

Variable parathyroid hormone(1-84)/carboxylterminal PTH ratios detected by 4 novel parathyroid hormone assays

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AIM: Parathyroidhormone (PTH) measurement is important in the evaluation of bone disease in patients with chronic renal failure. Large carboxyl-terminal PTH fragments (C-PTH) cross-react with second-generation PTH assays, lead to an overestimation of biologically active PTH, and are evaluated by a combination of second- and third-generation PTH assays. The aim of our study was to examine whether the use of 4 different PTH assays of putatively same specificity leads to comparable results detecting C-PTH fragments.

SUBJECTS AND METHODS: In 70 chronic dialysis patients, total PTH and PTH(1-84) were measured in parallel by 4 novel PTH assays (Nichols Advantage Intact PTH and Bio-Intact PTH Chemiluminescence Assay, Nichols Institute Diagnostics, USA, DUO Total and CAP PTH IRMA, Scantibodies Laboratory, USA). The C-PTH concentration was quantitated by subtracting PTH(1-84) from total PTH. Consecutively, the PTH(1-84)/C-PTH ratio was calculated.

RESULTS: Nichols Intact PTH and DUO Total PTH assays were highly correlated ($r = 0.985$), as well as Nichols Bio-Intact and DUO CAP assays ($r = 0.984$). However, total PTH values measured by the Nichols assay were 30% higher (median (range): 185 (9.9 - 2,332) versus 130 (2.3 - 1,271.1) pg/ml, $p < 0.01$). PTH(1-84) values, measured by the Nichols Bio-Intact PTH assay were 8% higher compared to the Scantibodies CAP assay (median (range): 79.6 (7.5 - 1,060.9) versus 73.7 (4.4 - 918.9) pg/ml, $p = \text{NS}$). Thirty-six patients had a ratio < 1 measured by the Nichols assays, whereas only 8 patients showed the same ratio when measured by the Scantibodies assays. In 28 patients (40%), contradictory PTH(1-84)/C-PTH ratios were found, showing a ratio < 1 when measured by the Nichols assays, but > 1 when the Scantibodies assays were used.

CONCLUSION: In conclusion, our results suggest that the PTH(1-84)/C-PTH ratio cannot be equally used as a predictor of bone turnover when different PTH assays are used. Depending on those assays, differences in total PTH values mathematically lead to varying amounts of C-PTH fragments resulting in variable, even contradictory PTH(1-84)/C-PTH ratios.

Reference for above article:

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