



Pathology & Biology Section – 2005

G15 Interpreting Lesions to the Conduction System of the Heart in Case of Death Pursuant to Cocaine Ingestion

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The goal of this presentation is to evaluate the potential role of the pathological lesions of the conduction system in the pathomechanism of death in cocaine users and to demonstrate the difficulties of forensic investigations when death is preceded by cocaine ingestion.

This presentation will impact the forensic community and/or humanity by presenting several cases in which it was concluded that pathological lesions in the conduction tissue may play a role in the occurrence of death attributed to intoxication following cocaine ingestion

Since 2000, there has been a considerable increase in cocaine use and cocaine traffic in Switzerland. This trend is matched by an increasing number of deaths attributed to intoxication in the presence of cocaine and of its metabolites. However, it is not always clear whether intoxication is the sole cause of death.

Any forensic scientist will agree that death can be attributed to intoxication only after a complete autopsy, which includes histological analyses. Potentially lethal levels of a drug must be found and any other cause of death must be excluded. A rigorous approach is especially important in the case of drug users, which may occasionally present very high levels of certain substances without any sign of severe intoxication.

In the case of death after cocaine ingestion, the interpretation of the results of toxicological analyses carries an additional difficulty. Some victims present pathological lesions, such as cardiovascular lesions, that may or may not be linked to repetitive cocaine ingestion. The long-term and short-term cardiovascular toxicity of cocaine is well established. Some pathologies, caused by cocaine ingestion and which may in fact explain the observed death, can be identified through a macroscopic examination. Such is the case for a cerebral hemorrhage or the rupture of an atheromatous plaque in the coronary artery.

Cocaine use is also known to cause cardiac rhythm disorders, some of which have morphological substrates that can be detected through a microscopic examination. A survey of the literature shows that there have been few investigations of the conduction system of the heart in cocaine users and that no studies have ever examined conduction tissue in chronic users whose drug ingestion was confirmed by hair analysis. It thus appeared of interest to identify pathological lesions in the conduction system of the heart in chronic cocaine users that may explain cardiac rhythm disorders and even some deaths.

This presentation focuses on the different lesions found in the conduction system of the heart in cocaine addicts. Many authors believe that such lesions may be the cause of sudden death. The most frequently observed lesions consist of severe thickening of the atrioventricular node artery, intranodal and perinodal fibrosis, and microscopic foci of myocarditis.

Several cases with observable pathological lesions will be presented. The victims were young subjects: all were known to the police as long-term drug users, and some were undergoing a methadone treatment. In each case, a forensic autopsy and toxicological analyses were performed, including hair analysis to establish chronic drug use in general, and cocaine use in particular. This study included only cases in which toxicological analyses revealed the presence of cocaine in the blood, in the urine and in the hair.

It was concluded that pathological lesions in the conduction tissue may play a role in the occurrence of death attributed to intoxication pursuant to cocaine ingestion.

Cocaine, Conduction System, Hair Analyses