

**FORENSIC MEDICAL FEATURES OF STRANGULATORY  
ASPHYXIA IN HANGED ELDERLY PEOPLE**

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**ANNOTATION**

The qualitative and quantitative characteristics of the morphological manifestations of mechanical strangulation asphyxia during the execution of elderly victims are presented, as well as new diagnostic approaches to its expert evidence.

**Key words:** morphology, forensic medical examination.

Forensic examination of mechanical strangulation asphyxia during hanging has been thoroughly studied in the course of numerous studies of practical and experimental material. In the literature, the main morphological signs and laboratory indicators are given, which are important for determining the cause of death. The authors emphasize that a number of factors can influence the nature of their manifestations, such as the level of the neck loop, the time of its removal, the material from which it is made, and others, but they did not take into account such an important factor as the age of the victims. The statistical indicators given for the presence of each of the features in the age aspect were averaged.

As practice shows, diagnosing this type of death in a number of cases presents serious difficulties. Specifically, in the early removal of the hanging loop or the use of a soft wide loop, when the strangulation groove on the neck is weakly expressed or absent. Especially difficult is the determination of the cause of death in persons over 50 years of age who are suspected of hanging, and who have chronic diseases of the pulmonary and cardiovascular systems as their "indispensable companions." This problem is relevant and timely both for the theory and practice of forensic medicine.

**The purpose of the study** – studying the qualitative and quantitative characteristics of the morphological manifestations of mechanical strangulation asphyxia in elderly people who have been hanged, as well as the possibility of using forensic biochemical research methods to develop diagnostic criteria aimed at improving the quality of examinations for this type of death and their evidence.

**Materials and methods of research.** The work was carried out on the basis of the practical materials of the 1st branch of the Ministry of Higher and Secondary Special Education in Tashkent. 92 hanged corpses were examined. The first group consists of sixty persons who have died between the ages of 50 and 83 years of age due to a certain degree of chronic pathology of the cardiovascular and/or respiratory systems, the presence of which was confirmed by a histological examination of the internal organs. The control group (2nd) consisted of 32 deceased individuals aged 18

to 50. The examination of corpses was conducted only with a typical arrangement of a neck loop made of rigid or semi-rigid material, leaving a marked strangulation groove on the neck. The obtained results were compared with the published data of other researchers, which, in our opinion, were of an average nature, as they did not take into account the peculiarities of the age period.

There are some publications in the literature that indicate the possibility of the development of hemorrhages in the pituitary gland that are histologically detected in cases of asphyxia [5, 6]. We hypothesized the presence of macroscopic changes in the pituitary region, caused by a sharp increase in intracranial pressure as a result of the disruption of the venous blood flow from the brain, primarily due to the compression of jugular veins. To confirm this hypothesis, a technique was employed to examine this zone in a single complex: the pituitary gland, its legs, and the cavity sinus.

Qualitative and quantitative indicators of the frequency of asphyxia symptoms in the 1st and 2nd groups were compared and significant differences were found. Thus, subconjunctival exchymoses were found in the 1st group - 43%, in the 2nd - 88% ( $p < 0.001$ ); hemorrhages in the soft tissues of the grooves - 38 and 88% ( $p < 0.001$ ), in the regional lymph nodes - 67 and 91% ( $p < 0.01$ ), in the basin of the glomerular veins - 29 and 41% ( $p < 0.01$ ), under the visceral pleura (Tarde spots) - 38 and 91% ( $p < 0.001$ ), in the anterior limbs of the These hemorrhages were noticeably less intense and few in the elderly group.

No statistically significant differences were found between the groups in the frequency of occurrence of the following signs: involuntary discharge of saliva, stool, urine, semen and crystalline tube - in the 1st group - 71% and in the 2nd - 81%; compressing of the tip of the tongue between the teeth - 47.6 and 41%; circulation of cadaveric stains in the distal parts of the upper and lower extremities - 43 and 53% and 96% respectively; hemorrhages in the intervertebral discs (Simon

In the control group, anizocorrhea predominated - 22%, while in the 1st group it was 5%, respectively, facial and neck cyanosis - 81 and 38%, muscle strangulation - 59 and 23.9%, acute lung swelling - 53 and 14% ( $p < 0.001$ ). It is noteworthy that in the 1st group, sublingual bone and oral cartilage fractures were more common - 29 and 19% of observations, respectively ( $p < 0.01$ ).

