FORENSIC APPROACH OF SUICIDES – ATYPICAL CASES

ELENA TOPÎRCEAN[1], ANDREEA GHIȚĂ-NANU[2], SANDA DURA[3]

[1]Phd Candidate "Lucian Blaga" University of Sibiu, [2]Forensic Service of Sibiu County, [3]"Lucian Blaga" University of Sibiu

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Abstract: *The phenomenon of suicide has existed since ancient times, being found in all geographic areas and all social classes. Currently, there is an increasing trend of suicide at all ages, but especially in young people. This phenomenon mostly affects the individual, but also the people around him, and the society as a whole. We presented two cases of atypical suicide within the forensic casuistry of Sibiu County. The first case refers to a person of the male gender, aged 23, urban area, who was found dead at home with a bag of plastic in the head, cervically fixed by plastic clamps and the upper limbs were tied behind by plastic clamps, identical to those of the neck. Initially, the suspicion of heteroagression has been raised, which was invalidated after corroborating the investigation data, forensic findings and the information of psychological autopsy. The second case is that of a male, 24 years old, from urban area, who was found dead in a car located on the periphery of the city of Sibiu, whose windows were covered on the inside with white sheets of paper that was labelled "Do not open. H_2S toxic gas. Call 112!" and close to car, there were found containers with "Puro Acid 33%". The intervention of the Inspectorate for Emergency Situations Sibiu was requested. Based on the autopsy examination, toxicological and histopathological examinations, in conjunction with the investigation data and the toxicological examination of the material evidence, it was found that the death was violent and was due to acute intoxication by inhalation of a chemical substance containing sulfuric acid. In the cases presented, collating the investigation data, forensic findings and psychological autopsy information allowed the positive diagnosis of suicide.*

INTRODUCTION

The phenomenon of suicide has existed since ancient times, being found in all geographic areas and all social classes. Currently, there is an increasing trend of suicide at all ages, but especially in young people.(1) This phenomenon mostly affects the individual, but also the people around him, and the society as a whole.

Recent studies on the phenomenon of suicide show that the highest weight in the case of suicide by mechanical asphyxiation is found in men, with a rate of about 84% and in women, of about 16%, being known that in women, attempted suicides with no finality are much more common, the so-called emotional blackmail. The share of suicides is higher in urban areas, 60% compared to 40% in rural areas and in terms of age group, they are more common in the age groups of 30-39 years old and 40-49 years old.(2,3)

About hypo/anoxic condition

The respiratory process, through each stage, ensures optimal oxygenation of the needs of each tissue, organ and system. Its operation in physiological parameters requires meeting certain conditions, such as: the breathing air must contain the proper proportion of O_2 (21%), the air that passes along the airways should not be obstructed in any way, respiratory mechanics must be an effective one, alveolar-capillary gas exchange to be normal, O_2 transport from the lungs to the organs and systems to occur under physiological conditions, and its use at cellular level to occur in optimal parameters.(4,5)

A classification of anoxic conditions must consider the level at which the physiological mechanism of breathing is disrupted, resulting thus an etiologic classification. According to this criterion, there are three major categories of anoxic conditions:

- *Anoxia due to oxygen intake (anoxic anoxia)* - represents the situations in which oxygen (O_2) does not reach the alveoli, oxygen intake in the body up to the alveolar-capillary membrane level being affected;
- *Anoxia due to oxygen transport* - the transport of oxygen from the lungs to tissues is disrupted;
- *Utilisation anoxia (affecting the respiratory chain)* – the physiological processes of using O_2 at cellular level are disturbed.(6)

1. Anoxia due to oxygen intake (anoxic anoxia)

Anoxic anoxia can be traumatic or non-traumatic (pathological). Traumatic anoxic anoxia is known as mechanical asphyxia. It is produced in one of the following situations:

- insufficient oxygen in the air one breatheas. This situation occurs if the person is unable to breathe (bag over his head without the obstruction of the respiratory orifices) or if the person breathes air with low oxygen amount (sealed spaces or unventilated spaces or spaces where oxygen is replaced with other gases);
- obstruction of respiratory orifices - suffocation;
- airway obstruction. This may be external by compression with a rope under the action of gravity (hanging) by compression with a rope under relatively horizontal traction (throttling) or by compression with hands (choking). Airway obstruction may also be internal by the presence of laryngeal tumours (non-traumatic various conditions - throat tightness, croup, mediastinal tumours) by aspiration of gastric contents or foreign bodies;
- stopping or inefficiency of respiratory movements. The

[2]Corresponding author: Andreea Nanu, Str. Fochiştilor, Nr. 35, Sibiu, România, E-mail: andreea_nanu@yahoo.com, Phone: +40745 599340
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non-traumatic ones can occur in the paralysis of respiratory muscles, myasthenia gravis, polio, spontaneous pneumothorax in pulmonary tuberculosis etc. Traumatic causes may be mechanical through extrinsic compression (thoraco-abdominal compression), chemical through pharmacological paralysis of respiratory muscles or physical through electrocution;

- low lung perfusion through embolic mechanism, either non-traumatic - clotting disorder, left ventricular failure, interstitial pneumonia etc., or traumatic - bone fractures etc;
- altered alveolar-capillary membrane, either traumatic (inhalation of toxic gaseous) or non-traumatic (hyaline membrane disease).(4,6)

2. Anoxia due to oxygen transport

Anoxia due to oxygen transport can be of two types depending on the traumatic or non-traumatic causes they produce, as follows:

- traumatic causes - these can be quantitative, by decreasing the amount of hemoglobin (acute anemia in severe hemorrhage) or qualitative, by altering the quality of hemoglobin (carbon monoxide poisoning, nitrate, cyanide poisoning);
- nontraumatic causes - in turn, these can be quantitative (anemia due to different causes) or qualitative (sickle cell anemia, spherocytosis, ellipsocytosis etc.).(4,7)

3. Utilisation anoxia

In the case of utilization anoxia, also called histotoxic anoxia, cellular respiration is disturbed, in fact redox - tissue processes by blocking various enzymes. It may be due to traumatic causes, such as hydrogen cyanide poisoning or hypothermia, respectively, of non-traumatic origin, for example severe heart failure, hypoproteinemia etc.(4,8)

CASE REPORTS

Case no. 1

We present the case of a-23-year old male, from urban area, who was found dead at home in November 2014. From the research carried out on site and from the data provided by the criminal investigation authorities, it appears that the said, S.F., was found at home with a plastic bag in the head, secured by plastic clamps at cervical level and the upper limbs were tied behind by plastic clamps, identical to those of the neck (figure no. 1). Alongside the corpse, on the bed, there were plastic clamps identical to those used for binding, attesting the exercise of such ties (figures no. 2).

Figure no. 1. Aspects of crime scene investigation

Figure no. 2. Aspects of crime scene investigation

Figure no. 3. Aspects of crime scene investigation

On site, it was also found a document on the laptop found in the room (figure no. 3), which was in operation, and the document was opened on the screen, so as to be observed easily. The document was a "farewell letter" and was written in detail, containing messages for each member of the family and for a few close friends.

The message referred to: the reasons which led to the autolytic gesture, the self-diagnosis of a depressive syndrome and social isolation, testamentary provisions, planning a friend's visit immediately after performing the autolytic gesture, in order to avoid putrefaction and regrets to the suffering caused to family members and close friends.

From the Mobile Emergency Service for Resuscitation and Extrication (SMURD) pre-hospital emergency sheet made available, it appeared that the SMURD team was called for "unconsciousness".

Regarding the anamnesis, it was noted: patient found at home with a bag on his head tied tightly around his neck, his back, rigid corpse fully installed.

