MODERN CRITERIA FOR FORENSIC MEDICAL EVALUATION OF INTERNAL ORGAN SCRATCHES FROM IMMEASONABLE BODIES (LITERATURE REVIEW)

[1]Talibjanov M.T., [2]Ruziev Sh.I.
[1,2]Tashkent Pediatric Medical Institute
https://doi.org/10.5281/zenodo.11396138

Abstract*. Blunt mechanical trauma remains one of the most common types of injuries in forensic medicine. In many cases, its connection with the onset of death is obvious. Many studies have been devoted to the study of the clinic, morphology and epidemiology of this type of injury. Their relevance is high even now (Pigolkin Yu.I., Bogomolov D.V., 2001). Unfortunately, there are infrequent works devoted to the morphological aspects of the diagnosis of MT trauma (Khasanyanova S. V., 2002). Mortality from mechanical injury remains one of the leading places in the overall structure of mortality of the world's population.*
Keywords*: motor injury, tractor injuries, traumatological patients, traumatic shock.*

The literature data on BMT are contradictory. Many sources contain only scant statistical information. The greatest amount of such information is available in the literature up to the 80s of the XX century.

Sorokin in Leningrad, the death rate from car injuries decreased in 1964 compared to 1958 (the data of 1958 were taken as 100%), in 1964 the death rate was 78.7%. According to E.M. Epstein, in the Yaroslavl region in 1966, an average of 11.1% of autopsies were performed at. E.P. Tyulkin pointed out that 337 corpses were opened in Izhevsk over a number of years, of which motor injury was 28.3%, AT — 52.5%.

There are separate publications of the authors indicating absolute figures about TMT. Nizovtsev V. I. (1969) analyzed 53 cases of MT. Mazurenko M. D. (1969) reported 22 corpses of persons who died from tractor injuries.

Topolyansky N. D. (1969) described 83 cases of fatal injuries by agricultural machines. The research of A. P. Gromov (1966, 1968) is devoted to the study of occupational injuries and mortality from damage, who, when analyzing the studied sectional observations, showed that most of those who died from mechanical damage due to collapses and destructions died immediately or shortly after the injury.

According to B. D. Komarov and A. P. Kuzmichev (1979), for 10 years at the N.V. Sklifosovsky Research Institute, severe compression injuries to the chest and intra-thoracic organs accounted for 29% of all chest injuries.

The lethal outcome in the group with severe injuries reached 50-60%. Among the causes of mortality in traumatological patients, chest injury ranks second after traumatic brain injury. Among those who died from injuries, chest injuries were noted in 50% of the victims, in 25% breast injury was the main cause of death. During the described period, the authors also examined 980 victims with abdominal trauma, open injuries were noted in 692 cases (mortality was 48%), closed abdominal injuries - 28% (mortality was 30.4%).

M. D. Mazurenko (1987) conducted an analysis of industrial injuries for a number of years in Leningrad, the injury at work amounted to 76.2%, of which the PV accounted for 21.1%, the

actions of parts of moving vehicles — 20.7%, falls on the victims of various objects and mechanisms - 14.1%, compression of victims between objects and mechanisms - 8.6%), the effect on the affected parts and parts of working mechanisms when they hit them - 6.7%, explosions of boilers, cylinders, explosive substances, the effect on the affected parts and parts separated from the working mechanisms -3.2%.

The last years of the XX century brought large-scale catastrophes into the life of mankind, in which there was a mass death of people, many were damaged (Pashinyan G. A., Tuchik E. S., 1994).

Thus, mortality from soft tissue injury is still among the leading causes of mortality in the population. The first place in mortality among all soft tissue injuries is occupied by an automobile injury. Most often, people of working age suffer in the reproductive period of life, men predominate among them. No less often, those who died at the time of injury were intoxicated. The cause of death was most often head and neck injuries, traumatic shock.

The question of the prescription of damage formation (PDF) is still an urgent and completely unexplored problem due to the exceptionally large variety of factors that directly or indirectly affect the state of reactivity of tissues and organs. This issue seems controversial from a diagnostic point of view and undoubtedly requires further in-depth study and identification of new expert criteria.

