H72 Histopathology of Drug Abuse: A Retrospective Study on 312 Cases

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After attending this presentation, attendees will better understand about the postmortem histopathologic pattern in a large group of drug abusers.

This presentation will impact the forensic science community by providing the results of a histopathologic postmortem study, conducted on a large series of drug abusers in order to clarify the physiopathology of organ damage due to drug abuse.

The goal of this study is to evaluate the postmortem histopathologic pattern in drug abusers retrospectively analyzing the records of two institutes of legal medicine and two adjoining countries. The use of exogenous substances, both illicit and lawful, for recreational purposes is widespread and the effects of drugs can be observed in both surgical pathology and in forensic practice, as it is often the cause of death by itself or associated with other diseases. Multiple drug intoxication or abuse is also a great issue for the forensic pathologist because, in these cases, it is difficult to understand the effects of each substance. This retrospective research focuses, primarily, on cardiac and encephalic alterations due to both illegal drugs (most of which were heroin and cocaine) and lawful substances (benzodiazepines, barbiturates, etc.) and on the relationship between the type of substance, the cause of death, and the histopathologic findings.

This study included 312 cases of intoxication that were autopsied between 1999 and 2015. The police and medical records, the autopsy report, the results of toxicological exams, and the histology (on hematoxylin-eosin slides) were re-examined for each case.

Thirty-two cases were excluded because of putrefaction that hampered the histologic examination and the toxicological analysis. The entire series was classified into two groups: deaths due to drug intoxication (200) and deaths of drug abusers for other causes (80). The latter group included traumatic deaths, such as traffic accidents, homicides (mostly blunt force injuries and asphyxia), and suicides (fall from a height, hanging). The detected substances were arranged into illicit drugs (cocaine, synthetic stimulants, heroin, marijuana) and lawful substances (benzodiazepines, barbiturates, etc.), often associated with alcohol assumption. Overall, the most interesting microscopic alterations regarded the brain and heart. Concerning the heart, fibrosis, both interstitial and perivascular, small vessels disease, with thickening and vasculitis, fragmentation of cardiomyocytes, and atherosclerosis at a young age were detected. A broad spectrum of neuropathological changes were encountered among both groups. The most frequent findings were vessel thickening, micro-hemorrhages, edema, and metabolic disorders. Differences between the two groups were assessed, resulting in a significant contrast. Then, histopathological findings were correlated with the type of substance detected at toxicology (and/or known from circumstantial data and anamnesis), again with remarkable differences.

The most frequent cardiac disorders reported in drug abusers included vasoconstriction of coronary arteries (inhibition of NO synthesis and stimulation of endothelin-1 release) and decreased blood flow to the myocardium; alteration of coagulation (platelet function); endothelial dysfunction (induction of von Willebrand factor in endothelial cells), and prothrombotic state, which were consistent with the present findings. Regarding neuropathologic pattern, edema, vascular congestion, ischemic nerve cell damage, and neuronal loss were always found but were not specific. In light of this study, further research is needed in the field of neuropathology.

Drug Abuse, Histopathology, Intoxication