

34. POST-MORTEM INTERVAL ESTIMATION BY CHANGES IN THE OPTICAL DENSITY OF THE CEREBROSPINAL FLUID WITH THE TIME AFTER DEATH INCREASING

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The ability to accurately determine when death has occurred allows more accurate and with high quality provide the investigation of crimes, so the definition of a post-mortem interval (PMI) covers both medical and legal aspects.

Purpose: to estimate the interval and accuracy of the PMI establishment by generalizing the time dependence of changes in the optical density of the cerebrospinal fluid with the time after death increasing.

Materials and methods: The subject of the study were native centrifuged specimens of the cerebrospinal fluid. The cerebrospinal fluid was taken from 30 corpses of both sexes (the main study group) aged 53 to 78 years PMI from 1 to 6 hours and 20 healthy volunteers (control group).

It is known that the spectral optical density due to absorption of proteins is primarily determined by the spectral dependences of the absorption of optical radiation by amino acids in the structure of proteins. The optical density of tyrosine, tryptophan and phenylalanine is at a maximum in the spectral region from 260 to 290 nm. So the spectral dependence of the post-mortem temporal changes in the optical density of samples of cerebrospinal fluid in the ultraviolet spectrum of electromagnetic radiation in the range of wavelengths from 260 to 380 nm was studied. The choice of spectral range of wavelengths from 260 nm to 380 nm provides a separate possibility to study changes in the concentration of protein compounds under the influence of biochemical changes in the cerebrospinal fluid of the deceased during various intervals after death.

Results: Whith increasing the wavelength there is an optical density drop. Starting from wavelengths larger than 300 nm, proteins and amino acids do not absorb. So, it was found that the change in the optical density of the protein fraction of the cerebrospinal fluid in the range of wavelengths from 280 to 310 nm is interrelated with the PMI.

Conclusion: The spectrophotometric method is suitable for post-mortem interval diagnosing with an accuracy of ± 1 hours at wavelength 280 nm, with an accuracy of ± 1 hours 45 min at wavelength 300 nm, with an accuracy of ± 2 hours at wavelength 310 nm.

Keywords: post-mortem interval, spectrophotometry, cerebrospinal fluid