

Reliability of point-of-care blood gas, electrolyte, lactate and glucose measurement during cardiopulmonary bypass

ABSTRACT

The key objective of point-of-care testing (POCT) is to generate a result quickly so that appropriate treatment can be implemented, leading to an improved clinical or economic outcome. Especially during cardiopulmonary bypass for cardiac surgery, where dynamic changes in blood gas, electrolytes, lactate, and glucose values need to be closely monitored.

STUDY DESIGN

In this prospective randomized clinical study, the analytical performance of the GEM Premier 3000 was compared with the Ciba Corning 860 analyzer for blood gas / electrolytes / metabolites, and for hematocrit with the Sysmex XE-2100 instrument.

During a six-month period, 127 blood samples were analyzed on both the GEM Premier 3000 analyzer and our laboratory analyzers, and compared using the agreement analysis for quantitative data by Bland and Altman.

With exception of K^+ , the other parameters (pCO_2 , pO_2 , Na^+ , Ca_2^+ , hematocrit, glucose, and lactate) can be described in terms of the mean and standard deviation of the differences.

RESULTS

For K^+ -measurement on the GEM Premier 3000 a clear linear trend was noticed. Furthermore, in comparison with the other parameters, a therapeutically unacceptable systematic difference (mean of difference: -2.2, $p=0.05$) in hematocrit measurement on the GEM Premier 3000 was observed. The variance of the readings for the GEM Premier 3000 measurements was at clinical acceptable levels.

CONCLUSION

The simplicity and the convenience of only one consumable make the GEM Premier 3000 analyzer very suitable for POCT; however interpretation for clinical therapy needs to be done with caution.



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