Osteoprotegerin – a new biomarker for impaired bone metabolism in complex regional pain syndrome?

Krämer HH, Hofbauer LC, Szalay G, Breimhorst M, Eberle T, Zieschang K, Rauner M, Schlereth T, Schreckenberger M, Birklein F. Osteoprotegerin: a new biomarker for impaired bone metabolism in complex regional pain syndrome? Pain 2014;155(5):889-895.

Osteoprotegerin (OPG) is important for bone remodeling and may contribute to CRPS pathophysiology. We aimed to assess (1) the value of OPG as a biomarker for CRPS and (2) a possible correlation with radiotracer uptake in three-phase bone scintigraphy (TPBS). OPG levels were analyzed in 23 CRPS patients (17 women; mean age 50 ± 9.0 years; disease duration: 12 (IQR 8 – 24) weeks), 10 controls (six women; mean age 58 ± 9.6 years) and 21 patients after uncomplicated fractures (12 women, mean age: 43 ± 15 years; time after fracture: 15 (IQR: 6 – 22) weeks). The CRPS and control patients also underwent TPBS. OPG in CRPS patients was significantly increased in comparison to both control groups ($p = 0.001$; Kruskal Wallis test; CRPS patients: 74.1 (IQR: 47.1 – 100.7) pg/ml; controls: 46.7 (IQR: 35.5 – 55.0) pg/ml; $p = 0.004$; fracture patients: 45.9 (IQR: 37.5 – 56.7) pg/ml; $p = 0.001$). For details see Figure 1. As a diagnostic test for CRPS, OPG has a sensitivity of 0.74, specificity of 0.80, positive predictive value of 68% and negative predictive value of 84%. ROC curve analysis showed an AUC of 0.80 (confidence interval: 0.68 – 0.91). For the CRPS-affected hand, a significant correlation between OPG and TPBS ROI analysis in phase III was detected (carpal bones; $r = 0.391$; $p = 0.03$). The

persistent increase of OPG in CRPS indicates enhanced osteoblastic activity like increased radiotracer-uptake in TPBS phase III. A contribution of bone turnover to CRPS pathophysiology is likely. OPG might be useful as a 'biomarker' for CRPS.

Figure 1