

błędu grubego i systematycznego, a dodatkowo znacznie skraca się czas analizy.

3. Metoda jest prosta a jej koszty są relatywnie niskie. W odróżnieniu od innych metod wzbogacania analitów, w metodzie SPME całkowicie wyeliminować zużycie drogich i toksycznych rozpuszczalników. Ponadto charakteryzuje się ona ograniczeniem wpływu związków utrudniających miarodajne oznaczeń końcowe.
4. Metoda SPME wymaga jednak stosunkowo częstej kalibracji oraz szczególnej dbałości o czystość włókna sorpcyjnego. W celu uzyskania powtarzalnych wyników metodą SPME konieczne jest dokładne kontrolowanie i odtwarzanie parametrów procesu sorpcji i desorpcji analitów z włókna.

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Pulmonary macrophages in heroin addiction

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Background: The pulmonary complications of illicit drug abuse may be the most common form of drug-induced lung disease. Main purpose: The aim of the study was to determine pulmonary complications associated with intravenous heroin abuse. Patients and methods: Lung tissue samples from 43 drug addicts and 28 „normal” persons submitted for medico-legal autopsy at the Institute of Forensic Medicine of Slovak Postgradual Academy of Medicine and Institute of Forensic Medicine of School of Medicine of the Comenius University in Bratislava were evaluated by method of light microscopy. Results: In the heroin addict cases pulmonary oedema in 49% and emphysema in 7% of cases were found. Statistically significant ($p > 0,05$) increased number of hemosiderin-negative pulmonary macrophages in 88% of cases of drug addicts was found. Conclusions: The Increased number of pulmonary macrophages in the group of heroin addicts can indicate may lung defense mechanism defects and/or direct heroin influence on macrophages as well. The possible conclusion of this study for practical application: occurrence of increased number of hemosiderin-negative pulmonary macrophages by negative autopsy findings in young people points to the probability of heroin abuse as well as for the necessity to investigate option this in a person's history.

Key words: heroin addiction, morphology, pulmonary macrophages

INTRODUCTION

The prevalence of drug abuse is thought to be increasing in Slovak Republic in last ten years (Novomesky, 1996). The patterns of drug abuse prevalent in a given population are determined by a variety of factors such as the cost or availability of particular substances, peer pressure, local customs, and legal pressures. The pulmonary complications of illicit drug abuse may be the most

common form of drug-induced lung disease (Rosenow et al., 1992). The potential for respiratory system complications depends not only on the drug use but also on the route of administration, the origin of the drug, the presence of contaminants, whether or not there is sharing of paraphernalia, and the host response of the individual user (Glassroth et al., 1987).

Worldwide, heroin is the most common substance taken by intravenous drug abusers (Hind, 1990). Heroin is usually acetylated from the parent compound morphine and arrives in a pure form as a white powder. Pure heroin is progressively adulterated ("cut") by diluting it 20- to 100 fold with soluble "fillers" such as quinine, lactose, maltose, mannitol, baking soda, starch, barbiturates, and chloroquine (O'Gorman et al., 1987). The concentration of heroin in the product sold to the user by the pusher varies from 0 to 20 percent. The user mixes the dry white powder in unsterile water or in saliva. The mixture is heated in a spoon or bottle cap held over a lighted flame and removed from the heat as soon as bubbles appear. Other forms of heroin such as "brown" heroin are poorly soluble in water and require acidification with substances such as lemon juice or vinegar before heating. The heroin mixture is aspirated into a syringe through a ball cotton wool to filter out the larger impurities. The intravenous injection ("mainlining") is performed without sterilization of the skin, often in the presence of other users, who then share the syringe and needle without sterilization (Hind, 1990).

Intravenous drug abusers are at risk from infection and a wide range of lung parenchymal and vascular lesions unrelated to infection (tab. I), because the lung plays a very important role also in filtering foreign material entering the blood stream from an intravenous drug injection.

