POSITIONAL ASPHYXIA – A RARE CASE IN THE FORENSIC PRACTICE

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ABSTRACT:

Introduction: Positional asphyxia is a form of asphyxia, which occurs when someone's position prevents the person from breathing adequately. It may be a factor in a significant number of people who die suddenly during restraint by police, prison officers, military or health care staff. In the forensic practice, it is a rare cause of sudden death and a difficult diagnosis. Case presentation: We present a case of a 29-year-old man who died during transportation due to the specific position he was put into by the police officers accompanying him. His hands were restrained with handcuffs on his back and he was made to bend his head and torso forward to his knees for a long period of time. Results: During the forensic autopsy, morphological findings showed the presence only of signs of sudden death - external and internal, frequently found in asphyxia. The toxicology analysis was positive for cocaine but the amount was not lethal. Discussion: Researches have suggested that restraining a person in a facedown and in a seated position pushed forward with the chest on or close to the knees may reduce the ability to breath. The current criteria for positional asphyxia are based on the obstruction of normal gas exchange caused by the body position, the impossibility to move to another position, and the exclusion of other causes of death.

Key words: *positional asphyxia, sudden death, differential diagnosis*

INTRODUCTION:

Positional asphyxia, also known as postural asphyxia, is a type of mechanical asphyxia that is caused by a given body position that restricts normal breathing movements to progressively develop a mismatch between the oxygen requirements of the body and its delivery. Because of these conditions, progressively a general oxygen deficiency (hypoxia) develops.

CASE PRESENTATION:

We present a case of a young man (29 years old) who died suddenly during transportation after arrest in the seated position on the rear seat of a car (between two convoys), with his hands restrained on his back, with torso leaning forwards, following a command not to look out the window. Under these conditions of long-term transportation, the policeman found that the man, after initial complaints of not feeling well, does not react. They releases him from the fixative means and starts the classic indirect heart massage and mouth-to-mouth resuscitation. After the failure of these actions, the man was transported to a medical facility where no vital signs were found, but still the doctors continued the resuscitation, unoftunately without any success.

A forensic examination of the corpse has been carried out. During the autopsy and additional histological and chemical analysis we observed:

- signs of fast occurring death, light hypertrophy with heart dilatation, heart weight 510 g, rounded tip, myocardium - relaxed, thickness of the left ventricle - 1.5 cm, on the right - 06 cm;

Figure 1

- edema and bruising in the outer half of the upper eyelid of the right eye, bruising along the edge of the eyelids of the left eye, superficial abrasions on the forehead, abrasions and superficial rupture of the tongue, tram line bruising with abrasions in the area of the wrists, bruises and abrasions in the right elbow area, abrasions on the right forearm, subcutaneous and muscle bruises subcutaneously in the lumbal region;

Figure 2

- histological data for inflammatory and degenerative changes in the lungs and myocardium with overlapping morphological changes for acute circulatory disorder expressed by:

● myocardium - diffuse foci of prolonged, tapering, wavy cardiomyocytes and areas with fragmentation of the same, serous pericarditis - mononuclear cell infiltrate in an epicardial fragment, minimal focal points of lipomatosis, blood stasis in the capillaries, erythrocyte extravasation in perivascular spaces, interstitial edema, generalized degenerative changes in the heart muscle, single areas of focal myocardium fibrosis;

Figure 3

● lungs - interstitial and alveolar edema, parenchymal haemorrhage, blood stasis, haemorrhagic infarctions, acute emphysema and dystelectasis - alternating, adjacent areas of

atelectasis and foci of over-developed alveoli and alveolar ducts, extreme dilation and stasis in capillaries and venules, desquamation of the bronchial epithelia, single alveoli with siderophages, focal and interstitial fibrosis in small areas as well as scarring lymphoid infiltrates, homogeneous blue to purple structures in alveoli most likely corresponding to fungal callus without evidence of an inflammatory reaction (immune deficiency);

