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CASE REPORT

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Planned Complex Suicide: An Unusual Case

ABSTRACT: We report an unusual case of planned complex suicide. The victim was a woman aged 67 years, who was found dead in her bath in a state of advanced putrefaction. A plugged-in hairdryer was submerged in the water and the electrical fuses in the room had short-circuited. A kitchen knife lay below the body of the victim, whose left forearm bore incisions suggestive of wrist-cutting. At autopsy, no sign suggesting electrocution could be observed because of the advanced state of putrefaction of the body. Toxicological analysis revealed massive ingestion of tianeptine (blood concentration 15.5 mg/L). Although the exact cause of death could not be determined because of the state of the corpse, meticulous examination of the scene and information obtained from the victim's relatives led to the conclusion of suicide.

KEYWORDS: forensic science, planned complex suicide, acute intoxication, electrocution, wrist-cutting

Complex suicide is a mode of suicide in which several methods are used. Unplanned complex suicide, where a second method is used after the first has failed, is to be distinguished from planned complex suicide, during which several different means are used successively with the aim of avoiding failure of the preceding method. The methods used are extremely varied (1–3). We report an unusual case combining a medication overdose, electrocution, and wrist-cutting.

Case History

A 67-year-old woman was found at her home by emergency services, alerted by the nauseating odor emanating from the apartment. The body of the victim, lying on the right side, was partially submerged in the bath, with the head out of the water. In the bath, by the victim's legs, was a plugged-in hairdryer. The hairdryer was connected by an extension to the only electric socket in the room. The extension lay along a wooden shelf on which the hairdryer could have rested. The fuses in the bathroom had short-circuited. A kitchen knife lay beneath the victim's body. In the waste bin were empty blister packs of prazepam (Lysanxia® [Lynapharm, Lyon, France]), tianeptine (Stablon® [Servier, Neuilly-sur-Seine, France]), and an opiate analgesic (Lamaline® [Solvay Pharma, Suresnes, France], containing caffeine, paracetamol, and opium). No farewell letter was found but the victim's identity papers were conspicuously placed on the lounge table. The apartment was locked from the inside and the telephone line was unplugged. Questioning of those close to the victim revealed that she had already made several suicide attempts, including one by self-immolation a few months earlier. Although suicide was likely, the possibility of murder was not initially ruled out by the investigators.

The body was stored at 4°C and autopsy was performed 24 h later. Radiographs performed before autopsy did not show any traumatic injury or presence of projectile or other foreign matter. External examination showed very advanced putrefaction, old scars on both wrists, and several recent cuts on the anterior aspect of the left forearm suggesting attempted wrist-cutting. Four of these cuts extended to the subcutaneous tissue. Examination of these cuts confirmed that they were superficial. The stomach contained particles suggesting drug residue. No sign of electrocution or drowning was observed. Specimens were taken for toxicological and anatomic pathology analysis. Samples for toxicological analysis included heart blood (peripheral blood was not available because of the advanced putrefaction) and gastric content.

Materials and Methods

Alcohol was quantified by gas chromatography with a flame ionization detector. Blood and stomach contents were tested for drugs of abuse and pharmaceuticals by routine procedures including immunoassays, liquid chromatography coupled with a diode array detector (HPLC–DAD), and gas chromatography coupled with mass spectrometry (GC–MS). Opiates were quantified by GC–MS using an HP-5MS column after basic liquid–liquid extraction and derivatization. Paracetamol was quantified by HPLC–DAD with a Symmetry C8 column after basic extraction. Benzodiazepines were quantified by liquid chromatography coupled with mass-tandem spectrometry (LC–MS/MS) basic liquid–liquid extraction.

Results

The results of toxicological analysis are shown in Table 1. Morphine concentrations were within the therapeutic range, whereas codeine was below the therapeutic concentration. A morphine/codeine ratio above unity suggests the use of opium (4,5). Blood paracetamol (acetaminophen) was at the lower limit of the therapeutic range. The simultaneous presence of these three molecules is in favor of the use of Lamaline® (http://www.vidalpro.net/monographies/fiches/VF160047.htm), an analgesic combining opium powder with paracetamol. Nordiazepam and oxazepam, metabolites of prazepam, the active principle of Lysanxia®, an

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TABLE 1—*Concentrations of the different drugs in the blood and stomach contents of the victim.*

Drug	Blood	Gastric contents
Morphine	57 ng/mL	
Codeine	4 ng/mL	
Paracetamol (acetaminophen)	10.7 mg/L	
Nordiazepam	0.38 mg/L	0.29 mg/L
Oxazepam	0.14 mg/L	
Tianeptine	15.50 mg/L	956 mg/L

anxiolytic benzodiazepine, were at concentrations compatible with therapeutic use (6,7). With regard to tianeptine, the active principle of Stablon®, an original antidepressant that acts by enhancing the recapture of serotonin, the therapeutic and toxic concentrations are not described in the literature. However, study of the pharmacokinetics of tianeptine (8,9) made it possible to affirm that a massive dose of this antidepressant had been ingested. A personal observation by Kintz (10) of fatal intoxication by tianeptine with a blood concentration of 18 mg/L confirms this hypothesis. Histological examination revealed angiosclerotic lesions of the kidney, focal fibrosis of the right ventricle, and a subpleural emphysematous bulla. However, because of the advanced putrefaction of the tissues, it was impossible to clarify their possible involvement in the mechanism of death or to provide evidence concerning its circumstances.

