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DEATHS FROM ACUTE REACTION TO DRUGS AND PSICOACTIVE SUBSTANCES IN GALICIA IN 2005

Abstract: Drug abuse causes a large number of deaths in young people. Despite the fact that the number has decreased in recent years, it is still a major concern for our community. Drug related mortality is used as an indicator of abuse, and in Galicia these statistics are kept by the *Observatorio de Galicia sobre Drogas*. Analytical confirmation is done in the Forensic Toxicological Service of the Legal Medicine Institute of the University of Santiago de Compostela. The present study reflects the results for 2005, when 39 cases of death were suspected of drug abuse, of which 37 were analytically confirmed. Of the latter, 90% of them were males, and the median age was 35. Cocaine (56%) and opiates (54%) were the most frequently identified drugs, and poly-consumption was confirmed in 82% of the cases. Blood concentrations of drugs were very variable, and a bad correlation between opiates in blood/urine and hair was found.

Introduction

Recreative abuse of psicoactive substances is a major concern in developed societies. To know the intensity of this abuse some indicators have been developed, one of which is the Mortality Indicator (MI). In Spain the MI is elaborate based upon data obtained from the investigation of all the suspected drug-related deaths [1]. For this purpose biological samples are collected from the corpses and analyzed in different Forensic Toxicology Laboratories. In Galicia, northwestern Spain, the MI is elaborated by the *Observatorio de Galicia sobre Drogas* (OGD), founded in 1995. The toxicological analyses are performed in the Forensic Toxicological Service of the Legal Medicine Institute of the University of Santiago de Compostela.

In the ten years since the founding of the OGD, important changes have occurred related to the abuse of drugs, drug user profile, analytical techniques, and the types of samples collected. The objective of this work was to analyze the results of the cases investigated during 2005 in our Service in relation to the MI (the indicator includes all deaths related with adverse reaction to psicoactive substances) in order to establish the profile of the victim and the drugs more frequently involved in this kind of deaths

Material and Methods

Corpses from people between 10 and 64 years (range of age used to elaborate the MI), dead in Galicia in 2005 and whose cause of death was an adverse reaction to

psicoactive substances, were autopsied. Biological samples were collected and analysed in the Forensic Toxicology Service of the LMI – USC. Toxicological analyses comprised screening techniques (immunoassays and gas chromatography – mass spectrometry), and confirmation-quantitation techniques (radioimmunoassay, LC-MS or HPLC depending on the substance). The information of each case, provided by the forensic pathologist and the toxicologist, was filled in a form, which was finally sent to the ODG, to elaborate the MI. The form included information about socio- demographic, clinical, pathological or analytical variables. This information was used for this study. Analysis of data was done with the statistics package SPSS.14.0.

Results

In 2005 a total of 39 cases were investigated as suspected of death related with adverse reaction to psicoactive substances, but only 37 were confirmed by analytical methods, being 2 cases negative for any substance. Of them 90% were male, and the median age of the group was 35 years (range 19-64) (*Fig.1*). The corpses were found mainly at home (54%), followed by the street (23%). The detected drugs were, in order of frequency cocaine (56%), opiates (54%), benzodiazepines (51%), methadone (38%) and cannabis (21%). In relation with the number of different drugs detected, in most o the cases policonsume was detected, with 2 (26%), 3 (46%) and even 4 (10%) drugs identified. In the 18% of the cases only one drug was detected, and this drug was an opiate, cocaine or alcohol. The concentrations of the drugs were very variable (*Fig. 2, 3 and 4)* and, in general, they were inversely related with number of drugs (*Fig.5*), especially for the cocaine. The opiates were more frequently associated with cocaine (55%) followed by methadone (25%), while in the case of cocaine the main association was with opiates (52%) followed by benzodiazepines (43%). Finally, the most frequent association of methadone was with benzodiazepines (78%). Relation between the presence of drug blood and/or urine (indicating recent consume) and hair (indicating chronic consume) was also studied: the 46% of positive cases to opiates in blood/urine were negative in hair (*Fig.6*); in the case of positives to cocaine, only the 8% of positives in blood/urine were negative in hair.

Discussion

The number of cases was similar to the cases registered the year before in our laboratory, but lower than the figures for the previous decade, when the mean was 60 cases per year [2,3]. The distribution by sexes did not change, but the mean age of the group increased seven years (from 28 in the 90 decade until 35 in 2005). The type of drug detected changed also, from the opiates to the cocaine. This is in concordance with the pattern of abuse in the Spanish society, were the cocaine was (and is) the second illegal abused drug, after cannabis [4,5]. The policonsumer pattern is also in concordance with data from these studies. In relation with the concordance blood/hair, our results are similar to those of Druid et al [6], who reported the absence of opiates in the most recent hair segment in 18 out of 28 cases of drug-related deaths, suggesting that these individuals had a reduced tolerance to opiates. So careful segmental hair analysis can reveal recent opiate abstinence, very important in the interpretation of the tolerance. Tagliaro et al [7],

also found that the mean morphine content in the hair of opiate addicts who had died (heroin-related deaths) was lower than that of the alive addicts (active heroin addicts), (1,15 ng/mg vs 6,07 ng/mg). Under their opinion these findings support the theory of high susceptibility to opioid overdose after periods of intentional or unintentional abstinence, due to loss of tolerance. Finally, Drake et al[8] also found that fatal overdose cases were using considerably less heroin and other opiates in the period prior to death than active street users. Fatal overdose cases appeared to have been at risk from a lower tolerance to opiates and a higher level of alcohol consumption.

