

O2. The influence of ethanol on the accuracy of time since death estimation by the method of laser polarimetry of cerebrospinal fluid polycrystalline films.

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Introduction. The definition of DNS is complicated by the fact that a significant number of exogenous and endogenous factors, such as environmental conditions, the cause of death, anthropological features, the age of a person etc, are affected by posthumous processes occurring in the tissues of the corpse. Recently researchers began to pay attention to the impact of alcohol intoxication on the rate of flow of life processes and posthumous changes in human tissues.

Aim. To study the possible influence of alcohol and to develop objective forensic medical criteria for the diagnosis of its influence on the course of post-mortem processes based on the analysis of the change in the polycrystalline structure of the films of the cerebrospinal fluid (FCSF).

Material and methods. Objects of investigation are FCSF, taken in 30 corpses with accurately known level of ethanol and 10 healthy volunteers without ethanol. Coordinate distributions of azimuth and intensity of laser-induced fluorescence polarization image values were determined for each sample of FCSF in the optical arrangement of the Stokes polarimeter in different spectrum bands of optical emission.

Results. A good level of balanced differentiation of the presence of ethyl alcohol in the human body in the "green-yellow" and "red" sections of the spectrum has been revealed. There is a statistically significant difference between cases of death from cardiovascular disease in the presence and absence of ethyl alcohol in an organism by determining the magnitude of the statistical moment of the 4th order, which characterizes the distributions of the azimuth magnitude of the polarization of microscopic images of laser-induced fluorescence. The revealed differences in the structure of the polycrystalline FCSF can be explained by the influence of ethyl alcohol on the formation of a polycrystalline film network. Probably, ethyl alcohol, penetrating through the blood-brain barrier, affects both the quantitative composition of the medium-molecular compounds and the structure of certain proteins, in particular, the gamma-aminobutyric acid receptors, and thus affects the tertiary and quaternary structure of the proteins of the cerebrospinal fluid, which is reflected in the analysis of polycrystalline films of the cerebrospinal fluid.

Conclusion. An excellent balanced accuracy of the differentiation of the presence of ethyl alcohol in the human body ($Ac(M4) = 90\%$) has been achieved. Consequently, ethyl alcohol affects the structure of polycrystalline films of cerebrospinal fluid, which should be taken into account when time since death estimated using methods of laser polarimetry.

