing and Bablok regression with 95% confidence interval has an intercept of zero and slope one for both sodium and potassium, and the 95% of random difference is -6.32 to 6.32 for sodium and -0.84 to 0.84 for potassium, showing no significant deviation from linearity.

**CONCLUSION:** It can be concluded that AA and ABG analyzers may be used interchangeably for measurement of potassium in the Institute of Medicine, while the same cannot be concluded for the measurement of sodium, because of the significant difference in sodium measurement by the two instruments.

### Full Text

Reference:

Pant, V., Tumbapo, A. and Karki, B. (2017) Inter-instrumental comparison for the measurement of electrolytes in patients admitted to the intensive care unit. International



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