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New quantitative bone scan parameters for the assessment of bone turnover activity in patients with Charcot foot

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Background and aims: The assessment of disease activity by bone turnover in patients with Charcot neuroosteoarthropathy (CNO) may help to optimize treatment, but it is limited by the lack of suitable quantitative methods. One of the methods connecting both morphology of pathological process and evaluation of disease activity may be the quantitative bone scanning. The aim of our study was to assess the new quantitative bone scan parameters as markers of CNO activity by comparing them with usually used methods for disease activity evaluation. **Patients and methods:** Forty-two patients with acute (n=21) and non-acute (n=21) phase of CNO underwent quantitative bone scanning; in cross-sectional study, the patients with acute CNO were followed and new bone scans were repeated after treatment. New quantitative parameters - blood flow velocity (BFV) and the ratio of bone uptake of affected foot area and whole body (FWB) and the ratio of affected foot area and the identical area of contralateral foot (FCF) were assessed. This quantitative bone scan parameters were compared with markers of bone turnover (1CTP - COOH-terminal telopeptide region of type 1 collagen and BALP - bone-specific isoenzyme of alkaline phosphatase) and by skin temperature difference (STD) both in acute and non-acute phase of CNO. **Results:** Significant correlations between BFV, FWB; FCF and parameters of disease activity (1CTP- $p < 0.002$, < 0.0001 , < 0.0002 ; BALP - $p < 0.03$, < 0.0004 , < 0.02 ; STD - $p < 0.05$, > 0.05 , < 0.05) were seen. In addition, all bone scan parameters decreased after treatment of CNO and their differences to baseline values correlated with differences of bone turnover markers and STD (all $p < 0.05$). **Conclusion:** Our study suggests that bone scanning should be used not only for topical diagnosis of CNO, but also for monitoring of disease activity by suitable quantitative parameters. This study was supported by the grant MZO 00023001.