

BACKGROUND

The epoc Blood Analysis System (Alere, Orlando, FL) performs blood gases, electrolytes, and metabolites using a Blood Gas Electrolyte and Metabolite (BGEM) Test Card panel on 92 uL of whole blood. The BGEM test card uses potentiometric sensors to measure sodium, potassium, ionized calcium, pH, pCO₂; amperometric sensors to measure pO₂, glucose, and lactate; and a conductometric sensor to measure hematocrit. Results are available in 3-10 minutes, depending upon the time between calibration and patient testing. TJUH implemented the epoc in its ICUs in 2012 to provide Point of Care (POC) results. Alere recently added creatinine and chloride sensors to its BGEM cartridge. At the request of our Emergency Department, we evaluated creatinine and chloride on the epoc.

METHODS

Precision and method comparisons were performed at our Center City (CC) and Methodist Hospital (MH) sites. Whole blood was collected from 40 CC patients and 24 MH patients. Inter-assay and intra-assay precision was performed on 3 levels of controls (Eurotrol, Burlington, MA). Comparison studies were performed on the RapidLab 800 (Radiometer, Brea, CA) at the CC site. Comparison studies were performed at the MH site on the GEM 3500 blood gas analyzer (Instrumentation Laboratories, Bedford, MA) and the Cobas 6000 (Roche, Indianapolis, IN) using plasma from concurrently drawn specimens.

RESULTS

Intra-assay precision for creatinine on the epoc (n=20, 4 devices) was 6.6%CV, 2.1%CV, and 3.9%CV for Levels 1, 2, and 3, respectively, and 0.7%CV, 0.6%CV, and 0.5%CV, respectively for chloride (**Table 1**). Composite inter-assay precision for creatinine (n=20, 4 devices over 5 days) was 3.9%CV, 2.0%CV, and 2.7%CV for Levels 1, 2, and 3, respectively and 1.1%CV, 0.5%CV and 0.5%CV, respectively for chloride (**Table 2**). Method comparison for CC for creatinine (n=40) was: mean=1.636, median=1.135, r²= 0.979, y=1.0343x+0.0317 (**Figure 1**), and for chloride (n=40) mean=107.8, median=107.25, r²=0.888, y=0.839x+17.634 (**Figure 2**). Method comparison for MH for creatinine (n=24) was: mean=1.105, median=0.730, r²=0.8944, y=1.1125x-0.1095 (**Figure 3**), and for chloride (n=24) mean=103.667, median=104.000, r²=0.8172, y=1.0275x+1.7272 (**Figure 4**).

CONCLUSIONS

- The epoc creatinine and chloride studies showed results that were comparable to the laboratory.
- Performance for measuring creatinine and chloride is considered acceptable for implementation at those sites where epoc is currently in use.

Table 1: Intra-assay precision (same day, n=20)	Creatinine	Chloride
Level 1 QC CV	6.6%	0.7%
Level 2 QC CV	2.1%	0.6%
Level 3 QC CV	3.9%	0.5%

Table 2: Inter-assay precision (five consecutive days, composite, n=20)	Creatinine	Chloride
Level 1 QC CV	3.9%	1.1%
Level 2 QC CV	2.0%	0.5%
Level 3 QC CV	2.7%	0.5%