Conclusions

1. The number of drug related deaths in our community has stabilized in the past years. The dead profile is that of a 35 years old man, policonsumer of two, tree and even four drugs. The main drugs related with death are cocaine and opiates, but in association between them or with benzodiazepines, methadone, alcohol and THC.
2. The concentrations of the drugs were very variable, and inversely related with the number of positive drugs in the biological samples. So, potentiation of effects can be involved in some of the cases of death with low concentrations of drugs in blood.
3. Hair analysis is a useful tool in the interpretation of blood concentrations, because informs of the tolerance of the patient. Some cases of death with a low concentration of opiates in blood, and low or negative concentration of opiates in hair can be explained because of loss of tolerance. So hair analysis should be done, at least, in the cases were low blood concentrations´ of drug are found.

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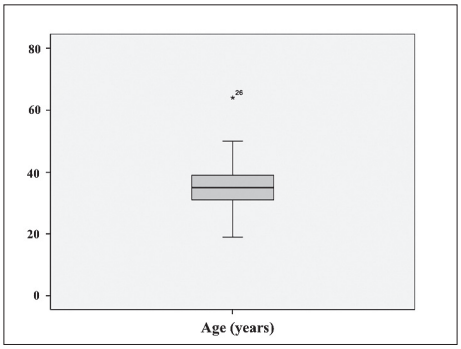

Figure 1 – Box Plot of data relative to age distribution.

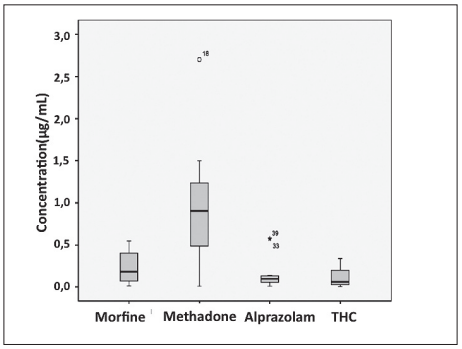

Figure 2 – Box Plot of the concentrations of some drugs in blood (µg/mL).

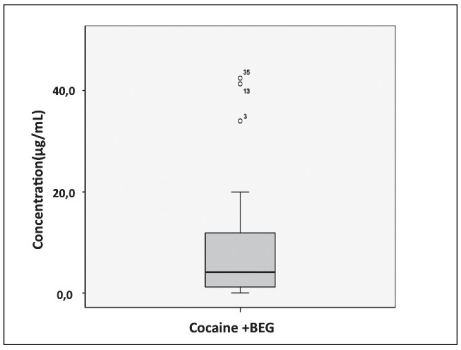

Figure 3 – Blox Plot of the blood Cocaine-BEG concentrations (µg/mL).

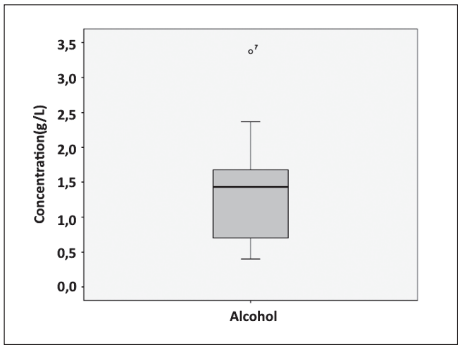

Figure 4 – Blox Plot of the blood Alcohol concentrations (g/L).

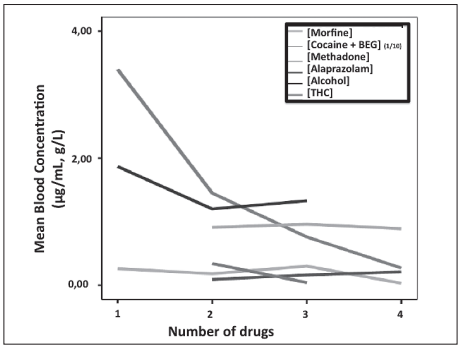

Figure 5 – Median concentration of some drug – Number of positive substances in blood ([cocaine-BEG] x (10^{-1}))

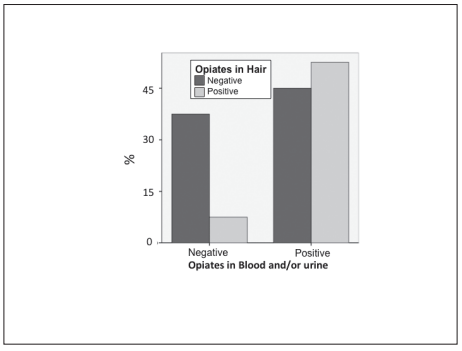

Figure 6 – Correlation between opiates in blood-urine and and opiates in hair.