G46 The Role of Postmortem Cardiac Enzymes in the Diagnosis Acute Cardiac Deaths

Nick I. Batalis, MD, and Bradley J. Marcus, MD, Christine N. Papadea, PhD, and Kim A. Collins, MD, Medical University of South Carolina, 165 Ashley Avenue, Main Hospital, Suite 281, PO Box 250108, Charleston, SC 29425*

After attending this presentation, attendees will have a greater understanding of biomarkers of acute myocardial injury and their role, or lack thereof, in the postmortem diagnosis of myocardial infarction. The information presented here will help guide the investigations and autopsies in cases of suspected acute cardiac deaths.

Sudden deaths due to myocardial infarction compose a large percentage of the workload of investigators, coroners, and forensic pathologists and others whose work involves death investigation. This presentation will impact the forensic community and/or humanity by aiding these workers in the approach and workup of suspected acute cardiac deaths. While biomarkers of myocardial damage may have some utility in the diagnosis of acute cardiac deaths, they should not be used exclusively to make the diagnosis. As deaths certified due to myocardial infarction occasionally incite legal battles involving employers and treating physicians, it is of the utmost importance to correctly classify these deaths and not simply rely on a single or series of biological markers. In addition, performing routine postmortem markers of myocardial damage can be costly and may consume resources that could be better utilized on other testing or equipment.

Sudden cardiac deaths due to myocardial infarction constitute a large percentage of the caseload for death investigators, coroners, and forensic pathologists. While sometimes one has a high level of suspicion of a myocardial infarction at autopsy, it is only by finding a thrombus or seeing characteristic gross or microscopic morphological changes in the myocardium that one can definitively make this diagnosis. Because of this, researchers continue to seek out a more sensitive method of determining acute myocardial damage. For years, treating clinicians have been able to measure serum levels of proteins and enzymes normally contained within the myocardium. Increased serum levels of these markers have been shown to be highly sensitive and specific for myocardial damage. The preferred markers have changed over time, but currently three of the more reliable markers include troponin (isoforms I and/or T), total creatine kinase (CK), and CK-MB a more specific isoform of CK.

Various authors have investigated the role of postmortem cardiac markers at autopsy and have had varying results. Some of the studies include a correlation of postmortem and antemortem levels of cardiac markers, a comparison of postmortem serum and pericardial fluid levels, and several have attempted to determine if postmortem levels are significantly higher in deaths due to myocardial ischemia than due to other causes of death. To date, though, there has not been a standardized study determining postmortem levels of cardiac markers from serum of different anatomic locations.

The current study included ten decedents, five with histories suspicious for myocardial infarction and confirmed at autopsy, and five control subjects who died of non-cardiac disease. For each decedent, six different samples (pericardial fluid and serum from the femoral veins, subclavian veins, aorta, left cardiac ventricle, and right cardiac ventricle) were drawn and tested for CK, CK-MB, and troponin-I (TnI). Three main conclusions were drawn; the levels of cardiac markers from the control group are significantly higher than the reference range for living patients; there are significant differences in the levels are cardiac markers between serum samples from different anatomic locations; and only three cardiac marker/anatomic site combinations were significantly different between the control and study groups (femoral/TnI, right ventricle/CK-MB, and pericardial fluid/CK-MB). These complete findings, a review of the literature, and a discussion about the role of postmortem cardiac markers in detecting acute myocardial damage will be discussed.

Cardiac Enzymes, Acute Myocardial Infarction, Death

 ** Presenting Author*