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Toxicological Aspects of Sudden and Violent Deaths in Southwestern Greece: A Three-Year Review (2001-2003)

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S u m m a r y. A study of violent and sudden deaths in Southwestern Greece between 2001-2003 was performed by the Laboratory of Toxicology and Pharmacokinetics, using case files at the General Hospital of Patras Agios Andreas. A total of 367 cases were collected and were subdivided into violent and sudden deaths. Violent deaths were subdivided to suicides and murders, whereas sudden deaths were subdivided into deaths caused by pathological and undetermined causes. More specifically, suicides were categorized as gunshots, hangings, drownings, poisoning by carbamates and organonophosphates and poisoning in drug addicts with overdose of combined opiates and benzodiazepines, as well as other drugs and other combinations. A significant number of cases in both violent and sudden deaths were related to the ingestion of alcohol alone and to the use of various drugs (opiates, tetrahydrocannabinoles, cannabinoles, heroin, antidepressants, benzodiazepines, carbamates, organophosphates, amphetamines) alone or in combination.

INTRODUCTION

The purpose of the present work was to approach the toxicological aspect of sudden and violent deaths, which were analyzed by the Laboratory of Toxicology and Pharmacokinetics at the General Hospital of Patras *Agios Andreas* during 2001-2003. Violent deaths usually involve suicides (poisonings with pesticides, suicide attempts by drug addicts and others with different means) and murders (gunshots, use of sharp objects) (1). Suicides among drug addicts mostly involve younger people in their twenties (2). The category of sudden deaths usually refers to deaths from pathological causes (heart attacks, strokes, pulmonary complaints) or to undetermined deaths. The picture here is different from suicides, because pathological as well as undetermined deaths involve older people, in their fifties (3)

METHODS

The cases were selected from different sources, such as hospital clinics and morgues of the local hospitals, with the assistance of the police and port authorities throughout Southwestern Greece, who provided the Laboratory of Toxicology and Pharmacokinetics of the General Hospital of Patras *Agios Andreas* with the samples for the appropriate toxicological analysis.

The samples were mainly blood and/or urine and in certain cases gastric fluid, bile fluid, vomitus and postmortem tissue, especially liver, as well as kidneys, lungs and brain. Qualitative and quantitative analysis was performed, using a variety of techniques. For the quantitative measurement of blood alcohol levels, gas chromatography and FPIA (Fluoro Polarization Immune Assay) were used (4). FPIA defines also the levels of benzodiazepines, barbiturates, acetaminophen, salicylates, phenobarbital, opiates, tetrahydro-cannabinoles, cocaine, amphetamine, LSD, organophoshates, carbamides, paraquat. Qualitative analysis for heroin, opiates, tetrahydrocannabinoles, organophosphates and carbamates esters was performed with thin–layer chromatography (4).

RESULTS

A total of 367 cases of violent and sudden deaths were investigated during 2001-2003. More specifically, sudden deaths were subdivided into 87 pathological and 138 undetermined cases. In both categories, there was usage of only alcohol, alcohol and pharmaceutical substances (antidepressants, acetaminophen and barbiturates), only substances or no drugs. It is remarkable that 89 undetermined deaths and 50 pathological deaths were connected with the employment of alcohol in comparison with 27 undetermined and 14 pathological deaths, which were related to the above mentioned pharmaceutical substances. The cases that appeared with no use of drugs were 11 for pathological causes and 25 for undetermined deaths.

As to the rate of men in comparison to women, 23% of the total number of cases referred to men, whereas only 1% referred to women who died from pathological causes. Moreover, 52% of the total number of cases referred to men, whereas only 14% referred to women who died from undetermined causes. The share of sudden deaths increased towards the age of 20 and 50 in both sexes. Finally, pathological causes of sudden deaths had the lowest share in the teenage group and those in their twenties.

In a total of 142 cases of violent deaths, 127 referred to suicides and 15 were murders. Suicides were subdivided into 22 cases that were shotguns, 20 hangings and 31 drug poisonings using organophosphates[12], carbamates[12], benzodiazepines[2], antidepressants[2], or sacylicates[1]. Among drug addicts' poisonings, the most common used combination was opiates-benzodiazepines[18], as well as opiates overdose [8], combination of opiates-benzodiazepines-amphetamines[2], combination of antide-pressants-opiates-tetrahydrocannabinoles or benzodiazepines-antidepressants. There were also 22 other cases of suicides using different means.

It is remarkable that in all the above cases, the ratio of women was considerably lower than the ratio of men. In poisonings by carbamates and organophosphates esters, 22% referred to women whereas 77% referred to men. The picture was similar in poisonings of drug addicts: 84% were men and only 18% women. The share of deaths due to suicides reached the peak in the group age 31-40 and they were considerably high in the ages 21-30 and 41-50.

CONCLUSIONS

Alcohol was found in the vast majority of sudden deaths, sometimes in combination of antidepressants, barbiturates and amphetamines overdose. Perhaps in this combination there is an issue of crossed resistance of alcohol with these drugs of CNS, so that the user may need a higher dose of sedative or barbiturate in order to sleep (5).

There was an increased use of opiates by drug addicts in comparison with other substances, in line with what is generally observed (2).

The drug users were young people, in agreement with reports noting that persons in their forties avoid the use of drugs, while the age of 20 is susceptible to this trend (2,3).

Sudden deaths and especially those occurred by pathological causes were increased in middle age people (41-60), a fact that is very common and has been also shown by others (3). As to the sex, it is obvious that the majority of both sudden deaths and suicides referred to men compared with women. Moreover, men were more drug addict-prone than women, a fact that is in line with previous reports where in all the countries of the European Community, men where more likely to use drugs in all ages (2).

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