Autopsy report revealed the following particular issues found during the external examination of the body:

- signs of real death - dark purplish lividities, extended and confluated, in stage of diffusion;
- signs of violence - at cervical, circularly level, paler strip with a relatively constant width up to 3 cm; corresponding to radio-carpal joint relief, on the front, excoriation of 0.5 cm in diameter, reddish-brown; on dorsal right carpal region, medially, there were few excoriations, up to 1.2/0.5 cm, differently oriented, reddish-brown; on the dorsal region of the left carpus, purplish-red ecchymotic strip evolving slightly obliquely upward towards the medial level up on the cubital edge, 9/1 cm, which outlines paler streaks on the surface, parallel to each other, longitudinally equidistant;
- Various signs: cyanosis of the hands, including under nails; from the oral cavity, a red liquid was passively coming out.

During the internal examination of the corpse, there was revealed the presence of asphyxia, consisting of asphyxia subpleural petechiae, pulmonary emphysema, acute pulmonary edema, blood fluid in the cavities of the heart and marked visceral acute generalized stasis.

Blood alcohol testing from the blood collected from the corpse was 0 (zero), and toxicology performed on blood samples by GC-MS technique was negative. Histopathologic examination of the harvested lung fragment revealed: marked congestion and large areas of haematic infiltration in the parenchyma alternating with large areas of acute pulmonary emphysema.

It was concluded that the death of the said, S.F., was violent and was due to anoxic anoxia.

DISCUSSIONS

At first glance, upon research at the crime scene, heteroagression suspicion was raised, given the upper limbs tied

behind. On the same occasion, there were identified elements suggestive of self harm, such as: access door in the house was locked on the inside, no trace of ravaging the scene, the absence of traumatic injuries due to defence, the presence of plastic clamps identical to those used for binding, attesting the exercise of such ties and the existence of a document with the value of "farewell letter".

Heteroanamnesis performed afterwards to the father has revealed the following: introverted personality, prone to social isolation, the existence of untreated depression for about 10 years, for which the victim had not sought help, family problems (parental absence and lack of support from their part) and prevailing suicidal ideation, lately without suicide attempts in his history.

Case no. 2

The second case presented in this paper is of a man, S.A., 24 years old from urban area. From research carried out on site and investigation data, it appears that the said was found dead in April 2014, in a car found on the outskirts of Sibiu city. The front windows of the car were covered on the inside with white sheets of paper on which was written "Do not open. Poisonous gas H_2S. Call 112" (figure no. 4) and on the left seat, there was a body tapped with plastic wrap. Near the car, there were found two empty plastic buckets, and five plastic containers labelled "Acido puro 33%" and inside the care, there were found other two plastic buckets with a white-yellowish liquid. It was also found that that the ventilation orifices on the dashboard were covered with tape and, next to the body, there was found a note announcing the existence of a "suicide note" at the victim's home.

Given the biohazard warning, the intervention of the Inspectorate for Emergency Situations was requested, the research on the crime scene and subsequently, the necropsy being conducted by wearing protective equipment. Material evidence was collected from the crime scene for toxicological examination.

Figure no. 4. Details of the warning message

Autopsy report noted the following particular issues found during the external examination of the body:

- signs of real death - dark purplish lividities in stage of diffusion, generalized rigidity, with no signs of externalizing the putrefaction;
- Various signs: subungual cyanosis;

During the internal examination of the corpse, the following were found: erosive areas at the level of the upper airways, with a tendency to confluence here and there (figure no. 5), abundant pinkish air foam at the level of extrapulmonary airways (figure no. 6), emphysema and acute pulmonary edema, acute generalized visceral stasis. All these aspects advocate for the existence of asphyxia.

