

UNUSUAL CHAINSAW SUICIDE FOLLOWING COMBINED METHYLENEDIOXYPYROVALERONE ("BATH SALTS") AND BARBITURATE ABUSE

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Abstract: This paper discusses the death scene investigation and pertinent autopsy and toxicology findings in a rare case of suicide with a chainsaw following combined methylenedioxypyrovalerone ("bath salts") and barbiturate abuse. This information is compared to data from previous literature on chainsaw suicides.

Keywords: methylenedioxypyrovalerone, bath salts, suicide, chainsaw, forensic.

INTRODUCTION

Suicides by chainsaw are extremely rare [1-8], and are even considered by some authors as exceptional [9,10]. Data from forensic literature shows that chainsaw injuries are generally associated with accidents and that most lesions are the result of reactive forces such as saw kickback, which tend to cause injuries to the left side of the face, neck, hands and feet [11,12].

A new group of recreational drugs, popularly known as "bath salts," "plant feeders," or "plant food" has recently emerged in various countries [13]. Methylenedioxypyrovalerone (MDPV) is a central nervous system stimulant which also exhibits hallucinogenic effects [14].

The purpose of this paper is to discuss the death scene investigation and pertinent autopsy and toxicology findings in a case of suicide with a chainsaw following mixed MDPV ("bath salts") and barbiturate abuse. This information is compared to the literature on suicides committed with a chainsaw.

CASE REPORT

Suicide scene investigation (conducted by the police): A 27-year-old male, 179 cm, was found dead

in his garage with lesions on his neck and a chainsaw beside him. A farewell message had been inscribed in red paint on the walls of the hallway, living room, and kitchen.

Splashes of blood were found on the garage walls and in the proximity of the body. Further blood marks, in the form of shoe prints, were discovered starting in the kitchen and leading all the way to the garage access door, located in the courtyard.

History

The mother of the deceased stated that her son was unemployed, consumed new drugs and suffered from depression, for which he had been prescribed medication following a psychiatric evaluation. No data regarding his psychiatric therapy treatment was available.

Autopsy findings

The autopsy revealed a single traumatic lesion, located on the neck. The wound was located in the anterior cervical region in the medial 1/3 part, had a linear form (after closing the edges), transversal disposition, was 16 cm long and 5 cm wide, with even edges, jagged aspect at the left extremity and a small cutaneo-muscular excerpt on each of the edges, with

