H57 Unexpected and Sudden Cardiac Death Due to Eosinophilic Myocarditis (EM): Still a Difficult Task for Forensic Pathologists

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Learning Overview: The goal of this presentation is to highlight that that antemortem diagnosis of EM is difficult due to ambiguous and non-specific symptoms. Although predisposing factors exist, EM may occur in healthy persons with no history of hypersensitivity. Death due to EM could be avoided through a prompt diagnosis and the administration of appropriate therapy.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by emphasizing the importance of exhaustive and detailed cardio-pathological analysis in cases of sudden and unexpected death. The anamnestic analysis (when possible) is also fundamental to track down any prodrome or predisposing factors. Although infrequent, EM must always be considered in cases of sudden death, even in young subjects and in the absence of specific symptoms.

In this presentation, a rare case of unexpected death caused by an undiagnosed and undetected EM is described. This topic is still controversial, even though myocarditis represents one of the main causes of sudden cardiac death. The criteria for the diagnosis of EM are debated in the forensic science community, and no standard protocol has been agreed upon.

Case Report: A 52-year-old man, in apparent good health, suddenly died while he was working as an accountant. According to the medical history, he suffered a mild temperature and diarrhea about ten days before death; however, the symptoms had disappeared after two to three days. He had no previous history of chronic or autoimmune pathologies, allergies, drug abuse, parasitic infections, or recent vaccinations.

Autopsy Findings: The external examination was unremarkable. The macroscopic heart examination showed no significant signs of hypertrophy. The coronary arteries were patent and free of moderate/severe atherosclerosis. The myocardium appeared flaccid, dilated, and pale. The lungs were edematous and congested. There were no other macroscopic pathological findings.

Microscopic Examination: Hematoxylin and eosin-stained histologic sections showed inflammatory myocardial damage of the subepicardial and mid-mural region of the right ventricle and the anterior and posterior wall of the left ventricle. The inflammatory myocardial infiltrate consisted of many eosinophils (partially degranulated), macrophages, and a few neutrophils and T lymphocytes. Immunohistochemical analysis showed largely CD15+ and CD68+ cells. Toxicologic investigations did not reveal the presence of drugs or substances of abuse.

Discussion and Conclusion: In this case, a complete forensic approach led to the conclusion that death was caused by a fatal arrhythmia related to the extensive myocardial inflammatory damage (EM). The World Health Organization (WHO) defines myocarditis as "an inflammatory disease of the heart muscle, diagnosed by established histological, immunological and immunohistochemical criteria." EM is an uncommon but potentially lethal type of myocarditis. The clinical as well as postmortem diagnosis of EM is difficult and often underrated. A comprehensive cardio-pathologic investigation is mandatory for a postmortem diagnosis of EM. Extensive myocardial sampling circumferentially, including the left and right ventricles in transverse section (as advised by the Association for European Cardiovascular Pathology guidelines), is always required.[1]

The histology of EM changes significantly depending on the extent and composition of inflammation, as well as associated myocardial damage. Necrosis of myocardial cells can be absent, focal, multifocal, or rarely extensive. Eosinophils can be preponderant or be a portion of mixed inflammatory cells with macrophages, plasma cells, lymphocytes, and even neutrophils. The role of the forensic pathologist is particularly important in correctly identifying EM at autopsy, particularly in cases that have remained undiagnosed antemortem. Because symptoms are non-specific and underestimated, the diagnosis is often not made until the time of autopsy. On completing this presentation, attendees will have gained knowledge of EM, including how a complete forensic investigation is essential to ascertain the cause of death.

Reference(s):

1. C. Basso et al. Guidelines for autopsy investigation of sudden cardiac death: Update from the Association for European Cardiovascular Pathology. *Virchows Arch.* 2017; 471(6):691–705.

Eosinophilic Myocarditis, Sudden Cardiac Death, Autopsy