

Case Study of Patient with Adynamic Low Bone Turnover Disease that Eluded Diagnosis – Comparison of PTH Ratio with Other Markers of Bone Turnover

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The ability to discriminate patients with adynamic low bone turnover disease from those with normal or high bone turnover disease is essential in the clinical management of ESRD patients. This diagnostic requirement has become more important with the growing incidence of adynamic low bone turnover disease (from 30% to 50% in dialysis patients) and the documented inability of the intact PTH assay to predict adynamic low bone turnover disease in patients with intact PTH levels greater than 150 pg/mL. We present an interesting patient case with bone histology that illustrates the importance of knowing both the 1-84 PTH level and the level of the large C terminal fragments (likely 7-84 PTH). The patient, a 60 year old woman with rheumatoid arthritis, had been on maintenance dialysis for one month before bone biopsy. Her medications included a calcium antagonist, a phosphate binder, and a statin. Bone biopsy was conducted to determine if her pain was due to arthritis or renal bone disease. Bone histometry revealed adynamic low bone turnover (BV/TV 9.21%; Tb.Th 80.4 mcm; W.Th 29.7 mcm; OV/TV 0.65%; OV/BV 7.11%; OS/BS 29.8%; O.Th 7.96%; ES/BS 3.82%; N.Oc/BS 0.11/mm; Ob.S/BS 9.3%; Fb.V/TV 0.02%; MAR 0 mcm/day; dLS/BS 0%; sLS/BS 4.68%; BFR/BS 0; BFR/BV 0; and Acf 0). The biochemical non-invasive markers were: total intact PTH 422 pg/mL; 1-84 PTH (CAP) 156 pg/mL (normal range for dialysis patient: 90-170 pg/mL); 7-84 PTH 266 pg/mL; 1-84/7-84 PTH ratio 0.59; carboxy terminal PTH 18.7 ng/mL; mid region-PTH 21,900 pg/mL; BAP 19 u/l; ALP 233 u/l; osteocalcin 74 ng/mL; alb 3.4 g/dL; Ca 10.1 mg/dL; P 3.3 mg/dL; Mg 2.3 mg/dL; 1,25 OH-Vit D 8.3; and Al 16 mcg/l. Only the 1-84 PTH/C terminal fragments ratio accurately predicted the histologically confirmed adynamic low bone turnover state. The intact PTH indicated high bone turnover and the 1-84 PTH indicated normal bone turnover. This case provides an intriguing example of the diagnostic utility of the 1-84 PTH/C terminal fragments ratio in predicting bone turnover status in a patient in whom the diagnosis of adynamic low bone turnover disease would have not been possible by assessment of intact PTH and 1-84 PTH alone.

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