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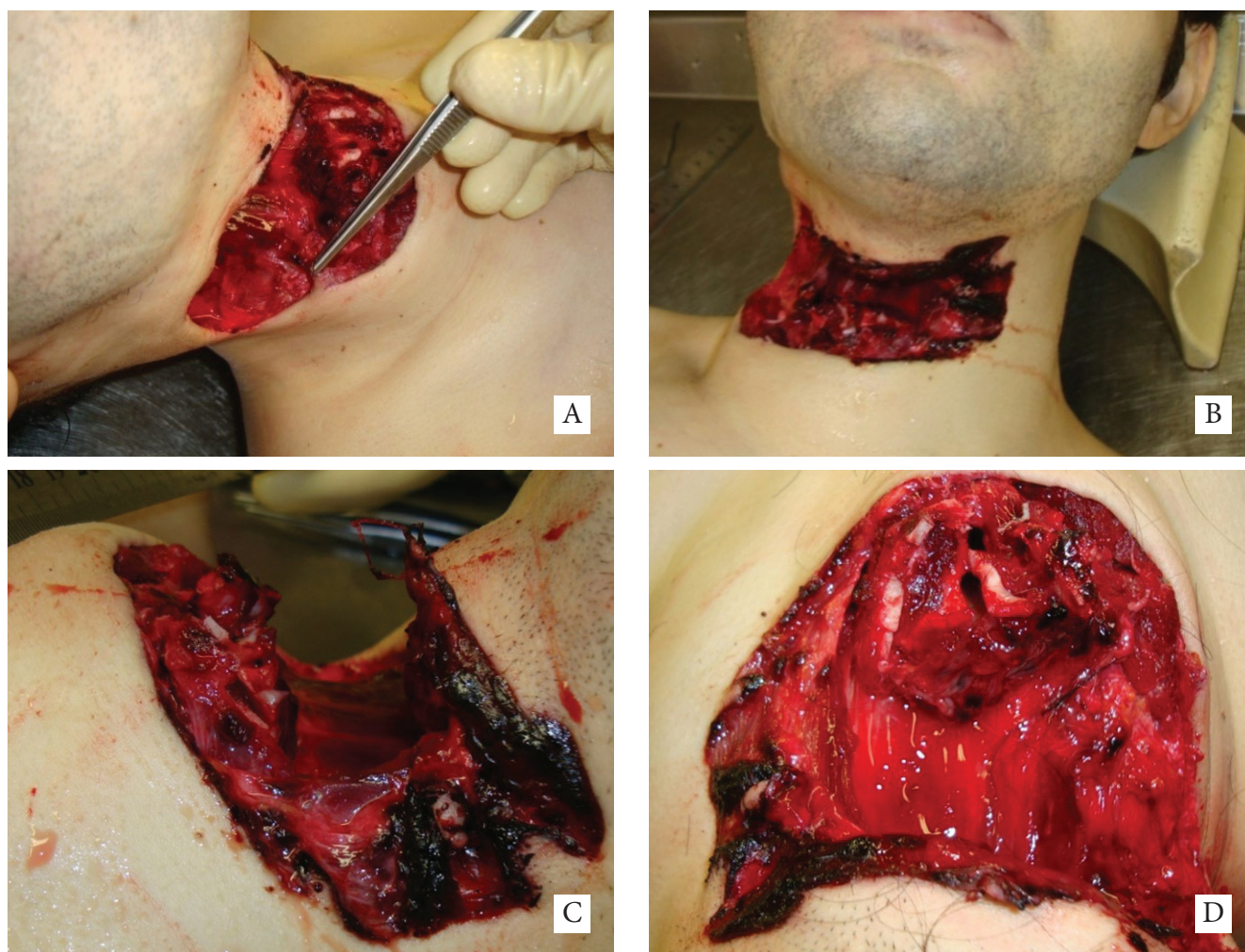


Figure 1. A-D: Morphological characteristics of the wound.

subcutaneous blood infiltration. The wound affected the skin, fatty subcutaneous tissue, muscular tissue, the superficial veins, jugular vein, main carotid, the vagus nerve, the thyroid cartilage, the pharynx and the larynx. The cervical spine was not affected. The mucous membrane of the trachea and bronchi was smeared with blood. Internal organs displayed signs of generalized anemia.

Histological findings: Microanalysis confirmed necropsy data.

Toxicology findings: Urine drug testing by immunological methods revealed barbiturates. Ethanol was not detected in blood and urine specimens.

MDPV (3,4-methylenedioxypropylvalerone), MDPV metabolites, secobarbital and the secobarbital metabolite hydroxysecobarbital were identified by untargeted screening in the urine samples by liquid chromatography tandem high-resolution mass spectrometry (LC-HRMS/MS). No traces of other psychoactive substances were identified.

LC-HRMS/MS experiments were performed in order to obtain specific identification data for MDPV and the metabolites. The structural identification of the analytes was based on accurate mass measurements and isotope pattern recognition of productions, and on comparisons to MS/MS data available in literature for the same compounds. Demethylenil-methyl-oxo-MDPV-G (phase I metabolite), demethylenil-methyl-oxo-MDPV (phase I metabolite), and demethylenil-hydroxy-alchil MDPV (phase II metabolite) were identified in the urine samples.

DISCUSSION

The localization of wounds in chainsaw incidents remains a subject of divided opinion. Some consider that in suicide cases, the chainsaw is mostly applied to the neck [2, 6], while others [9] argue that this region is not preferred for self-inflicted injuries; skull lesions are in the foreground. In this particular

case, the wound was located on the front of the neck, in its medial region – in other words, in an anatomic region accessible to the deceased own hand. In our forensic literature, the layout of self-inflicted traumatic injuries by using a chainsaw, is known to be located in the posterior or posterior-lateral area of the neck. This explains in an easier way the accessibility to self-inflicted lesions. In this case, the lesions are located in the front area of the neck, most likely similar to those in homicides, therefore this case of suicide is extremely rare, in fact we have not found a similar case in the literature related to this feature [2,15,16]. The shallow depth of the wound and the absence of lesions on the cervical spine indicate that the deceased was more likely to have pressed a running chainsaw into his relatively stationary neck, rather than employing the opposite mechanism of pressing his neck into a running chainsaw. In the first scenario (orthostatism), the gradual application of the compression force is much more difficult, while in the second scenario, the kickback effect is cancelled, resulting in deep wounds and bone tissue damage.

