H34 Two Instances of Sudden and Unexpected Infant Death (SUID) in Siblings With a Shared Mutation in Plakophilin 2 (PKP2)

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After attending this presentation, attendees will learn the value and limitations of the molecular autopsy in investigation of multiple cases of SUID within the same family and learn of a potentially arrhythmogenic mutation.

This presentation will impact the forensic science community by showcasing the evolution of investigations into multiple SUID cases, and the value and limitations of the molecular autopsy.

SUID remains one of the most actively studied and yet least completely understood areas of forensic medicine. More challenging still are instances of multiple SUID cases within the same family. Historically, some of these cases have resulted in criminal convictions, of which some of have been deemed wrongful and have been overturned on appeal.

More recently, non-structural genetic heart disease has been recognized as a potential cause of SUID, and, with postmortem genetic testing, is being identified more frequently. Presented are the cases of two full siblings presenting with SUID, with a shared genetic mutation that may account for death.

A 10-week-old girl was discovered dead in her crib approximately one to two hours after she was last fed. Resuscitation attempts were not successful. Scene investigation was non-contributory. An autopsy revealed no significant external or internal trauma or natural disease. Toxicological, biochemical, radiological, bacterial, viral, and metabolic studies were negative or non-contributory. A police investigation revealed no criminal suspicion. The cause of death was undetermined.

Approximately two years later, a 1-month-old full sibling was discovered dead in his bassinet approximately two hours after he was fed and put to sleep. The family history of SUID was disclosed immediately to death investigators. An autopsy was performed, with the additional steps of cardiac pathology and neuropathological consultation; however, no anatomical cause of death was identified. Similarly, scene investigation, ancillary tests, and the police investigation were negative. The cause of death was undetermined. The initial autopsy, including histology, was reviewed, with no new findings identified.

Postmortem genetic testing revealed both infants to be heterozygous for a recognized mutation of unknown significance of the PKP2 gene (c.473 G>A; p.R158K). Loss of function mutations in this gene have been associated with Arrhythmogenic Cardiomyopathy (AC/ARVC). This mutation has been reported in individuals with signs and symptoms of AC/ARVC, as well as asymptomatic individuals.

Following these tests, the cause of death in both cases was still given as undetermined, with discussion of the mutations included in the opinion. Family members met with the death investigation team, who conducted assessment at an arrhythmia clinic for first-degree relatives.

These cases illustrate the difficulties posed by multiple cases of SUID in the same family, the breadth and depth of the required investigations, and the value and limitations of the molecular autopsy in identifying potential disease-causing mutations.

Sudden Unexpected Infant Death, Molecular Autopsy, Arrhythmogenic Cardiomyopathy