G22 Can Immunohistochemical Stains Aid to Rule Out Pitfalls in Suffocation Deaths?

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The goal of this presentation is show the quantitative and qualitative expression of selected markers in specimens of tissues that are affected by various degrees of hypoxic insult using immunohistochemical methods.

This presentation will impact the forensic community by providing data that may be helpful in determining the presence of early hypoxic tissue damage via immunohistochemical methods.

In forensic practice, the identification of mechanical asphyxiation is often very difficult, especially in cases of attempted masking of the homicide, or because of putrefactive alterations of the body. In addition, postmortem dissection artifacts of the neck and their differentiation from ante-mortem bruises sometimes leave doubts at the pathologist examination.

The target of current research is focused on detecting severe tissue hypoxia by a great battery of techniques now avalaible. However, even this limited objective has not been yet obtained with the degree of reliability required for legal purposes.

Cell death, expecially in neurons or myocytes, due to hypoxic damage is the most common focus for research. However, the main problem, in the forensic context, is that a considerable period of hypoxia – usually a minimum of many minutes or even hours - is needed before changes can be detected. In autopsy samples the postmortem and agonal changes may interfere with the early changes of hypoxic damage.

Quantitative and qualitative expressions of selected markers in specimens of tissues that are affected by various degrees of hypoxia insult were evaluated by immunohistochemical method. The relationships between the expression of selected markers and temporal evolution in human tissues were evaluated: the antibody HIF-1α, as a marker of early myocardial ischemia, due to asphixia. HIF-1α is the major trascription factor involved in adaptative cardiac response to hypoxia, whose expression can be a useful tool in those cases with short survival period (as recently shown by Pampin and Coll).

The authors also attempted to use TGF-β expression in neck skin, as a marker of a vital lesion and duration of survival period. TGF-β plays a general function in skin response to injury, both in inflammation and in tissue repair; and it shows different immunohistochemical expression patterns in relation to post-injury time interval.

Finally, the number of pulmonary macrophages with CD68 immuno- histochemical stain was estimated.

The results were evaluated considering the possibility of false negative immunohistochemical staining in tissue with putrefactive alteration.

A total of thirteen cases of suffocation death were studied: 5 cases of strangulation, 6 of hanging, 2 of choking. Negative controls were gained from cases of precipitous death in young people and positive controls from cases of confirmed asphyxial deaths. HIF-1α was tested in myocardial tissues, TGF-β in neck skin samples and CD68 in lung samples.

The results of the retrospective analysis encourage the authors to continue this study in further cases in order to evaluate the applicability of these tests in routine forensic practice.

Axphyxial Death, Putrefactive Alterations, Immunohistochemistry

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