Lesion characteristics in this specific case fit into the morphological pattern of the use of chainsaws as reported in literature [15]: deep irregular skin wound; the absence of external abrasions can be explained by the prompt and intense effect of the “bath salts” and by good motion control. Also the hesitation wounds in such situations are difficult to identify due to the rapid acceleration of the chain that almost instantly produces tissue damage, and the structural conformation of the chain that makes it penetrate as deep as possible. Such suicide cases are most common in males with two exception found in French and German literature where a women were involved in same situations [9,17].

Despite the absence of tentative cuts, which are an important indicator of suicide [9], the current case includes multiple objective elements which demonstrate that the injuries were self-inflicted: physical capability of the act; pre-existing psychiatric disorders; the number, location, depth, and disposition of wounds; the absence of any injury which could point to self-defense; positive toxicological findings for MDPV (“bath salts”) and barbiturates, substances which lead, among other things, to suicidal actions; examination at the scene and farewell letter; no other apparent suspicious circumstances disclosed in the postmortem examination report or elsewhere in the police inquiry [15].

Cause of death was mostly exsanguination and blood aspiration [18]. In this case, establishing

the cause of death was not problematic, given that the morphological description typical for a massive hemorrhage with consecutive anemia was obvious.

Self-inflicted patterns of injury are observed in individuals suffering from psychiatric disorders, such as schizophrenia, major depression and alcohol or drug abuse [2,6,9]. In this case, depression and the repeated consumption of new drugs played an important role, as the toxicological exam revealed MDPV and Benzodiazepine intoxication.

An emerging substance abuse problem involves the abuse of synthetic research chemicals for their stimulant properties [19,20]. These products, commonly labelled as “bath salts” or “plant food,” are administered through insufflation, oral, smoking, rectal and intravenous methods [20,21] and can be purchased legally in most states on the internet, at head shops, or at gas stations [19,22-24]. The consumption of synthetic cathinones results in typical stimulant-related subjective effects. Users of “bath salts” have frequently compared their effects to those caused by cocaine, amphetamine and MDMA: increased alertness and awareness, increased energy and motivation, euphoria, excitement, improved mood, mild empathogenic effects, openness in communication, sociability and talkativeness, intensification of sensory experiences, music sensitivity, moderate sexual arousal and perceptual distortions, reduced appetite and insomnia [21,25-29]. Besides cardiovascular, neurological, hematological and digestive symptoms, adverse effects of MDPV include cognitive (confusion, long-term cognitive impairment, mental fatigue, disorientation to name, place and time, loosening of association), psychiatric (irritability, aggression progressing sometimes to violent or even criminal behavior, anxiety, panic attacks, lack of motivation, anhedonia, depression, suicidal thoughts/actions) and perceptual (paranoid delusion, visual and auditory hallucination) effects [13,30,31].

In conclusion, this case was “suicide by chainsaw” and some unusual factors were taken into account:

1. A young adulthood male.
2. He was unemployed and had no occupational experience regarding saws.
3. He had an history of drug abuse.
4. He had a psychiatric disorder and his compliance with the treatment is questionable.
5. Even if we do not have hesitation wounds a farewell message had been found.
6. Focus of saw injures in the front area of the neck similar somehow to those in homicide.

7. The footprints found were compatible with those of the subject's feet.

8. The drug consumption and the psychiatric pathology affected his mental capability of the act.

9. The use of a violent method of suicide.

10. There were no other apparent suspicious circumstances disclosed at the post mortem examination or elsewhere in the police inquiry.

11. Cause of death was mostly exsanguination and blood aspiration.

The presented case is extraordinary because behavioral manifestations, which led to the suicidal act, were secondary to substance abuse (MDPV – “bath salts”) in combination with a depressive disorder, and the suicide method was extremely rare and aggressive for a young adult lacking occupational experience with chainsaws.

Conflict of interest

The authors declare that they have no conflict of interest.

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