G60 Sudden Death in a Professional Soccer Player Due to Left-Dominant Arrhythmogenic Cardiomyopathy

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The goal of this presentation is to present a case of sudden death during a soccer match of a player affected by an undiagnosed Arrhythmogenic Right Ventricular Disease (ARVD) characterized by an atypical localization in the left ventricle.

This presentation will impact the forensic science community by explaining a sudden unexpected death occurring during physical activity, specifically in professional soccer, in a young man affected by a rare Left-Dominant Arrhythmogenic Cardiomyopathy.

Arrhythmogenic cardiomyopathy generally affects the right ventricle (ARVD) and more rarely invades the left ventricle, too. The basis of this cardiomyopathy consists of a replacement of the heart muscle tissue with fibrous and adipose tissue, associated with an inflammatory infiltrate, caused by myocellular death. This pathologic tissue may cause, in unforeseen and infrequent circumstances, the triggering and the protraction of fast cardiac arrhythmias, including ventricular fibrillation, that may lead to cardio-circulatory collapse. This case report describes a sudden arrhythmic cardiac death due to Arrhythmogenic Cardiomyopathy (AC), precipitated by intense physical exertion.

During an Italian championship soccer match, Serie Bwin, a 25-year-old professional soccer player, fell to the ground, lost consciousness, and died. He had no clinical or electrocardiographic manifestation of heart disease based on prior clinical and instrumental examinations (electrocardiogram, exercise electrocardiogram or stress test, and echocardiography) performed by his football organization.

A complete postmortem examination was performed 24 hours after death. The external examination was unremarkable. The internal examination revealed a normal-size heart and macroscopic features compatible with the agonistic activity performed by the player. Sections of the heart, taken using the "short axis" method, showed an area of scarring in the subepicardial region of the left ventricle and the posterior and lateral areas of septum. In the area of scarring, the wall of the left ventricle appeared thin (0.9cm). The scar tissue measured 0.4cm in thickness and 3.5cm in length. The examination of the right side of the septum and right ventricle did not show any macroscopic alterations. The other organs did not show specific alterations, except for intense vascular congestion and generalized edema.

The histological examination of the heart, performed with hematoxylin-eosin, Acid Fuchsin Orange G-stain (AFOG), and Mallory and Azan stains, revealed normal conformation of the tissue and vessels of the myocardium. In the posterior wall of the septum and in the lateral wall of the left ventricle, a replacement of the ventricular myocardium was present with fibrous and adipose tissue, and the remaining myocardiocytes showed different sizes, vacuolization of sarcoplasm, and large and irregular nuclei. In the right ventricle, with preserved structure, there was an area of subendocardial connective reinforcement and limited interstitial fibrosis. Histological findings of the other organs showed severe stasis. The histological examination led to the diagnosis of left-dominant arrhythmogenic cardiomyopathy as the cause of death.

The limited amount and distribution of altered tissue in the left ventricle justified the normality of clinical and instrumental results obtained during the frequent screening examinations performed annually by the player for his soccer team.

The left-dominant arrhythmogenic cardiomyopathy, although of limited size, is recognized as a high arrhythmogenic potential without evident mechanical consequences on the cardiac pump, which explains, in affected athletes, the possibility of a normal competitive performance until the lethal arrhythmic event.

Arrhythmogenic Cardiomyopathy, Sudden Cardiac Death, Soccer Player

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