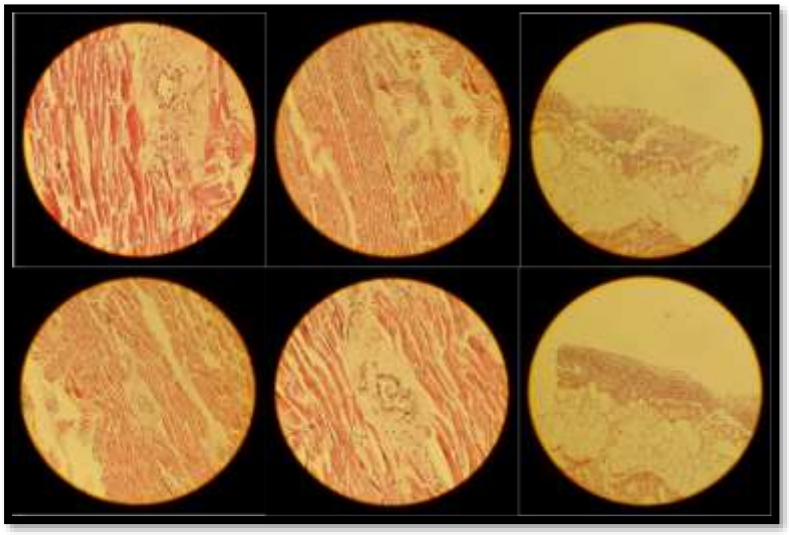

Figure 4

● trachea and bronchi - venous stasis - dilation and stasis in the capillaries, hemorrhage and acute catarrhal bronchitis - exudates of erythrocytes and leukocytes in the lumen;

● liver - acute blood stasis, fatty dystrophy, cholestasis in single hepatocytes;

● spleen - acute venous stasis;

● adrenal gland - normal histological structure, blood-filled vessels;

● kidney - pronounced venous stasis;

● brain - swelling of soft brain meninges, marked perivascular and pericellular edema;

● skin and subcutaneous tissue: petty bleeding - infiltration with erythrocytes with tissue strain.

● lack of data on fatty emboli in the lung;

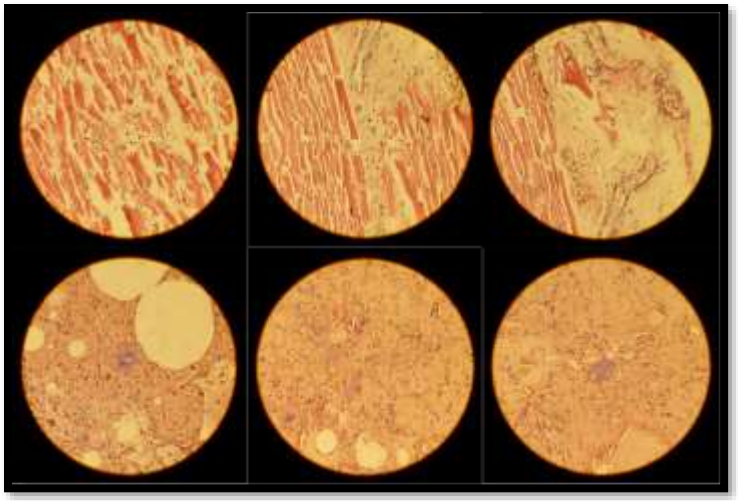

Figure 5

- lack of ethyl alcohol and other volatile reducing substances in the blood and urine, lack of alkaloids (opium and synthetic narcotic substances), salicylates, phenothiazines, barbiturates and imipramine medications.

- presence of amphetamine-type stimulants, traces of base substance with the benzodiazepine Tranxen.

These findings were confirmed in the re-autopsy and the new additional histological and chemical studies, but the initial examination, based on the overall analysis of the data, assumes that the cause of death is due to positional asphyxia, that occurred on the background of changes in the heart muscle and other internal organs, characteristic for prolong use of narcotic drugs, whereas in the subsequent examination, the cause of death was attributed to a disease, with a history of cardiac arrhythmias and the occurrence of dysrhythmia, without any witness or existing medical records of previous heart disease and arrhythmias of the deceased.

DISCUSSION:

In cases of rapid cardiac death, large part of the morphological manifestations common for mechanical asphyxia can be observed, so in some cases it is necessary to make a differential diagnosis between them.