Equally and significantly less frequently in both groups were traces of loop node localization in the closed strangulation furrow (9% in the 2nd group and 9.5% in the 1st), serous vesicles along the furrow - 13 and 10% respectively.

Such a sign, such as the "enlargement" of the right chambers of the heart due to the sharp augmentation of the cavities of the right atrium and the ventricle by large volumes of venous blood, is not characteristic of people over 50 when they are hanged due to pathological changes in them. These changes are due to the degeneration of the myocardium, the involvement of the conducting system, which leads to a decrease in

the contractile function of the cardiac muscle and a sharp overload.

The development of "acute lung swelling" (acute emphysema) observed during hanging is more characteristic of a healthy lung tissue and an adequate reaction of the heart to the increasing load. In the 1st group, pulmonary edema and venous hyperemia predominated due to lifetime stagnation in the small bloodstream. The low incidence of anizocoria can be explained by age-related degenerative changes in the central and peripheral nervous systems, which play the main role in the manifestation of this symptom. The phenomenon of "pumpkin hemorrhage" was rarely observed in both age groups, and it was often diagnosed that the spleen had noticeably increased in size, apparently as a result of certain infectious diseases experienced during life.

In all observations, intense hemorrhages were observed in the pituitary capsule, ranging from foci to scattered dark red, which were most pronounced on the upper surface of the capsule and around the foot, and to a lesser extent on the lower surface adjacent to the bone (the pituitary gash), and on the lateral surfaces adjacent to the cavity sinus. The cavity sinus becomes rapidly filled with blood, which is accompanied by a lateral compression of the pituitary gland, a sharp expansion of the vessels of the lower extremities, and a hemorrhage into the vessels, which was confirmed by histological examination. Thus, it can be said that this feature is pathognomonic and highly informative in hanging and can serve as an additional diagnostic criterion for mechanical strangulation asphyxia.

B.E. Eshmuratov noted the expert significance of hemin in the diagnosis of strangulation during life, but not an indication of whether the degree of severity and thickness of the subcutaneous base of the groove were taken into account accordingly. We studied the amount of hemin in the subcutaneous base of 29 corpses of different ages in different sections of the strangulation furrows. Fragments of the subcutaneous base were taken from the various surfaces of the neck: front, left and right lateral and posterior (LPC) - 4 objects directly during strangulation. If the groove was poorly expressed and could not be seen on its individual fragments, the subcutaneous base was removed from the areas where the pressure of the loops may have been exercised in the process of fixing it on the neck when it was tightened by the body's mass. As a control, the subcutaneous base was taken from the anterior surface of the neck above the clavicle. It has been established that in all cases, the concentration of hemin in the subcutaneous tissue, regardless of its thickness in the region of the strangulation furrow, exceeds the control values by 1.2-4. Hemin content in the control samples was 6.7-54.35 mcg/g, in the subcutaneous base directly at the strangulation furrow - 24.95-85.35 mcg/g, while in the samples from the anterior and lateral surfaces of the neck, in all cases, the amount of hemin in the subcutaneous base of the posterior surface of the neck slightly exceeded.

The results obtained give grounds for asserting that a 20% or more increase in the

amount of hemin in the experimental sample of the subcutaneous base (for example, when studying the subcutaneous base from the area of the least pronounced strangulation furrow) has diagnostic value as evidence of its formation during life.

According to A.V. Chvalun [6], when the loop is removed from the neck of the corpse at the scene of the incident and moved to the site of the study, there is a "mixing" of blood from different parts of the blood supply system, which affects the change in the amount of glucose in the blood from different regions of the vessels. Our research did not confirm this hypothesis.

The identified significant differences in glucose content can be explained by the conditions of general hypoxia, while it is possible that in individuals of the 1st group, due to the low content of reserve carbohydrates in tissues, energy synthesis in the agonal period was primarily due to blood glucose. Confirmation of this is the high concentration of glucose in the PCP in both groups, which can be taken as some "initial" value, reflecting the concentration of glucose in the body under conditions of "acute stress," which is an asphyxial process.

Thus, the conducted research has proved a significant decrease in the frequency and intensity of general asphyxial and species-specific signs of death during hanging, a regular change in biochemical indicators in biomaterials of lipas over 50 years old as a result of a decrease in the response to concrete physical exposure.

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