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Bone Formation Marker Increase are Associated with Mood and Relapse Improvement during Detoxification of Alcohol Dependent patients

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Background: Alcohol dependence (AD) is often studied with bone turnover rates or mental health separately, but the overall relationship is relatively unclear. A recent study shows that there is an interlink between bone and depression in alcohol dependence patients (Kalinichenko et al., 2021), but there are no recent studies that discuss the effect of alcohol detoxification on bone turnover and mental health.

Aims & Objectives: This study aims to discover the relationship between bone turnover and psychological traits in AD patients during the detoxification.

Methods: A total of 170 AD patients and 119 non-AD controls were recruited in this study. The AD patient had clinical assessment of smoking status, liver function tests, alcohol craving rated by Penn Alcohol Craving Scale (PACS), relapse risk rated by Alcohol Relapse Risk Scale (ARRS) total score, severity of depression rated by Beck Depression Inventory (BDI), and severity of anxiety rated by Beck Anxiety Inventory (BDI). The serum levels of bone formation marker procollagen type 1 N-terminal propeptide (P1NP) and bone resorption marker C-terminal end of the telopeptide of type I collagen (CTX-1) were measured by Enzyme-Linked Immunosorbent Assay (ELISA). The AD patients had detoxification with clinical assessments from basal, week1 (W1) and week2 (W2) of records.

Results: The average age and percentage gender were similar between controls and AD patients (average age at 43 and 45 years old, and percentage male at 83% and 82%, respectively). The serum P1NP and CTX-1 levels were not different between controls and the basal level of AD patients (Mann–Whitney U test, P=0.112 and 0.083, respectively). The serum P1NP levels, but not CTX-1 levels, were gradually increased from basal, W1 to W2 of alcohol detoxification period (mixed models of repeated-measures ANOVA, $P<0.001$). The serum P1NP levels significantly and negatively correlated with the serum CTX-1 levels ($r = -0.237$, $p = 0.002$), PACS scores ($r = -0.481$, $p < 0.001$), BDI scores ($r = -0.374$, $p < 0.001$), BAI scores ($r = -0.338$, $p < 0.001$), and ARRS scores ($r = -0.44$, $p < 0.001$) using repeated measure correlations during alcohol detoxification period.

Discussion & Conclusion: The bone formation marker P1NP increases throughout the 2 weeks of alcohol detoxification, and it is correlated with the improvement of alcohol craving, alcohol relapse risk, depression, and anxiety.