G126 Motor Vehicle Crash Involving an Elderly Woman With Undiagnosed Giant Cell Myocarditis

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After attending this presentation, attendees will be able to debate proposed National Association of Medical Examiners (NAME) standards for investigations of motor vehicle crash fatalities and be able to identify the histologic pattern of giant cell myocarditis.

This presentation will impact the forensic science community by discussing some of the controversy surrounding creation of autopsy performance standards for investigation of motor vehicle crashes.

A 92-year-old woman was traveling down a residential street when her vehicle impacted a maintenance vehicle on railroad tracks that crossed perpendicular to the road. No evasive action or braking was noted. Externally, she had obvious long bone fractures of the lower leg and forearm, but no other potentially lethal external trauma was noted.

With recent proposed changes to autopsy performance standards from NAME regarding autopsies of drivers of motor vehicle crashes where no external trauma to account for death is present, an autopsy was conducted. At autopsy, internal exam revealed a large pericardial sac laceration and a right atrial laceration with an associated 1200ml. right hemothorax and right-sided rib fractures. Medical disease apparent on gross examination was significant only for mild coronary arterial atherosclerosis and no acute gross anatomical findings to account for death other than the injuries.

Per recent proposed changes for the NAME histological examination autopsy performance standard recommending histological exam when no cause of death is forthcoming on gross or toxicological exam or based on circumstantial evidence, submission of tissue for microscopic examination would not have been necessary. Because of the academic nature of this institution; however, histology is routinely performed on all major organs including the heart in the vast majority of autopsies. Unexpectedly, histological examination of the heart revealed a diffuse, multifocal, mononuclear inflammatory infiltrate with abundant eosinophils and rare, poorly formed granulomas with multinucleated giant cells within the interstitium, focally migrating into the surrounding myofibrils within the interventricular septum and left ventricle. Conversations with the next of kin disclosed that the decedent had been diagnosed with myasthenia gravis within the preceding few years. The histologic and circumstantial evidence was consistent with giant cell myocarditis.

Mononuclear and granulomatous myocarditis is a subset of inflammatory ailments of the heart that includes but is not inclusive of toxic myocarditis, infectious etiologies including tuberculosis, fungal and parasitic etiologies, sarcoidosis, autoimmune disorders, and hypersensitivity reactions.[1] In particular, giant cell myocarditis has been associated with intractable ventricular tachycardia and other arrhythmias and tends to occur in younger people with an average age of onset of 42.6 years +/-12.7 years.[2,3] A very extensive review study of granulomatous inflammatory disorders of the heart at autopsy uncovered the importance of giant cell myocarditis in the medicolegal arena in cases of apparent sudden death, especially in a younger age group.[4] Giant cell myocarditis is often associated with numerous autoimmune disorders including type 1 diabetes, systemic lupus, rheumatoid arthritis, alopecia totalis, and myasthenia gravis often associated with thymomas.[1,5-7] Giant cell myocarditis tends to have more eosinophils with myocardial fiber necrosis and poorly formed granulomas compared with the histologic pattern of sarcoidosis while sarcoidosis tends to have prominent granulomas and more fibrosis.[4,8]

This presentation will impact the forensic science community by discussing some of the controversy surrounding creation of autopsy performance standards for investigation of motor vehicle crashes. The recent proposal by NAME regarding autopsies of decedents in motor vehicle crashes has not been without some controversy especially when adherence to a revised standard may diminish the coroners/medical examiners/pathologists' discretion in triaging cases. Similarly, the suggested changes in the NAME standard for histological examination of tissues have also generated much discussion. As this case demonstrated, even adherence to the most comprehensively worded standards may miss rare findings.

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