GENDER DIFFERENCES IN THE PHARMACOKINETICS OF ETHANOL IN SALIVA AND BLOOD AFTER ORAL INGESTION

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The aim of this study was to compare the pharmacokinetics of ethanol in saliva and blood according to gender and to evaluate the determination of ethanol in saliva for evidential sobriety testing. Twenty-four persons, 12 men and 12 women, took part in the experiments. The subjects received ethanol, as neat 40% v/v vodka, in the amount which should lead according to Widmark formula to the blood alcohol concentration equal to 1.0 g/l. Duplicate samples of an unstimulated mixed saliva secretion and venous blood were taken at 15 min intervals timing from the end of consumption, and ethanol concentrations in both specimens were determined by means of gas chromatography. The pharmacokinetic calculations were done using first-order absorption and Michaelis-Menten or zero order elimination models. In most cases ethanol reached higher maximal concentration in saliva than in venous blood, and was faster eliminated from saliva. The significant gender differences in the time-concentration profiles were observed. The maximal ethanol concentrations, both in blood and saliva, were lower in women compared to men. In females, ethanol was faster excreted from the body. Both experimental (C_{max}) and extrapolated to zero time (C_0) maximum ethanol concentrations were lower in females. The apparent volumes of distribution after oral dose for saliva and blood were very close and did not differ statistically. The study shows that the same factor equivalent to volume of distribution should be used in back calculation of alcohol concentration, and saliva alcohol analysis can be treated as independent method to test sobriety.

Key words: ethanol kinetics, oral administration, concentration-time profile, saliva alcohol, male, female

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