PATIENTS AND METHODS

Lung tissue samples from 43 drug addicts and 28 "normal" persons submitted for medico-legal autopsy at the Institute of Forensic Medicine of Slovak Postgraduate Academy of Medicine and Institute of Forensic Medicine of School of Medicine of The Comenius University in Bratislava were fixed in formalin, processed by routine method and embedded in paraffin. Sections were stained with hematoxylin-eosin and Peifer's reaction for evidence of hemosiderin and evaluated by method of light microscopy. Besides morphological findings described in the literature (tab. I) the presence of pulmonary macrophages (Fig. 1) was evaluated. The characteristics of both groups studied are included in table II. The control group was comprised above all of motor vehicle accident victims. The data obtained was statistically evaluated by means of Chi-square test for table 2x2. The qualitative detection of morphine as a metabolite of heroin in urine samples obtained by autopsy by means of latex agglutination immunoassay; technique (ONTRAK) were tested. The concentration of opiates and the metabolites in urine samples by means of semi-quantitative fluorescence polarisation immunoassay technology (Abbott) was detected.

RESULTS

In the group of intravenous heroin abusers of all pulmonary complications (tab. I) only parenchymal lesions as pulmonary oedema connected with intraalveolar bleeding in 21 of 43 cases i.e. 49 percent and emphysema in 3 of 43 cases i.e. 7 percent were found. Statistically significant ($p > 0,05$) increased number of hemosiderin-negative pulmonary macrophages (Fig. 2) in 38 of 43 cases of heroin addicts i.e. 88 percent compared with 11 of 28 cases i.e. 39 percent in control group (tab. III) was found. In the group of heroin addicts toxicological investigation of urine in 41 of 43 cases i.e. in 95 percent was performed. The presence of opiates and their metabolites in all of cases examined was found. Two patients survived for some days and toxicological investigation by autopsy was not necessary.

Table I. Pulmonary complications associated with intravenous drug abuse (Hasleton, 1996).

<ul style="list-style-type: none"> Infections <ul style="list-style-type: none"> Human Immunodeficiency Virus Pneumonia <ul style="list-style-type: none"> Community Acquired Aspiration Septic Pulmonary Emboli Fungal Lung Abscess Tuberculosis Vascular Lesions <ul style="list-style-type: none"> Foreign Body Embolism <ul style="list-style-type: none"> Talc Microcrystalline Cellulose Cornstarch Cotton Mercury Needles Pulmonary Artery Medial Hypertrophy Mycotic Aneurysm Parenchymal Lesions <ul style="list-style-type: none"> Pulmonary Oedema Progressive Massive Fibrosis Emphysema Interstitial Pneumonia/Fibrosis Hemosiderosis
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Table II. Characteristics of analysed groups.

	group of addicts	control group
No. Cases	43	28
Age (years)	17-43	15-29
Age average	21	21

Table III. Occurrence of pulmonary macrophages.

Pulmonary	Group of addicts		Control group	
	No.		No.	
Macrophages	Cases	%	Cases	%
Fe Negative				
Resent	38	88	11	39
Absent	5	12	17	61

DISCUSSION AND CONCLUSIONS

Morphological changes in drug addicts forms a relatively new chapter in our daily morphological practice. The number of drug addicts in our country is relatively smaller and time of drug abuse is relatively shorter compared with western countries. The organism and individual organ injury to a great extent are known only from literature. The aim of our study was to determine histopathological findings in the lung of heroin addicts.

Heroin produces its effect by acting on several systems such as: central nervous system, cardiovascular system, respiratory system, gastrointestinal tract, urinary tract and reproductive system. The object of our interest is the effect of heroin on the respiratory system, where causes respiratory rate decrease, respiratory volume decrease, cough reflex inhibition, cilia movement inhibition and histamine release (Wenke, 1990).

