Plasma nicotine metabolite cotinine level in alcohol dependence

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Background
In our previous methadone treatment study, all patients had cigarette smoking. Patient of alcohol dependence is usually combined with cigarette smoking. Herein, we tested the hypothesis for the role of plasma nicotine metabolite cotinine levels in alcohol dependence (AD).

Aims & Objectives
The aim of this study is to discovered the associations between plasma cotinine levels and clinical assessments in a population of active alcohol dependent patients.

Methods
This study was approved by the institutional review boards of the Taipei City Psychiatric Center (TCPC; IRB No: TCHIRB-10701109) and National Health Research Institutes (NHRI, Zhunan, Taiwan; IRB No: EC1070102). 153 active alcohol dependent (AD) patients and 116 non-alcohol dependent controls were recruited. The active alcohol dependent patients, still use alcohol within 24 hours, had recorded smoking history of ever smokers and pack-years of cigarette smoking. The plasma cotinine level was measured by enzyme-linked immunosorbent assay (ELISA). The clinical assessments and plasma cotinine levels were recorded at baseline (week 0), and withdrawal (or detoxification) period of week 1 and week 2. The clinical assessments of age of alcohol tolerance, education years, the Fagerstrom test for nicotine dependence (FTQ), compulsivity rated by obsessive compulsive drinking scale (OCDS), anxiety rated by Beck Anxiety Inventory score (BAI), depression rated by Beck Depression Inventory score (BDI), and relapse risk rated by Alcohol Relapse Risk Scale total score (ARRS) were recorded during the withdrawal period.

Results
The active AD patients showed higher plasma cotinine levels than the controls at baseline, and withdrawal week1 and week2 (P<0.0001). The plasma cotinine level predicted alcohol dependence with a cut-off value of 10 pg/ml at sensitivity of 83%, and a specificity of 90.2% after receiver operating characteristic analysis (area under the curve; AUC=0.87, P<0.0001). The plasma cotinine levels were positively correlated with FTQ (Spearman's r=0.699, P<0.0001) and pack-years of cigarette smoking (r=0.498, P<0.0001), and negatively correlated with age of alcohol tolerance, education years, craving, depression, anxiety or relapse risk (r=-0.209, P=0.01; r=-0.246, P=0.002; r=-0.21, P=0.01; r=-0.335, P<0.0001; r=-0.212, P=0.009; r=-0.312, P=0.0001, respectively). Further analyses were conducted using a backward stepwise multiple linear regression, excluded FTQ and Smoking known to be associated with cotinine, the plasma cotinine levels were significantly and negatively correlated with female and ARRS (P = 0.003 and 0.0001, respectively).

Discussion & Conclusion
The active alcohol dependent patients have higher plasma cotinine levels than the non-alcohol dependent controls. Plasma cotinine level could be an indicator for alcohol dependence. In AD patients, the higher plasma cotinine levels represented the more severe nicotine dependence which was indicated by its correlation with FTQ. Plasma cotinine levels are lower in female than male. The higher plasma cotinine levels indicated a lower relapse risk in AD at baseline. Plasma cotinine level did not associate with any clinical assessments during the withdrawal period of two weeks.