



### H108 Dead in a Hot Bathtub: A Singular Case of Heat-Related Death

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The goal of this presentation is to examine the histopathological aspects of a rare case of heat-related death.

This presentation will impact the forensic science community by discussing why there is a necessity for a complete methodological forensic approach by means of autopsy and histopathological examination to diagnose rare cases of heat-related deaths are important.

Deaths from extreme heat are defined as those resulting from a high body temperature or in which heat exposure is recognized as a contributing cause (“heat-related deaths”) of death. Heatstroke is a medical emergency characterized by the rapid onset and increase (within minutes) of combined elements (e.g., heat and humidity) on the body. The National Association of Medical Examiners describes that diagnosis may be established from the circumstances of the death, environmental temperature, and/or measured antemortem body temperature at the time of collapse. In cases in which the measured antemortem body temperature at the time of collapse was  $\geq 40.6^{\circ}\text{C}$ , the cause of death should be certified as heatstroke or hyperthermia. This report describes characteristics, circumstances, radiological, toxicological, and histopathological findings of a heat-related death.

A 26-year-old girl was found dead by her boyfriend in 24cm of water in her bathtub. The house was perfectly tidy, the only significant object was the presence, in the bedroom, of an alprazolam bottle. No other drugs were in the house. The body temperature was  $43^{\circ}\text{C}$ , the body was dark red and diffuse, and partially vanishing hypostasis and rigor mortis were present. The water temperature in the tub was  $27^{\circ}\text{C}$  five hours after the discovery of the body. The external examination displayed no visible injuries on the body and the autopsy was conducted three days later. Postmortem radiological study with a Computed Tomography (CT) scan was unremarkable. Toxicological exams revealed a blood alcohol content of 1.72gr/L and benzodiazepines were excluded. Macroscopic examination of all organs was unremarkable. The etiopathogenetic definition was outlined by the histological examinations of all organs and skin samples, using Hematoxylin-Eosin (HE) and immunohistochemical staining method. HE-stained skin samples revealed peeling of the epidermidis, subepidermal gap formation, and cyst-like spaces in the epidermidis, indicative findings of heat damage of the skin. Immunohistochemical staining was performed on the skin utilizing heat shock protein antibodies (HSP90, HSP70, and HSP27) and myoglobin antibodies on muscle and kidney samples. The skin displayed an intense positivity to HSP90 and a decreasing positivity to HSP70 and HSP27; kidney samples exhibited myoglobin residues in renal tubules and muscle samples.

#### Heat-Related Death, Heat Shock, Hyperthermia