

FATAL OUTCOME OF 17-YEARS OLD GIRL DUE TO COMBINED METHADONE/HEROIN INTOXICATION

Ilinka Brainova

Department of Forensic Medicine and Deontology – Medical University, Sofia

Zdrave 2 Str., Sofia 1431, Bulgaria

Tel.: 0889364148

e-mail: ilinka_brainova@yahoo.com

ABSTRACT

A case of fatal combined heroin/methadone poisoning of 17-years old drug addict is presented. The cadaver was examined at the Department of Forensic Medicine and Deontology, Sofia in order to establish the cause and manner of death. There were performed macroscopic and microscopic examinations, and toxicological analysis.

During the gross examination of the cadaver there were no needle marks in predilection and/or hidden sites, characteristic for cases of injection intake of drugs. By the internal examination were established nonspecific morphological findings such as severe lung and pulmonary edema, acute venous congestion, mild splenomegaly, and purulent pyelonephritis. There were no characteristic histological changes. By toxicological analysis of standard samples taken from the cadaver were established toxic quantities of heroin and methadone.

The combination between heroin and methadone which are semisynthetic and synthetic opioids, led to potentiation and synergy of their effects and fatal outcome. Toxic and lethal doses might be significantly overlapping, so the outcome of the last intake of “normal” dose of a drug depends on multiple external and internal factors. The absence of needle marks refers to non injection way of drug administration – most probably by snorting of heroin and peroral administration of methadone.

Key words: overdose; heroine; methadone; combined intoxications

INTRODUCTION

The majority of morbidity and fatalities as a result of drug addiction are due to heroine abuse (ЕЦМНН, Годишен доклад, 2011). Heroine or diacetylmorphine is a semi synthetic opiate derivative, which is quickly metabolized by deacetylation in the organism to 6-monoacetylmorphine and morphine. Even though the established minimal lethal dose is 200mg, it is much bigger in heroin addicts (Rop et al, 1997). In the majority of cases drug addicts develop strong physical and psychical dependence, which does not depend much on the personality and physiological characteristics of an individual, but on the specific effect of heroin (Shewan et al, 2005). In the majority of fatalities when toxicological analysis shows presence of opioids, their concentration is not fatal in and off itself. In cases of treated for heroin addiction deceased patients the concentrations of heroin metabolites measured postmortem are equal or smaller compared to non fatal concentrations measured before. As a result of drug abuse pathological complications in different organs and systems may occur (Alexandrov, 2010; Alexandrov et al, 2012a; Alexandrov et al, 2012b). The fatal outcome might be also a result of decreased for some reason tolerance to heroine (Gerevich et al, 2005).

Methadone is synthetic opiate derivative, μ -receptors' agonist, which is used for substitution therapy of heroin addiction (Gandey et al, 2011; Trescot et al, 2008). Use of methadone, like heroine, results in developing physical and psychical dependence (Караджов, 2001). Methadone is sold on the black market of drugs: pure or mixed with heroine and different impurities. On one hand, methadone therapy decreases the risk of fatal overdosing with heroin (Morgan et al, 2006). On the other hand, it increases the risk and frequency of overdosing with combination of methadone and heroin and fatal outcome. According to some researchers the older one is the bigger the risk of combined heroin/methadone intoxication is and this risk is biggest at age 35-44 years. In the same

time, the risk of heroine overdosing decreases (Bryant et al, 2004). There is a tendency of increasing the incidence of abuse and fatalities due to overdosing with opioids used for medical purposes – methadone, opioid analgetics, etc. (Cerdá et al, 2013).

There are single announcements of cardiotoxic effects of methadone in and off itself in patients treated with it for chronic pain syndrome. Methadone may cause sudden death with cardiac genesis in such patients(Gandey, 2011).

The combination between heroin and methadone results in potentiation and synergy of their effects and as a result increased frequency of acute poisonings with fatal outcome, even if the doses are relatively small.

MATERIALS AND METHODS: Forensic medical autopsy, toxicological analysis, histological examination.

