G89 Cardiac Death in Anabolic Steroid Abuse: A Pathological and Toxicological Study

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After this presentation, participants will understand the proposed methodological approach in analysis of cases of doping-related death. The presentation will cover reports in the scientific literature of doping-related deaths due exclusively to the use of anabolic androgenic steroids (AAS).

This presentation will impact the forensic science community by highlighting the importance of a correct methodological approach in such cases, and the possible cause-effect relation between AAS intake and cardiac death.

The true extent of doping is underestimated. The absence of chemico- toxicological findings in biological samples is a limitation in epidemiologi- cal studies, conducted as surveys on the living or case histories of the dead. Literature reports of doping-related deaths due exclusively to AAS confirm that the phenomenon is underestimated and that epidemiological data from postmortem and intra vitam studies are contradictory.

The present work describes two cases of the death of young athletes who had taken AAS; cardiopathological evidence is discussed in relation to studies in the relative literature.

The methodological approach is based on the following steps:
(1) assessment of circumstances, (2) analysis of medical documentation,
(3) external examination and autopsy, (4) microbiological analysis,
(5) chemico-toxicological analysis, and (6) interpretation of results.

Case 1 - A body-builder aged 32 was found dead in his home. Medical history: Subject had taken AAS for years. He had recently stopped taking them, due to unidentified side-effects. Postmortem findings: External examination, excessive muscular development. Cadaveric section: cardiomegaly, with concentric hypertrophy of the left ventricle (LV). Histology: focal lymphocytic myocarditis and adipose distrophy in disarray at the apex of the right ventricle. Microbiological analysis: Molecular study by Polymerase Chain Reaction (PCR): negative for cardiotropic viruses. Toxicological analysis: Screening and confirmatory chromatographic techniques to search for xenobiotics were negative.

Case 2 - A body-builder aged 31, accustomed to practicing martial arts, unexpectedly lost consciousness during training. Hospitalized in intensive care, he died 72 hours later of cardiac failure and acute hepato-renal failure.

The medical history included astenia, dyspnea, and perimalleolar edema. The clinical picture had worsened ten days before death. Also was reported long-term intake of AAS (boldenone, dromostanolone, enanthate methenolone, stanozolol, trenbolone). Postmortem external examination: Excessive muscular development. Cadaveric section, dilatative cardiomyopathy, with endocardial thrombosis. Histology: Marked dysmetria of hypertrophic myocytes, with diameter up to 30 µ; dyschromic and dysmetric nuclei, evident interstitial fibrosis, and rare inflammatory infiltrates. The subendocardial trabeculae, especially of the right ventricle (RV), showed extensive areas of colliquative myocytolysis in repair phase. Microbiological analysis: Molecular study by PCR positive for Epstein- Barr Virus (EBV). Toxicological analysis: Screening (GC-MS) and chromatographic (GC-MS/MS) confirmatory techniques to reveal xenobiotics in hair were positive for AAS (stanozolol).

A cause-effect relation between AAS and cardiac death can only be demonstrated by applying rigorous methods of investigation. Further clinical and experimental studies are needed for further in-depth knowledge of the pathogenetic and physiopathological role played by AAS in causing cardiac death. In particular, clarification is needed on the possible effects of AAS on sympathetic control of the cardiac function, related to myocardial contractility and vascularization.

Anabolic Androgenic Steroids, Cardiac Death, Doping

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