H83 New Biomarkers of Myocardial Necrosis Identification in Decomposed Bodies

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Learning Overview: In cases of prolonged postmortem interval, the forensic histopathological diagnosis is limited due to autolysis and putrefaction processes and detecting early Myocardial Infarctions (MIs) can be challenging. After attending this presentation, attendees will know two potential new biomarkers of myocardial necrosis identification in decomposed bodies: CD 68 and Myeloperoxidase (MPO).

Impact on the Forensic Science Community: This presentation will impact the forensic science community by informing attendees that the autopsy has always had a critical importance as well as the histologic findings in MI diagnosis in medical malpractice cases. Using antibodies to human CD68 and MPO and their application in forensic fields may be an sensitive diagnostic tool to enhance accuracy of postmortem diagnosis of MI in putrefied bodies.

MI is one of the main sequelae of coronary heart disease and one of the most common causes of death worldwide.[1] Many medical malpractice claims are attributable to misdiagnosis, however.[2] Traditionally, the postmortem diagnosis of MI is made via histopathology using a combination of Hematoxylin-Eosin (H&E) staining and immunostaining on preserved heart tissue. In the case of decomposed myocardial tissue, immunohistochemistry plays a particularly important role in reaching the diagnosis of MI. In fact, although biological structures are predisposed to autolysis in the postmortem period, leukocytes and the nuclei of granulocytes are very resistant to autolysis and putrefaction.[3]

While there are many studies published in the scientific literature regarding postmortem MI diagnosis and timing of early ischemic injury, only a few studies have been performed on putrefied bodies. In these few studies, some immunohistochemical markers were found to improve diagnostic accuracy, including C5b-9 and NP57.[4] The current study examines two new biomarkers to determine whether they might potentially further improve diagnostic accuracy in cases of putrefied bodies.

Human CD68 is a transmembrane glycoprotein expressed in monocyte lineages and some other leucocytes. MPO is a heme-containing peroxidase stored in azurophilic granules of polymorphonuclear neutrophils and macrophages and released into extracellular fluid during inflammatory processes. These white blood cells are recruited immediately after an ischemic cardiac event. An immunohistochemical study was performed to evaluate morphologic changes in heart samples procured from eight autopsies performed on decomposed bodies after variable postmortem intervals ranging from 3 to 11 months. All were cases of presumptive medical malpractice due to the misdiagnosis of MI.

Control hearts from traumatic death cases did not show any immunoreactivity to MPO or CD68 markers. Immunohistochemical investigations of CD68 and MPO were able to confirm an MI diagnosis in all eight decomposed cases. Overall, these results suggest that autopsy plays a critical role in detecting histologic findings diagnostic of MI in potential medical malpractice cases. Using antibodies to human CD68 and MPO may increase postmortem diagnostic sensitivity in cases of suspected MI in putrefied bodies.

Reference(s):

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Acute Coronary Syndrome, Ischemic Heart Disease, Myocardial Infarction

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