Patologie 2-08 14.4.2008 8:24 Str. 16
proLékaře.cz | 21.10.2026

AN AUTOPSY CASE OF POISONING WITH ETHANOL AND PSYCHOTROPIC DRUGS

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Summary

A case of fatal poisoning involving ethanol with psychotropic drugs is presented. Quantitative toxicological analysis showed that the concentrations of ethanol, amoxapine and phenobarbital in the femoral blood were 2.86 mg/ml, 0.41 μg/ml and 6.80 μg/ml, respectively. We concluded that the cause of death was due to the combination use of ethanol, amoxapine and phenobarbital.

Key words: poisoning – ethanol – amoxapine – phenobarbital – drug interaction

Souhrn

Pitevní nález otravy etanolem a psychotropními látkami

Je uveden případ smrtelné otravy způsobené kombinací etanolu a psychotropních látek. Kvantitativní toxikologická analýza prokázala v krvi z femorální žíly koncentraci etanolu 2,86 mg/ml, amoxapinu 0,41 μg/ml a fenobarbitalu 6,80 μg/ml. Jako příčina smrti bylo stanoveno současné užití kombinace etanolu, amoxapinu a fenobarbitalu.

Klíčová slova: otrava – ethanol – amoxapin – phenobarbital – interakce léčiv

Soud Lék., 53, 2008, No. 2, p. 16–17

INTRODUCTION

Amoxapine is a dibenzoxazepine class of antidepressant. Its therapeutic and toxic effects are quite similar to those of the tricyclic antidepressants [1]. Phenobarbital, a barbiturate derivative, is widely used as a sedative and an anticonvulsant [2]. Here we report a case of death involved the combined toxicity of ethanol, amoxapine and phenobarbital.

CASE REPORT

A 32-year-old woman (height 152 cm, weight 46 kg) with a history of depression, was found dead in her house. She had been prescribed an antidepressant. Autopsy findings indicated no evidence of external injury. The internal examination revealed no distinct injury or disease. The lungs were slightly congested. Postmortem samples including heart blood and femoral venous blood were collected for toxicological examination and kept at –40 °C until analysis, but urine was not available.

Toxicological screening and its quantitation were performed using a high performance liquid chromatography drug analysis system (Class-VP system, Shimadzu, Kyoto, Japan) [4]. Determination and quantitation of ethanol was performed using a head-space gas-chromatography (GC-Autosystems, Perkin-Elmer Japan, Yokohama, Japan).

RESULTS AND DISCUSSION

From the results of toxicological screening, ethanol, amoxapine and phenobarbital were identified in the victim's blood. Each concentration in the postmortem specimens is presented in Table 1. As shown in Table 1, the concentration of amoxapine in cardiac blood was about 2.7 times higher than that in the femoral venous blood. Postmortem amoxapine concentration depends on the sampling site or tissue [6], which may be due to the antemortem distribution or postmortem redistribution [8].

According to previous reports, therapeutic plasma levels of

Table 1. Ethanol and drug concentrations in each sample

Specimen	Ethanol (mg/ml)	Amoxapine (μg/ml)	Phenobarbital (μg/ml)
Heart blood	2.73	1.13	8.13
Femoral venous blood	2.86	0.41	6.80

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amoxapine are 0.017-0.21 μg/ml, and the blood concentration in fatal cases ranges from 0.26 to 20 μg/ml [1, 6, 7, 9, 10, 12-15]. Therapeutic levels of phenobarbital are 10-40 μg/ml, while a blood ethanol concentration of more than 3.5 mg/ml is fatal [2, 15]. In the present case, the concentration of amoxapine in the blood (1.13 μg/ml in cardiac and 0.41 μg/ml in femoral blood) was over the therapeutic range, and within the toxic range. The levels were also around the minimum level of other reported fatal cases [6].

Previous reports describe the association of alcohol in fatal cases of amoxapine overdose [10, 12-14], and those blood ethanol levels were in the ranges of 1.4-3.8 mg/ml. It has been reported that some kinds of antidepressants are especially toxic when combined with ethanol [5]. A large amount of ethanol depresses the function of the central nervous system including respiratory depression, and it also enhances the pharmacological effects of various drugs such as hypnotics, antidepressants or analgesic agents when taken together [3]. Respiratory depression and hypotension have been reported as adverse effects of amoxapine overdose [7]. Since relatively high levels of ethanol (2.73 mg/ml in cardiac and 2.86 mg/ml in femoral blood) were detected, the combined use of ethanol with amoxapine may have acted in a critical role in the present case. Although the concentration of phenobarbital in femoral blood was below the therapeutic range, its interaction with ethanol [11] must be considered.

From the autopsy findings and the results of the toxicological examination, we conclude that the death was mainly due to the combined toxicity of ethanol with amoxapine, while phenobarbital may also have partially contributed. The present case indicates that we should pay more attention to the toxicity of combinations of ethanol and psychotropic drugs.

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OZNÁMENÍ

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IV. kongres nemocí z povolání s mezinárodní účastí
Luhačovice 24. a 25. října 2008

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