CASE PRESENTATION

It is a case of 17-years old girl, whose cadaver was found in an apartment that was known as junkies' place. By data from the parents 6 months prior to her death they had understood about her heroin addition and she checked in for methadone treatment programe. Two days before she was found death they declared her missing. She called them several times and by their words she didn't sound well.

By the external examination were established the following findings: Around the mouth and nostrils there was foam with reddish brown color, with small bubbles, with friable texture. There were no traumatic injuries, including needle marks. There were two piercings and four tattoos. One of the tattoos is quite impressive and indicative: it is a sentence „More is never enough” (Picture №1).

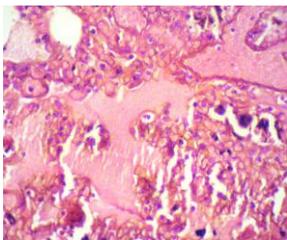
Picture 1



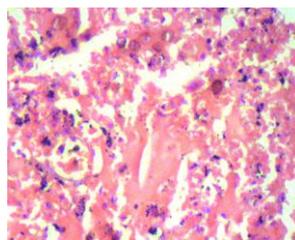
During the internal examination were found: cerebral edema and venous congestion; severe lung edema; mild splenomegaly; purulent pyelonephritis.

The histological examination revealed nonspecific changes: edema and inflammatory infiltration of the lungs (Pictures №№2, 3, 4); aspiration areas (Pictures №№3, 4); ondulation and fragmentation of myocadrocytes, edema, interstitial and perivasal fibrosis in the myocardium (Pictures №№ 5, 6, 7, 8).

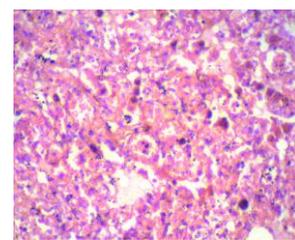
Picture 2

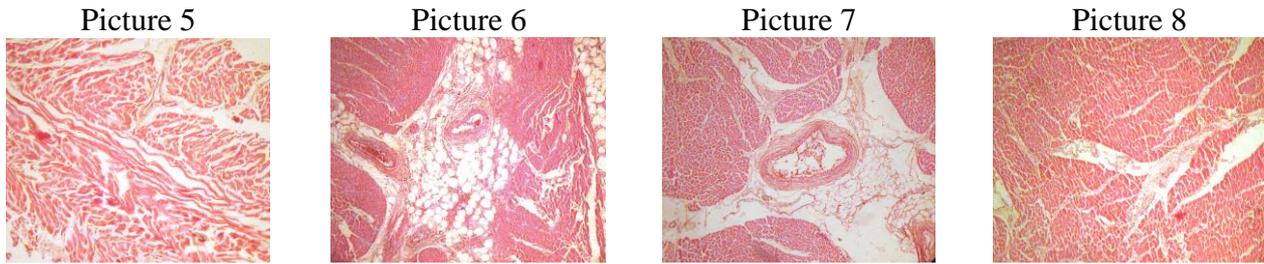


Picture 3



Picture 4





The results of toxicological analysis performed by the methods of thin laminar chromatography, UV-spectrophotometry, and gas chromatography (GC/NPD) showed presence of morphine, 6-MAM and methadone (Table №1).

	stomach, intestine and contents sample	liver and kidney sample	blood sample	urine sample
Morphine (mg%)	0,028	0,023	0,042	0,010
6-MAM (mg%)	0,004	0,007	0,002	0,020
Methadone (mg%)	0,055	0,020	0,007	0,315

Table №1 – Results from toxicological analysis.

CONCLUSION

The cause of death was acute combined poisoning with methadone and heroin, that led to acute circulatory and metabolic disorders. The combination between methadone and heroine leads to potentiation of their effect in quantitative and qualitative aspect and as a result relative overdosing (poisoning). The absence of needle marks draws the conclusion that probably the heroine was administrated by snorting or inhalation of its steams and methadone was taken perorally.

The histological changes: initial chronic ischemia of the heart, severe lung edema and inflammatory infiltration, aspiration areas in lungs are most probably result of the direct and indirect effects of the drugs and their impurities.

