

H104 Death in the Water? Not Always Drowning!

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Learning Overview: After attending this presentation, attendees will understand the importance of external examination, autopsy findings, and histological and immunohistochemical studies in a singular case of a child dying as a result of acute fulminant myocarditis.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by explaining the necessity of a complete autopsy and histopathological examinations to assess the real cause of death when it would seem simple.

Acute fulminant myocarditis is a disease of unclear pathophysiology and etiology, uncertain diagnosis, and variable presentation.¹ The World Health Organization (WHO) and the International Society and Federation of Cardiology (ISFC) define myocarditis as an acute, chronic, or fulminant inflammatory disease of the heart muscle, diagnosed by the histological, immunological, and immunohistochemical method.² A variety of etiologies, including systemic illness, drugs, and infectious agents, have been implicated; however, for a proportion of cases, the cause remains unknown.³ Clinical presentation of myocarditis range from mild dyspnea and non-specific symptoms (fever, chest pain) to life-threatening ventricular arrhythmias, cardiogenic shock, and sudden death.⁴ Children more frequently have fulminant myocarditis. The histological diagnosis of myocarditis is based on the manifestation of an inflammatory infiltrate of the myocardium with necrosis and/or degeneration of adjacent myocytes.⁵ Immunohistochemical techniques improve the diagnosis through characterization and quantification of myocardial inflammatory reactions.⁶ The immunohistochemical investigations show an increased number of CD45R0+-T-lymphocytes in myocardial samples.⁶

Case Report: A 6-year-old male was found dead at sea. He was taken out of the water, but, despite cardiopulmonary resuscitation, the doctors certified the death. External examination did not show any visible injuries on the body and no plume of froth at the mouth and nostrils. In the fingers, a blueish coloration was observed; a white foamy, frothy material was also observed on the naris. A complete autopsy was performed two days after death. Cervical and thoracic organs were dissected with Gohn's technique (*en bloc*). No significant findings were observed during the autopsy, and there were no signs of froth in the trachea. The macroscopic examination of all organs was unremarkable. Histological examination of all organs using Hematoxylin-Eosin (H&E) staining was performed. Lung samples showed edema and abundant inflammation. The H&E-stained heart samples showed diffuse round cell infiltration with focal necrosis of cardiac myocytes. A marked lymphohistiocytic infiltrate was present diffusely in all chamber walls, accompanied by histiocytes and plasma cells. Immunohistochemical staining was performed on the lungs and heart, utilizing antibodies directed against helper T cells (CD4), cytotoxic T lymphocytes (CD8), and B lymphocytes (CD20). The immunohistochemical-stained lung samples showed a strong positivity for CD8 lymphocytes. The immunohistochemical-stained heart samples showed a strong positivity to CD4, CD8, and CD20, diffusely in all chamber walls.

The external examination and the macroscopic and microscopic findings contributed to an exclusion of a drowning death. The histological examination and the immunohistochemical study of the heart allowed the death to be attributed to an acute fulminant myocarditis in an apparently healthy child.

Reference(s):

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Fulminant Myocarditis, Immunohistochemistry, Inflammatory Cardiomyopathy