As a rule, depending on the type of mechanical asphyxia, the rate of death, the general and the current state of the body at the time of death, only some of the general-affective morphological changes can be manifested, such as: facial cyanosis (echimotic mask), punctual hemorrhages on the conjunctivas and scleras (sometimes on the skin of the face, neck and shoulders), bleeding form the nose and ears (rarely), intense and abundant lividity, discharge of pelvic reservoirs, dark liquid blood, blood-filling to the right half of the heart and its adjacent blood vessels (compared to its left half), acute blood stasis in the internal organs, punctate epicardial haemorrhage, pleura, renal pelvis (so-called Tardio's spots), acute alveolar emphysema, wrinkled spleen (sign of Sabin-Orachovac), swelling of the brain and lungs, bites of the tongue (in some cases, in the seizure phase of asphyxia development). The following morphological features, overlapping with the above-described general ones, can be observed in fast occuring deaths with cardiac genesis: Facial cyanosis (especially in the case of massive pulmonary thromboembolism), rarely punctual

conjunctival haemorrhages as well as on the csleras (sometimes facial, especially in massive pulmonary thromboembolism), bleeding form the nose and ears (rarely, in the case of massive pulmonary thromboembolism), intense and abundant postmortem lividity, dark red blood, blood supply to the right half of the heart and its adjacent blood vessels (compared to its left half, massive pulmonary thromboembolism), acute blood stasis in the internal organs, punctual epicardial haemorrhage, pleura, renal pelvis, acute alveolar emphysema, swelling of the brain and lungs. It is apparent that there are multiple overlapping morphological signs in both types of death, which makes it difficult to differentiate in some cases. The acceptance of the diagnosis "acute disruptance of the heart rate (rhythm death) can only be accepted after excluding all other possible causes of death. The development of positional asphyxia can not be ruled out based on the available data of the circumstances around the death - its rate and the forced position of the detainee and the overall morphological autopsy finding.

Based on the most common type of mechanical asphyxia (drowning) this condition passes through the following stages: preasphyctic stage, stage of dyspnea and convulsions, stage of relaxation, stage of terminal respiratory movements and stage of autonomic function of the heart.

In the various types of mechanical asphyxia, however, not all of these phases can be observed. In mechanical asphyxia, death occurs with a primary arrest of breathing, whereas in a rapid death with a cardiac genesis, it occurs with a primary arrest of the heart. It is this fact that determines some of the morphological differences in both types of death in the particular case, and basically a lack of neurological symptomatology, a seizure phase in the process of death in death with primary arrest of the heart. In this case, there are abrasions and surface ruptures on the edge of the tongue on both sides. These finding warrants the conclusion that at the moment of death there were certain seizure symptoms that are characteristic of both mechanical asphyxia and epilepsy and other conditions accompanied by seizures. This fact can not be neglected in clarifying the cause of death.

Positional asphyxia is a type of mechanical asphyxia, which is rarely seen in healthy individuals. For the development of such asphyxia, often other factors facilitate its occurrence. They can be of different nature, both somatically and emotionally. It is also relevant that the current general state of the organism, such as the use of alcohol, drugs and others substances that have a suppressive effect on the central nervous system, particularly the center of respiration, as well as on the cardiovascular system. All such factors favor the development of positional asphyxia and should be taken into account in the analysis of each individual case.

CONCLUSIONS:

The diagnosis of "positional asphyxia" is difficult and should include all the data on the case (testimony for the incident, the conditions, the present symptom and the death rate, as well as the medical documentation for previous diseases of the deceased) to be compared with the established autopsy morphological finding and results of additional histological and chemical studies. In the differential diagnosis plan, other causes of death leading to a primary arrest of breathing should be excluded. The cause of death can be attributed to "rhythm death" only in the so-called "white autopsy" when any other possible cause, including positional asphyxia are excluded.

In the presented case, considering the above mentioned analysis and discussion, we assume that the cause of the death of the deceased was due to the progressive oxygen deficiency resulting from a forced position of the body, against the background of pathological inflammatory and ischemic changes in the heart, the presence of an amphetamine-type stimulant and an acute emotional stress response because of the arrest. This mechanism of protracted hypoxia, in the specialized scientific literature, is referred to as positional asphyxia.

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