not dissolved completely after several hours to several days. We changed the concentration of ammonium hydroxide from 1 mmol/L to 2 mmol/L. We again prepared a standard solution of uric acid at the same molar ratio of 1.7:1 with this concentration of 2-mmol/L ammonium hydroxide. With this ammonium hydroxide concentration, uric acid dissolved completely in a few minutes. The standard solution was stable at least 3 months stored in a well-stoppered brown, all-glass container at -20 °C. Ammonium hydroxide was selected because it was suitable for mass spectrometric analyses and also because uric acid was stable in the ammonium hydroxide solution. We therefore recommend the use of 2 mmol/L ammonium hydroxide, not 1 mmol/L ammonium hydroxide or other basic solutions, to prepare uric acid standard solutions.

References

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Plasma Aldosterone: Comparison of a New Automated Assay with a Standard Extraction Method

To the Editor:
A variety of clinical conditions present with an abnormality in aldosterone concentration. Primary hyperaldosteronism (PHA), long considered a rare cause of hypertension (<2% of the hypertensive population), has in the past decade been suggested to be present in 3%–32% of hypertensive patients (1). Although commercially available reagent sets have made it technically easier to measure plasma aldosterone concentration (PAC) for PHA analysis, these methods are often time-consuming and limited to small throughput, with reported problems arising with their application to assay PAC from patients with chronic renal failure (CRF) (2–4).

We previously validated a new automated method for measuring direct renin (5), and because there was little, if any, information on the evaluation of a similar method for aldosterone, we applied this automated...
method to measure PAC and compared the results with those obtained from a standard extraction method. We compared measurements of samples from hypertensive and normotensive individuals with CRF and applied samples from hypertensive or normotensive individuals without CRF as controls. We also evaluated whether different anticoagulants have any effect on PAC measured by this automated method.

The study participants were of mixed ethnic origin. CRF patients were either regular hemodialysis (HD) patients with an assumed glomerular filtration rate <5 mL/min, or low-clearance (LC)-CRF patients not receiving dialysis [mean (SD) creatinine, 458 (119) μmol/L]. We obtained samples from 67 persons, of whom 37 were controls without CRF and 30 were CRF patients (19 HD and 11 LC-CRF). We obtained informed consent from all participants. We collected blood samples in both lithium-heparin (Li-Hep) and potassium EDTA tubes. For HD patients, we collected blood samples pre- and post-HD.

We measured PAC in all participants samples with the Nichols Advantage® (NA) fully automated assay and the standard in-house extraction method of St. Mary’s Hospital and the standard in-house merular filtration rate (HD) patients with an assumed glomerular filtration rate <5 mL/min, or low-clearance (LC)-CRF patients not receiving dialysis [mean (SD) creatinine, 458 (119) μmol/L]. We obtained samples from 67 persons, of whom 37 were controls without CRF and 30 were CRF patients (19 HD and 11 LC-CRF). We obtained informed consent from all participants. We collected blood samples in both lithium-heparin (Li-Hep) and potassium EDTA tubes. For HD patients, we collected blood samples pre- and post-HD.

We applied the NA and extraction methods to measure corresponding samples collected under different conditions of anticoagulation (EDTA and Li-Hep). With both methods, there was a strong correlation between results from EDTA vs Li-Hep plasma samples (results not shown).

In patients without CRF, there was a significantly strong correlation ($r^2 = 0.90; P < 0.0001$) between PACs measured with the NA and the extraction methods. Means (SE) for the NA and extraction methods showed no significant difference at 231 (26) and 237 (21) pmol/L, respectively (Fig. 1B).

By contrast, there was poor agreement between the 2 methods for samples from the CRF group, especially at the high concentrations found in CRF patients (Fig. 1C). The correlation ($r^2$) between the 2 methods for PACs in LC-CRF patients (n = 11) and in CRF patients preHD (n = 18) were 0.83 ($P = 0.0001$) and 0.79 ($P < 0.0001$), respectively, whereas the mean concentrations were significantly different in both cases: in the LC-CRF group the mean (SE) was 495 (92) pmol/L with the NA method and 212 (45) pmol/L with the extraction method, and in the preHD group it was 774 (181) pmol/L with the NA method and 248 (106) pmol/L with the extraction method. The correlation for PACs in post-HD samples (n = 18) was not significant ($r^2 = 0.04$).

In conclusion, our results show no significant difference in aldosterone measured in EDTA vs Li-Hep plasma. In patients without CRF, the aldosterone values obtained from the NA method compare well with extracted results, with only a few discrepancies. Similar to the NA method for direct renin, the automated aldosterone method has the advantage of high throughput. Therefore, the combination of these NA methods can facilitate PHA population-based studies and screening. Care must be taken with CRF patients, however, because we observed large discrepancies between PAC measured by the NA method and by extraction in patients with CRF.

References


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