From all pulmonary complications described in the literature in our work only parenchymal lesions as pulmonary oedema connected with intraalveolar bleeding in 49 percent of cases and pulmonary emphysema in 7 percent of cases in the group of heroin addicts were found. In the same group a very

interesting finding such as increased number of hemosiderin-negative pulmonary macrophages in 88 percent of cases was found. This finding was statistically significant ($p > 0,05$) compared with the control group.

An increased number of pulmonary macrophages in 31 years old female, heroin addict with a 10 year addiction history, reported Magnan et al. (1991). Direct effect of morphine as a metabolite of heroin on macrophages in vitro by Singhal et al. (1993, 1996) was described. An increase in the percentage and absolute number of macrophages in lymphoid organs and in the spleen after long-term morphine administration to retrovirus-infected mice was found (Lopez et al., 1993). The possibility of direct propagation of pulmonary macrophages in the lung is mentioned by Ferencik et al. (1999).

Based on this literary data we can assume, that an increased number of pulmonary macrophages in the group of heroin addicts with intravenous administration of heroin may indicate lung defense mechanism defects and/or direct heroin influence on macrophages as well.

The possible conclusion of this study for practical application is as follows: occurrence of increased number of hemosiderin-negative pulmonary macrophages by negative autopsy findings in young people points to the probability of heroin abuse as well as to the necessity to investigate this option in a person's history.

ACKNOWLEDGEMENT

The authors wish to thank to Mr. P. Fiala MD, PhD from Institute of Forensic Medicine of School of Medicine of The Comenius University in Bratislava for kindly lending histological slides from 17 necroptic cases of heroin addicts.

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Czesław Chowaniec

Badania nad obecnością leków i środków odurzających w organizmie uczestników ruchu drogowego

Researches on the presence of narcotics in traffic users

Z Katedry Medycyny Sądowej Śląskiej AM w Katowicach
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Wobec wzrastającej liczby wypadków drogowych w Katedrze Medycyny Sądowej ŚAM podjęto badania nad obecnością środków oddziałujących negatywnie na sprawność psychofizyczną człowieka. Badaniami objęto uczestników kolizji i wypadków drogowych, którzy nie byli (jak sprawdzono) pod działaniem alkoholu etylowego, względnie wykazane stężenie alkoholu było niskie do 1‰. W latach 1995-1999 przebadano 143 próbki krwi od kierowców i innych uczestników ruchu drogowego. Na 60 pozytywnych przypadków, najczęściej, bo u 32 osób, wykryto obecność tylko jednego leku (barbiturany, benzodwiazepiny, opiaty) W pozostałych przypadkach stwierdzono barbiturany i benzodwiazepiny, benzodwiazepiny i opiaty, pochodne benzodwiazepiny i trójcykliczne antydepresanty. Oznaczone we krwi stężenia wykrytych substancji mieściły się w szerokim zakresie dawek terapeutycznych.

On account of a rising number of road accidents especially fatal ones, the research on the presence of the agents which influence negatively human psychophysical efficiency was carried out in the Department of Forensic Medicine of Silesian Medical Academy in Katowice. There were examined individuals involved in different kinds of road accidents who were not under the influence of ethylene alcohol (as it was conducted) or had rather a low concentration of alcohol (about 1‰) In the years 1995-1999, 143 blood samples from drivers and other traffic users were examined. Fluorescence polarization immunoassay (FPIA) was used for determination of barbituric acid derivatives, benzodiazepine, amphetamine, tricyclic antidepressive agents, opium narcotics and cannabinoids. Results of examinations were positive in 60 cases. One substance (barbiturate, benzodiazepine, opiate) was found most often (32 cases). In the remainder of examined cases barbiturates with benzodiazepine, benzodiazepines with opiates and benzodiazepines derivatives with tricyclic antidepressive agents were found. Blood concentrations of these substances were in a broad range of therapeutic doses.

Słowa kluczowe: wypadek drogowy, leki psychotropowe, narkotyki
Key words: road accident, psychotropic drugs, narcotics