Discussion

Planned complex suicides are rare (11). From an epidemiological viewpoint, the victims are generally young or middle-aged adults, with a marked male predominance (1,3,11). They often have a history of psychiatric illness, essentially bipolar disorders (11,12) or depressive syndromes (3,11,13,14). Previous suicide attempts are often noted (3,14). As far as we are aware, the case we present here is the first involving an elderly woman. A history of depression and previous suicide attempts are, however, present.

The methods most frequently used in complex suicides are those used in so-called "classic" suicides: hanging, firearms, medication overdose, fall from a height, and drowning (3). More rarely, cases combining simultaneous shots from two firearms (15–17), two shots followed by hanging (13), a shot followed by self-immolation (18), or self-immolation and fall from a height (19) have been described. As far as we know, this is the first case combining ingestion of toxic substances, wrist-cutting, and electrocution.

Study of planned complex suicides including the ingestion of toxic substances shows that a wide range of molecules are used. Altun (11) described a case of ingestion of coumachlor and coumatetralyl, rodenticides with anticoagulant properties, although blood tests were not performed as the victim died by hanging. Padosch (13) reported a case of complex suicide probably involving the ingestion of benzodiazepines and oxalic acid, but toxicological analysis was not performed because the obvious cause of death was a gunshot. Parra (12) reported a case involving permethrin, a neurotoxic insecticide identified in the stomach contents of the victim who had also stabbed himself in the stomach with a knife. Yamazaki (20) reported a case of complex suicide involving bromvalerylurea at a potentially toxic but not lethal dose. In the present case, morphine, nordiazepam, and oxazepam were within the therapeutic range. However, the blood concentrations of tianeptine unquestionably showed major exposure to this molecule. Tianeptine is an original antidepressant that acts by increasing serotonine reuptake, and which has excellent clinical tolerance (21). Severe intoxications are essentially characterized by cardiovascular disturbances such as ventricular extrasystoles and arterial hypertension or hypotension, and coma (22). To the best of our knowledge, no fatal case has been published in the literature. Only one personal observation by Kintz (10) reported a case of fatal intoxication with a blood concentration of 18 mg/L. The blood concentration found here (15.5 mg/L) thus appears toxic and potentially lethal. However, this interpretation must be made with caution, as in the absence of a femoral blood sample, the possibility of postmortem redistribution of tianeptine from the stomach contents, where the tianeptine concentration was very high, to cardiac blood, cannot be ruled out (23).

Electrocution is a relatively rare method of suicide and tends to be used by men more than by women (24). Electrocution in a bathtub is a different situation, as the traces of electric burns and petechiae are often invisible (25,26), as was the case here. Moreover, although no suicide involving electrocution has been described as being a planned complex suicide as such, two cases of suicide by electrocution combined with the ingestion of medication have been reported (20,27). Lastly, no case of complex suicide involving wrist-cutting has been described as yet.

In the present case, it is difficult to establish the timing of events and to determine the precise cause of death. The superficial nature of the cuts definitely excludes the hypothesis of wrist-cutting. The blood levels of tianeptine, although they should be interpreted with caution, reveal toxic and potentially lethal exposure to this molecule. It is, however, strongly possible that the time elapsing between ingestion of the molecule and the onset of its effect was sufficient for the victim to attempt to electrocute herself in the interval. The diagnosis of electrocution was extremely difficult to establish because of (i) the very advanced state of putrefaction of the tissues, and (ii) the fact that the characteristic lesions may be absent in electrocutions in a bathtub (see above). However, the fact that the fuses had short-circuited in the bathroom supports this hypothesis. It therefore seems impossible to reach a definitive conclusion as to the real cause of death. On the other hand, careful examination of the scene of death and questioning of those close to the victim allowed the investigators to exclude beyond any doubt the possibility of murder and to reach the conclusion of suicide.

Conclusion

Planned complex suicides raise major difficulties of interpretation concerning the exact cause and circumstances of death. This case, unusual in the methods used, emphasizes once again the need for a pluridisciplinary approach associating forensic specialists, toxicologists, anatomic pathologists, as well as police investigators in order to provide an answer.

