G80 Postmortem Interval and Cardiac Troponin Effect

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The goal of this presentation is to show the cardaic troponin effects in PMI and its value in daily forensic use.

This presentation will impact the forensic science community by demonstrating the statistical data of the cardiac troponins experimentally and the estimation of PMI accordingly and also the daily use of it.

In clinical practices, cardiac troponins (cardiac myofibril- specificproteins) are specific markers of myocardial damage. In addition, measurements of cardiac isoform of troponin are recognized as important tests in the postmortem diagnosis of myocardial necrosis when such a lesion is suspected but cannot be established. Previous studies have suggested the possible application of these markers in the postmortem diagnosis of acute myocardial infarction. However, some reports showed that elevated postmortem cardiac troponin I (cTnT) levels in cardiac tissue and pericardial fluid may reflect postmortem interval. Postmortem interval may provide valuable information for

evaluation cases in both criminal and civil law pursuits, for their elucidation as well. Time-since-death markers have lagged behind the progress in technology of the past years. Since the earlier attempts, failed to meet the definite postmortem interval, for variable reasons with much success, the postmortem biochemical changes in various body fluids and tissue have been tried for the estimation of time of death. The degradation of cardiac Troponin I in myocardial tissue and pericardial fluid has been investigated. The goal of this study is to investigate the potential use of myocardial tissue and pericardial fluid cTnI level as an estimator of postmortem interval. Cases selected from routine necropsies performed in the Council of Forensic Medicine, Istanbul. Samples were obtained from 98 deceased, where exact postmortem interval was known. Isolation of cTnI from heart tissue and pericardial fluid was chosen because it is found in a highly protected internal location.

The findings were elucidated according to patient records, scene of death, autopsy, and complementary toxicological and histological studies, depending on the probable intensity of myocardial damage and cause of death. No statistically significant difference was found between cause of death and titration alterations of cTnI in cardiac tissue and pericardial fluid speciments ($p>0.05$). On the other hand, alteration in the level of cTnI in the pericardial fluid dependent on the period of time after death showed statistically significant positive correlation ($r=0.523$ $p<0.0001$). Especially differentiation between period of first 12 hours after death and interval beyond could be established within confidency interval of 95% using the estimation of pericardial fluid cTnI level. Meaningful statistical correlation in between the pericardial effusion and cardiac tissue cTnI titrations($r=0.427$ $p<0.0001$) was noticed. This result shows us the protein degrading effect of the PM autolysis to the pericardial effusion. This is a similar finding with the similar studies and it is very valuable to show the autolytic degradation instead of the reflection of the tissue necrosis. The positive correlation between the level of pericardial fluid cTnI and the postmortem interval and discriminative properly of this marker for estimation of the postmortem interval should provide a superior tool for this purpose. The data presented demonstrates that this technique represents a major advance in time since death determination providing reliable quantitative biochemical markers from a protected organ versus estimates such as those based on direct temperature measurements.

Furthermore, it could be shown that cardiac tissue is not influenced by autolytic changes in the postmortem interval to a considerable extent. Although previous forensic pathological studies have suggested the possible application of cardiac troponins in the diagnosis of myocardial infarction, there appears to be insufficient data with regard to its influence of postmortem interval. These results suggest that immune enzymatic studies concerning postmortem differential diagnosis of myocardial infarction may provide considerably reliable data with probability of false positive results on a negligible level. In forensic medicine, there is a need for more sensitive biochemical markers for estimation of postmortem interval and diagnosis of myocardial injury. A study of the distribution of biochemical markers in different fluids is of great significance in postmortem diagnosis, because their distribution depends on the location of tissue damage and release kinetics. Further studies are required to compare these results and create the possibility for new conclusions.

Postmortem Interval, Cardiac Troponin I, Forensic Autopsy

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