

### Evaluation of Clinical and Biochemical Variables in Acute Methanol Poisoning: Is blood pH a Good Prognostic Factor for Prediction of Outcome?

SHAHIN SHADNIA<sup>1</sup>, KAMBIZ SOLTANINEJAD<sup>2</sup>

<sup>1</sup>Excellent Center of Clinical Toxicology, Toxicological Research Center, Clinical Toxicology Department, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

<sup>2</sup>Legal Medicine Research Center, Legal Medicine Organization, Tehran, Iran

**Background:** Acute methanol poisoning is one of the most important chemical poisonings due to drinking of illegal and handmade alcoholic beverages in Iran. The aim of this study was to evaluate clinical and biochemical parameters as prognostic factor in acute methanol poisoning.

**Methods:** A retrospective study was performed on acute methanol poisoning cases admitted to the Lohman Hakim Hospital Poison Center (Tehran, Iran) over a two-year period. The demographic data, clinical presentations, paraclinical findings and patients' outcome were extracted from medical records.

**Results:** During this period, thirty patients with acute methanol poisoning have been enrolled in the study. All of the patients were men, with the median age of 25.5 years. Visual disturbances, respiratory manifestations, and loss of consciousness were the most common clinical manifestations on admission. The median of blood methanol level was 20 mg/dL. The median of pH, PaCO<sub>2</sub> and HCO<sub>3</sub> was 7.15, 22.35 mmHg and 7.2 mEq/L, respectively. Fatality rate was 30%. There was a significant difference between survivors and non-survivors with regards to coma, blood methanol level, and PaCO<sub>2</sub> and blood glucose. Also, we did not observe a significant difference between these two groups regarding pH and HCO<sub>3</sub> level.

**Conclusion:** It can be suggested that coma, PaCO<sub>2</sub> and hyperglycemia on admission time could be used as strong predictors of poor outcome and blood pH and HCO<sub>3</sub> is not a good prognostic factor for assessment of methanol poisoning outcome.

**Keywords:** Hydrogen-Ion Concentration; Methanol; Poisoning; Prognosis

### Biochemical Markers of Acute and Chronic Ethanol Use: Forensic and Clinical Applications

KAMBIZ SOLTANINEJAD<sup>1</sup>, SHAHIN SHADNIA<sup>2</sup>

<sup>1</sup>Legal Medicine Research Center, Legal Medicine Organization, Tehran, Iran

<sup>2</sup>Excellent Center of Clinical Toxicology, Toxicological Research Center, Clinical Toxicology Department, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

**Background:** The analysis of ethanol in bio-samples is an important method for determination of acute alcohol use/abuse both in clinical and forensic toxicology. In forensic cases, it is known that micro-organisms involved in the postmortem putrefaction process can produce alcohol and when the body has been traumatized. In clinical setting, post-ingestion time has a critical role for determination of alcohol level in biological fluids and the ethanol has been decreased during post-ingestion period, especially in chronic alcohol abusers. From this view, new biomarkers have been studied for evaluation of acute and chronic ethanol use/abuse in clinical and forensic cases. In this article, the role of each biomarker in determination of alcohol use/abuse was reviewed.

**Methods:** We searched the PubMed and Google Scholar databases for articles about biomarkers of ethanol use/abuse with words "Alcohol", "Ethanol", "Biomarker", "Abuse", "Forensic" and "Clinical" from 1975-2014.

**Results:** In postmortem cases, alcohol concentrations in blood, urine and vitreous depending on the status of the body. Urine and vitreous analysis may also be helpful, particularly in conjunction with blood. If none of these specimens is available, resort can be made to other organ and tissue samples but there are difficulties in both methodology and interpretation of results relating any alcohol present to ingested ethanol. Ethanol in gastric contents generally indicates recent ingestion, but the rapid absorption of ethanol and postmortem diffusion from the stomach may limit the usefulness of analysis of gastric contents. It is possible to measure parameters which are associated with or indicate ethanol consumption. Recently, ethyl glucuronide (EtG), 5-hydroxytryptophol (5-HTOL), gamma-glutamyltransferase (GGT), mean corpuscular volume (MCV) of erythrocytes and aminotransferases were found to have some applications in the clinical and medico-legal settings for determination of alcohol use/abuse history in acute and chronic states.

**Conclusion:** 5-HPTOL and EtG can be considered as new biomarkers for determination of alcohol use/abuse in clinical and medico-legal settings.

**Keywords:** Biological Markers; Ethanol; Forensic Toxicology