References

1. Cingolani M, Tsakri D. Planned complex suicides: report of three cases. Am J Forensic Med Pathol 2000;21:255–60.
2. Marcinkowski T, Pukacka-Sokolowska L, Wojciechowski T. Planned complex suicide. J Forensic Sci 1974;3:95–100.
3. Bohnert M, Pollak S. Complex suicides—a review of the literature. Arch Kriminol 2004;213:138–53.
4. Pepin G. Opiacés et opioïdes. In: Kintz P, editor. Toxicologie et pharmacologie médicolégales. Paris: Elsevier, 1998;335–430.
5. Ceder G, Jones AW. Concentration ratios of morphine to codeine in blood of impaired drivers as evidence of heroin use and not medication with codeine. Clin Chem 2001;47:1980–4.
6. Chasseaud LF, Taylor T, Brodie RR. Prazepam metabolism in female subjects. J Pharm Pharmacol 1980;32:652.
7. Kratzsch C, Tenberken O, Peters FT, Weber AA, Kraemer T, Maurer HH. Screening library-assisted identification and validated quantification

of 23 benzodiazepines, flumazenil, zaleplone, zolpidem and zopiclone in plasma by liquid chromatography/mass spectrometry with atmospheric pressure chemical ionization. J Mass Spectrom 2004;39:856–72.
8. Wilde MI, Benfield P. Tianeptine. A review of its pharmacodynamic and pharmacokinetic properties, and therapeutic efficacy in depression and coexisting anxiety and depression. Drugs 1995;49:411–39.
9. Demotes-Mainard F, Galley P, Manciet G, Vinson G, Salvadori C. Pharmacokinetics of the antidepressant tianeptine at steady state in the elderly. J Clin Pharmacol 1991;31:174–8.
10. Kintz P. Personal communication. In: Baselt RC, editor. Disposition of toxic drugs in man. 7th ed. Foster City: Biomedical Publications, 2004;1105–6.
11. Altun G. Planned complex suicides: report of three cases. J Forensic Sci 2006;157:83–6.
12. Parra MW, Lube MW, Al-Khayat H, Cheatham ML. A planned complex suicide: need for a high index of suspicion. Am Surg 2006;72:454–5.
13. Padosch SA, Schmidt PH, Madea B. Planned complex suicide by self-poisoning and a manipulated blank revolver: remarkable findings due to multiple gunshot wounds and self-made wooden projectiles. J Forensic Sci 2003;48:1371–8.
14. Blanco-Pampin JM, Suarez-Penaranda JM, Rico-Boquete R, Concheiro-Carro L. Planned complex suicide. Am J Forensic Med Pathol 1997;18:104–6.
15. Fatteh A, Gore SB, Mann GT, Garvin K. Suicide with two guns: a unique case. J Forensic Sci 1980;25:883–5.
16. Hudson P. Suicide with two guns fired simultaneously. J Forensic Sci 1982;27:6–7.
17. Parroni E, Caringi C, Ciallella C. Suicide with two guns represents a special type of combined suicide. Am J Forensic Med Pathol 2002;23:329–33.
18. Türk EE, Anders S, Tsokos M. Planned complex suicide. Report of two autopsy cases of suicidal shot injury and subsequent self-immolation. Forensic Sci Int 2004;139:35–8.
19. Bohnert M, Rothschild MA. Complex suicides by self-incineration. Forensic Sci Int 2003;131:197–201.
20. Yamazaki M, Terada M, Ogura Y, Wakusugi C, Mitsukuni Y. A suicidal case of electrocution with hypnotic drug poisoning: an autopsy report. Nihon Hoigaku Zasshi 1997;51:95–101.
21. Lôo H, Ganry H, Dufour H, Guelfi JD, Malka R, Olié JP, et al. Long-term use of tianeptine in 380 depressed patients. Br J Psychiatry Suppl 1992;15:61–5.
22. Harry P. Intoxication par les nouveaux psychotropes. Rev Prat 1997;47:731–5.
23. Pelissier-Alicot AL, Champsaur P, Gaulier JM, Marquet P. Mechanisms underlying postmortem redistribution of drugs: a review. J Anal Toxicol 2003;27:533–44.
24. Wick R, Gilbert JD, Simpson E, Byard RW. Fatal electrocution in adults—a 30-year study. Med Sci Law 2006;46:166–72.
25. Bonte W, Sprung R, Huckenbeck W. Problems in the evaluation of electrocution fatalities in the bathtub. Z Rechtsmed 1986;97:7–19.
26. Karger B, Süggeler O, Brinkmann B. Electrocution—autopsy study with emphasis on ''electrical petechiae.'' Forensic Sci Int 2002;126:210–3.
27. Anders S, Gehl A, Tsokos M. Suicidal electrocution using timers. Case reports and review of the literature. Arch Kriminol 2001;208:80–7.

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