ious acute and nonacute populations to assess both the diagnostic and prognostic value of these new tests.

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References

Influence of Blood Sampling Site on Intact Parathyroid Hormone Concentrations in Hemodialysis Patients

To the Editor:

Parathyroid hormone (PTH) concentrations must be determined repeatedly in hemodialysis (HD) patients to evaluate secondary hyperparathyroidism (SHPT) and adjust the dosage of PTH-lowering compounds (vitamin D or cinacalcet). Available PTH assays provide variable PTH results (1, 2) and may create uncertainty in therapeutic decision-making. Thus, there is a need to standardize PTH measurements as well as preanalytical conditions. To the best of our knowledge, the impact of the blood-sampling site on PTH determination for HD patients has not been investigated. We compared intact parathyroid hormone (iPTH) concentrations simultaneously measured in central (iPTH-c) and peripheral (iPTH-p) blood samples from CVC-bearing HD patients.

We enrolled 30 HD patients [14 women, mean age 64 (SD 14) years, 16 men, mean age 77 (6) years] after receipt of informed consent. The local ethics committee approved the study. All patients had a central venous catheter (CVC), and none had an arteriovenous fistula. All CVCs were maintained open with 3.8% sodium citrate. Approximately 10 mL blood was simultaneously collected by 2 different nurses in Vacuette Serum Tubes with separator gel, the first from a tunneled CVC placed in the superior vena cava passing through the jugular vein, and the second from a peripheral (forearm) vein, before being connected to the extracorporeal circuit for HD. All samples were left to clot, transported on ice to the central laboratory, centrifuged at 2500g, and analyzed within 30 min. We measured baseline urea, creatinine, phosphorus, calcium, magnesium, and alkaline phosphatase activity using an Olympus AU2700 analyzer. We measured serum iPTH concentrations (10–65 pg/mL) using an immunonchemiluminometric assay on a Roche Modular E 170 analyzer.

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Letters to the Editor
The intraassay CV of the iPTH assay was <3%.

We found no statistically significant difference between central and peripheral concentrations of urea, creatinine, phosphorus, calcium, magnesium, and alkaline phosphatase activity, biochemical markers of kidney and bone function (Wilcoxon test). Conversely, the concentrations of iPTH-c (median 229 ng/L, interquartile range 87–360 ng/L) and iPTH-p (median 144 ng/L, interquartile range 59–273 ng/L) differed significantly (Wilcoxon test, P < 0.001). Although there was a good correlation between each pair of values (P < 0.001), a significant difference (P = 0.001) in the absolute concentration was observed, with iPTH-c approximately 30% higher than iPTH-p. The mean difference (i.e., iPTH-c – iPTH-p) obtained by Bland–Altman analysis was 113 (155) ng/L. The PTH ratio (iPTH-p/iPTH-c) was 0.72 (range 0.27–1.04). No correlation between iPTH concentration and iPTH-p/iPTH-c was found.

The observed higher concentration of iPTH-c could be because CVC blood samples taken from the central catheter placed in the vein/cava immediately below the thyroid veins directly collect hormone just released by parathyroid cells. On the other hand, the lower iPTH-p concentrations could be caused by hormone degradation and hemodilution in the systemic circulation. Nevertheless, the concentration of the other measured analytes, with longer half-life and produced by the systemic metabolism instead of a topic pulsatile secretion, were not different between central and peripheral blood samples.

Our study compared the influence of blood sampling site on iPTH concentrations in HD patients. Two studies reported intraoperative iPTH concentrations in peripheral or jugular veins in patients undergoing to parathyroidectomy for primary hyperparathyroidism (3, 4). Woodrum et al. (3) studied 201 patients with primary hyperparathyroidism (PHPT) who underwent single-gland parathyroidectomy. Blood samples were obtained peripherally in 114 patients and centrally from 87 patients. Subjects with central venous sampling had significantly higher PTH concentrations at baseline and at all collection times, before and after gland excision. However, the study was limited because compared patients who had either peripheral venous or central venous intraoperative PTH samples drawn. Beyer et al. (4), comparing simultaneous peripheral and central PTH concentrations in PHPT patients undergoing cervical exploration, showed higher absolute PTH concentrations in central venous samples. Our data are consistent with the data from these 2 studies. It should also be noted that, in HD patients, there can be substantial interference in PTH determinations by PTH fragments, normally cleared by the kidney, which represent up to 50% of the hormone concentration (5).

Nephrologists should be aware of the difference in PTH concentrations between blood samples collected from central or peripheral sites. Clinical monitoring and therapy should be based on the same blood sample type.

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References


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