DISCUSION

The methadone substitution therapy is one of the most successful treatments of heroin addiction and has positive and negative sides. On the one hand this therapy helps for easier overcoming of heroin dependence with decreased physical and psychical stress for the addicts and escaping abstinence syndrome. On contrary, the therapy of one opioid addiction with another opioid has its risks of abuse, overdose and combined intoxication. There has to be strict control over methadone therapy and prevention of selling methadone at the black drug market as a supplement or impurity of the street heroin in order to reduce methadone and methadone/heroin abuse.

REFERENCES

1. Александров, А., 2010. Съдебномедицинско проучване при починали с данни за употреба на наркотични вещества.

2. Европейски център за мониторинг на наркотиците и наркоманиите, Употреба на опиоиди и инжектиране на наркотици, Годишен доклад 2011: Състоянието на проблема с наркотиците в Европа, 89-100.
3. Караджов, Ю., 2001. Наркотиците – почти всичко за тях.
4. Alexandrov, A., B. Landzhov, St. Hristov, D. Hinova-Palova, A. Palov, L. Malinova, D. Nikolov, T. Alexandrova, 2012a. Morphological changes in the lungs caused by intravenous drug abuse, *Trakia Journal of Sciences*, 10(2), 321-326.
5. Alexandrov, A., B. Landzhov, St. Hristov, D. Hinova-Palova, T. Todorov, A. Palov, L. Malinova, D. Nikolov, T. Alexandrova, 2012b. Various Morphological Changes in the Liver Related to and Resulting from Prolonged Intravenous Heroin Use, *Acta Morphologica et Antropologica*, 19 (in press).
6. Bryant, W., S. Galea, M. Tracy, T. Piper, K. Tardiff, & D. Vlahov, 2004. Overdose deaths attributed to methadone and heroin in New York City, 1990–1998 *Addiction*, 99, 846–854.
7. Cerdá M., Y. Ransome, K. Keyes, K. Koenen, M. Tracy, K. Tardiff, D. Vlahov, S. Galea, 2013. Prescription Opioid Mortality Trends in New York City 1990-2006: Examining the emergence of an epidemic, *Drug and Alcohol Dependence*, (in press).
8. Gandey A., 2011. High-Dose Methadone Boosts Cardiovascular Risk, *Medscape*.
9. Gerevich J., E. Bácskai, L. Farkas, and Z. Danics, 2005. A case report: Pavlovian conditioning as a risk factor of heroin 'overdose' death, *Harm Reduction Journal*, 2, 11.
10. Morgan O., C. Griffiths, and M. Hickman M., 2006. Association between availability of heroin and methadone and fatal poisoning in England and Wales 1993–2004, *International Journal of Epidemiology*, 35, 1579–1585.
11. Rop P., M. Fornaris, T. Salmon, J. Burle, and M. Bresson, 1997. Concentrations of Heroin, 06-Monoacetylmorphine, and Morphine in a Lethal Case Following an Oral Heroin Overdose, *Journal of Analytical Toxicology*, 21, 232-235.
12. Shewan D., P. Dalgarno, 2005. Evidence for controlled heroin use? Low levels of negative health and social outcomes among non-treatment heroin users in Glasgow (Scotland), *British Journal of Health Psychology*, 10, 33–48.
13. Trescot A., S. Datta, M. Lee, and H. Hansen, 2008. Opioid Pharmacology, *Pain Physician* 2008: Opioid Special Issue: 11, 133-153.

FIGURE LEGEND

Table 1 – Results from toxicological analysis.

Picture 1 – Tattooed sentence.

Picture 2 – Inflammatory infiltration of the lungs, HE, 10x25.

Picture 3 - Inflammatory infiltration of the lungs and aspiration, HE, 10x25.

Picture 4 - Inflammatory infiltration of the lungs and aspiration, HE, 10x25.

Pictures 5-8 - Ondulation and fragmentation of myocadocytes, edema, interstitial and perivascular fibrosis in the myocardium, HE, 10x25.