H30 Early Myocardial Ischemia: An Immunohistochemical Analysis of Dystrophin and Matrix Metalloproteinase 9 (MMP-9)

Cristina Mondello, MD, University of Messina, Messina 98123, ITALY; Elvira Ventura Spagnolo, MD, University of Palermo, Palermo 90127, ITALY; Salvatore Roccuzzo, MD, University of Palermo-Messina, Messina 98124, ITALY; Luigi Cardia, MD, University of Messina, Messina 98123, ITALY; Alessio Asmundo, University of Messina, Messina 98123 , ITALY*

Learning Overview: After attending this presentation, attendees will understand that the forensic diagnosis of early myocardial ischemia is based on the knowledge of the immuno-inflammatory pathophysiology and cellular phenomena accompanying cardiac alterations.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing the usefulness of immunohistochemistry to detect early myocardial ischemic damage through the analysis and comparison of C5b-9, fibronectin, dystrophin, and MMP-9 expression.

Sudden Cardiac Death (SCD) is an unexpected natural death due to cardiac causes that occurs within a short time period in a person without any prior condition that appears to be fatal. Coronary Artery Disease (CAD) and ischemic cardiac damage are the main causes of SCD. In cases of cardiac death arising due to ischemia in which the death occurs within six hours from the onset of ischemic damage, the histologic myocardial changes are not specific and cannot provide clear evidence for the postmortem diagnosis.

Immunohistochemical analysis has been suggested as a technique to help bridge the gap in the histologic diagnosis of early myocardial ischemia and several markers have been analyzed.[1] Thus, knowledge about the chronology of the inflammatory reaction and myocardial tissue response after the ischemic insult become very useful in determining immunohistochemical markers relevant to forensic research.

This study evaluates the expression of dystrophin and MMP-9 in cases of SCD due to coronary atherosclerotic disease both with and without definitive microscopic evidence of myocardial ischemia. These proteins have different roles in cardiac tissue: dystrophin is normally expressed in cardiomyocytes contributing in stabilizing the sarcolemma during cardiac contraction and in the transmission of myofibers contraction force, while MMP-9 is a protease generally associated with degradation and regulation of the extracellular matrix and recently related to regulatory mechanism for precise cellular control of biological processes. Their expression was also compared to C5b-9 complex and fibronectin expression to analyze if markers provided the same or no findings.

Results of this study revealed that dystrophin and MMP-9 show different post-ischemic time-dependent expression as, respectively, depletion of sarcolemmal staining and increasing of interstitial and leukocytes immunopositivity occurs. Dystrophin and MMP-9 seem to be useful immunohistochemical markers for the detection of early ischemic damage. These proteins (and especially dystrophin) show early modification of expression as well as of C5b-9 complex.

Reference(s):

1. Mondello C., Cardia L., Ventura-Spagnolo E. Immunohistochemical detection of early myocardial infarction: A systematic review. *Int J Legal Med.* 2017; 131:411–421.

Myocardial Ischemia, Immunohistochemistry, MMP-9

*Presenting Author