Figure no. 5. Erosive areas and abundant pinkish air foam at the level of upper airways

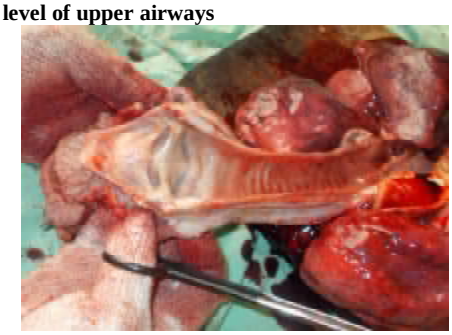
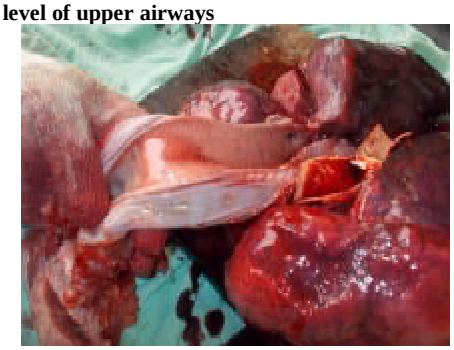


Figure no. 6. Erosive areas and abundant pinkish air foam at the level of upper airways



Blood alcohol contents taken from the blood collected from the corpse was 0 (zero), and toxicology performed on the urine sample by GC-MS technique was negative. Positive reactions were obtained on papers-strip tests indicating the presence of hydrogen sulphide (iodide starch paper and lead acetate). Toxicological analysis of the substance in the buckets in the car revealed the presence of sodium and chlorine ions. Histopathological examinations conducted on epiglottis and lung fragments detected: epiglottis - areas of necrosis and epithelial mucosal desquamation and epithelial gaps here and there, edema and small inflammatory focals at chorion level; lung - marked congestion and hemorrhagic infiltration areas alternating with areas of emphysema, exfoliated epithelial cells of the bronchioles and red blood cells into the lumen of the bronchioles.

DISCUSSIONS

Based on autopsy, toxicological and histopathological examinations, in conjunction with investigation data and toxicological examination of the material evidence, it has been concluded that the death of the said, S.A., was violent and was due to acute intoxication by inhalation of a chemical substance containing hydrogen sulfide.

From the information obtained from the heteroanamnesis performed to parents, we note: the victim was unmarried, lived with his parents, engineer by profession, with stable employment without psychiatric history or a history of suicide attempts. Parents have told us that they had found a "farewell note" asking them to forgive him, and that he did not explain the autolytic gesture.

The peculiarity of the case derives from the fact that toxics used belonged to an occupational, industrial environmental and the access to them should be controlled, restricted, given the special toxicity.

The warning message was extremely important for the research team on the crime scene and for the forensic personnel.

CONCLUSIONS

In these cases, it is about toxic substances that act by different pathophysiological mechanisms, as follows: in case no. 1, it was about a failure of oxygen, by breathing in an enclosed space, with consequent accumulation of carbon monoxide, which is a real hematic toxic. The mode of action of hydrogen sulfide used in the suicide presented in the case no. 2, was determined by the methemoglobinizing effect, by irreversible oxidation of divalent iron in the hemoglobin to trivalent iron, with consequent enzyme inhibition, causing, therefore, the alteration of the utilization of oxygen at cellular level.

Analyzing the cases presented, we notice a diversification of the suicidal methods, including using toxic substances taken from the industrial environment, but especially the existence of the phenomenon of "copying" atypical suicide methods on websites.

Another aspect that we wanted to emphasize is the psychological autopsy, which has been defined by Shneidman in 1981 as a "retrospective reconstruction of the life of the deceased, with the aim of better understanding of his death".(9) Psychological autopsy has a wide range of investigation, seeking to obtain an overview of internal and external determining factors of suicide. Psychological autopsy method resorts to reviewing all the information about the life of the deceased, such as any medical documents, data obtained by interviewing caregivers and any other issues that can help shaping the psychological profile of the suicider.(10,11) Thus, psychological autopsy correlated with the forensic objective criteria and legal investigation data, allows the elucidation of the legal form of death.

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