

## Ethanol in Carbon Monoxide Intoxication: Focus on Delayed Neuropsychological Sequelae

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**Abstract :** Background: In carbon monoxide (CO) intoxication, the pathophysiology of delayed neurological sequelae (DNS) is very complex and remains poorly understood. And predicting whether patients who exhibit resolved acute symptoms have escaped or will experience DNS represents a very important clinical issue. Brain magnetic resonance (MR) imaging has been conducted to assess the severity of brain damage as an objective method to predict prognosis. And co-ingestion of a second poison in patients with intentional CO poisoning occurs in almost one-half of patients. Among patients with co-ingestions, 66% ingested ethanol. We assessed the effects of ethanol on neurologic sequelae prevalence in acute CO intoxication by means of abnormal lesion in brain MR. Method: This study was conducted retrospectively by collecting data for patients who visited an emergency medical center during a period of 5 years. The enrollment criteria were diagnosis of acute CO poisoning and the measurement of the serum ethanol level and history of taking a brain MR during admission period. Official readout data by radiologist are used to decide whether abnormal lesion is existed or not. The enrolled patients were divided into two groups: patients with abnormal lesion and without abnormal lesion in Brain MR. A standardized extraction using medical record was performed; Mann Whitney U test and logistic regression analysis were performed. Result: A total of 112 patients were enrolled, and 68 patients presented abnormal brain lesion on MR. The abnormal brain lesion group had lower serum ethanol level (mean, 20.14 vs 46.71 mg/dL) (p-value<0.001). In addition, univariate logistic regression analysis showed the serum ethanol level (OR, 0.99; 95% CI, 0.98 -1.00) was independently associated with the development of abnormal lesion in brain MR. Conclusion: Ethanol could have neuroprotective effect in acute CO intoxication by sedative effect in stressful situation and mitigative effect in neuro-inflammatory reaction.

**Keywords :** carbon monoxide, delayed neuropsychological sequelae, ethanol, intoxication, magnetic resonance

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