
Proceedings Paper:
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Background and Aims: Renal osteodystrophy is common in advanced chronic kidney disease (CKD) patients and is characterized by abnormal bone turnover and mineralization. Parathyroid hormone (PTH) increases bone turnover through osteoblast and osteoclast activation. Osteoprotegerin (OPG) is a decoy receptor of receptor activator of nuclear factor kappa-β ligand and thus, inhibits osteoclast maturation. Meanwhile, sclerostin is an inhibitor of the Wnt signalling pathway and thus, inhibits osteoblast maturation. We aimed to assess the relationship between these bone regulatory markers and bone turnover as assessed by bone histomorphometry and bone turnover markers (BTMs).

Method: We recruited 43 CKD patients with eGFR<30ml/min/1.73m^2 or on dialysis. Fasting serum samples were analysed using Immunodiagnostic Systems automated assays (Boldon, UK) for intact PTH (iPTH) and BTMs such as bone alkaline phosphatase (bALP) and intact procollagen type 1 N-terminal propeptide (intact PINP) which are bone formation markers, and tartrate-resistant acid phosphatase 5b (TRAP5b) which is a bone resorption marker. OPG and sclerostin were analysed using manual ELISA by Biomedica (Vienna, Austria). Trans-iliac bone biopsy was performed after tetracycline labelling. Bone samples were analysed using quantitative histomorphometry. Normal bone turnover was defined as bone formation rate/bone surface (BFR/BS) of 18 - 38μm^3/μm^2/year. Spearman rank correlation was used to test the relationship between the variables.

Results: Median BFR/BS was 32.12 (IQR 17.76 – 48.25) um^3/um^2/year. 26% of patients had low and 40% had high bone turnover. iPTH and OPG were positively correlated with BFR/BS (rho = 0.42, $p<0.01$ and rho = 0.36, $p<0.05$ respectively). Sclerostin was not correlated with BFR/BS. Furthermore, sclerostin did not correlate with bALP and intact PINP whereas OPG correlated with TRAP5b (rho = 0.43, $p<0.01$). iPTH correlated with bALP (rho = 0.62, $p<0.001$), intact PINP (rho = 0.62, $p<0.001$) and TRAP5b (rho = 0.50, $p = 0.001$).

Conclusion: Circulating levels of iPTH and OPG were modestly associated with bone turnover but sclerostin was not. There are likely to be bone regulators other than iPTH, OPG and sclerostin which regulate bone turnover in renal osteodystrophy.

Figure: None