H86 Heart Fatty Acid Binding Protein (H-FABP): Early Detection of Myocardial Infarction in Postmortem Analysis

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The goal of this presentation is to illustrate that with the biomarker H-FABP, early Myocardial Infarction (MI) can be detected.

This presentation will impact the forensic science community by providing a new tool to detect early myocardial infarction with the biomarker H-FABP. This may become a valuable asset for forensic pathologists. This presentation will also provide an opportunity for attendees to explore their ability and performance for the benefit of forensic science.

Postmortem detection of MI is still a challenge for forensic pathologists. Acute MI occurs when the blood supply to the heart is diminished for an extended period of time and the myocardial cellular repair mechanisms fail to maintain homeostasis and re-establish normal cellular functions. In cases where the delay between MI and death is within three to six hours, routine histological microscopic analysis fail to provide enough information since the morphological changes of the damaged tissue are not identifiable. Early detection of MI in postmortem analysis is a valuable asset for forensic pathologists in determining the cause of death.

Following ischemic injury to the muscle tissue of the heart (cardiac tissue), certain chemicals (biomarkers) are released by the damaged cells which can be detected microscopically, utilizing immuno-histochemical techniques. Biomarkers, measurable chemicals released by the damaged cells, are regularly used in diagnosis of MIs in hospitals. This research is a follow-up to a study published in 2012 which analyzed the efficiency of two biomarkers, Troponin-I and Complement C-9, or the early detection of MI.[1]

This study focuses on a new biomarker, H-FABP, in early MI detection. H-FABP is the common name for the gene protein FABP3. This biomarker of interest is a transport protein, oxygenating long chain fatty acids in the cardiac muscle cells located in the myocardium. H-FABP may prove to be a very useful biomarker in early detection of MI with the quick release time of 30 minutes after symptoms have occurred. H-FABP appears to be a very good candidate in early detection of MI in tissue samples, specifically for cases where the conventional Hematoxylin-Eosin (H&E) staining failed to reveal the evidence of such MI. It reveals that MI may be detected within six hours of the onset of symptoms utilizing immune-histochemical staining of the cardiac tissue with H-FABP.

The present study reveals that all the cases in the group where the cause of death was reported as the myocardial infarction at less than six hours showed a negative/remarkably reduced staining whereas the viable myocardium showed a very positive staining for the H-FABP. The biomarker, H-FABP seems to have great potential in detecting the early MI. This early detection of MI will definitely assist in determining the time and cause of death in forensic cases. With no standardized method of determining early MI with routine histology, this research utilizing H-FABP with immuno-histochemical techniques provides a vital asset to pathologists in the near future.

Reference(s):

1. Jasra S.K., Badian C., Macri I., Ra P. Recognition of Early Myocardial Infarction by Immunohistochemical Staining with Cardiac Troponin-I and Complement C9. *J Forensics Sci*. 2012:57(6):1595-1600.

H-FABP, Myocardial Infarction, Biomarker