Several different approaches are possible to solve the issue of the prescription of damage formation. One of them is to identify existing known sequences of qualitative pathomorphological events in and around the injury area, the study of which can provide information about the prescription of soft tissue injury.

The disadvantage of this approach is that a qualitative assessment of events in the injury zone and along its periphery can only give approximate information about the prescription of the injury.

Any damage causes one or another general reaction of the body, therefore, the second way to study PDF is to take into account the general reaction by biochemical, clinical, morphological and other methods.

When conducting a forensic medical examination or examination of persons affected by soft tissue injuries, an integrated approach is used when the data of macroscopic examination are supplemented by the results of laboratory methods (gas chromatographic, chemical analyses, microscopy of organs and damaged soft tissues by technical and forensic methods).

The disadvantage of this approach is that a qualitative assessment of events in the injury zone and along its periphery can only give approximate information about the prescription of the injury.

Recently, the histochemical method of tissue research has developed rapidly. The authors who applied it found tissue histochemistry to be more informative when examining only tissues (skin) from areas of lifetime damage in the early stages after injury or death due to injury.

The authors described in detail the detected changes in tissues and organs and gave the dynamics of changes over time. In individual works, the authors pointed out the influence of alcohol intoxication on processes in tissues.

The work of T. G. Pazenko (1977) presents the results of experiments on guinea pigs, data from the study of the lifetime of abrasions on sectional material. Experimentally, there were no pronounced changes in the area of lifetime injuries immediately after their application and in

postmortem abrasions by histological and histochemical methods used. 10 minutes after the injury, an increase in alkaline phosphatase in the area of damage, pyroninophilia of tissues due to DNA decay were noted. After 30 minutes - an increase in reactive changes: swelling of the papillary dermis tissue, dilation of blood vessels with an abundance of red blood cells in the lumens; histochemically -indicators of the development of an inflammatory reaction. After 1 hour, the author observed the marginal standing of leukocytes in the lumen of deep vessels. These changes persisted in the abrasions up to a day after the injury.

J. Raekallio (1986) conducted numerous histological and histochemical studies of soft tissues in victims of soft tissue injury and in animal experiments, which created a certain base for subsequent researchers. In J. Raekalio's work, histologically established changes in the skin around the injury zone are divided into 4 groups: 1 period — changes in the vessels around the injury zone, time intervals are given - vascular spasm in seconds, vasodilation in 10 minutes.

Period 2 - without specifying the time interval - erythrocyte stasis in capillaries and local hemorrhages, aggregation of erythrocytes in blood vessels, the onset of thrombosis with stopping bleeding were noted.

Period 3 — an increase in the number of enzymes in the peripheral zone around damaged tissues - from 1 hour onwards.

Period 4 - cellular response in the form of leukocyte aggregation (marginal standing of leukocytes, leukocyte output from blood vessels), after 4 hours -leukocyte reaction, inflammation.

The described changes in vessels and cells were regarded as early manifestations of an inflammatory reaction in tissues in response to damage. The author noted that the appearance of a leukocyte reaction in tissues can be delayed up to 24 hours from the moment of injury, and the described changes in tissues that developed in the period of 8-12 hours from the moment of injury are not informative enough to accurately determine the tissues.

These facts forced the author to apply the histochemical method of research to determine inflammation mediators in tissues - histamine, serotonin - in experiments on animals and on sectional material.

The author identified two zones according to the activity of mediators in the histochemical study of damaged skin and skin around the damaged area - central and peripheral. The central zone - in the immediate vicinity of the damage, with a depth of 200 to 500 microns, is characterized by a decrease in enzymatic activity. The peripheral zone, its depth is from 100 to 200 microns, is characterized by an increase in enzyme activity already within an hour after the injury. Histamine activity reaches its maximum value 20-30 minutes after the injury. Up to 8 hours after injury, in his opinion, histological and histochemical methods are effective. For the rest of the period of time, the author considered the histological method to be the leading one in determining DOP, identified the peripheral zone and changes in it after 4-8 hours: leukocytes are visible around the lesions, which have not yet formed an inflammatory shaft. Between 8-12 hours, polymorphonuclear leukocytes, macrophages, activated fibroblasts form a peripheral zone around the injury. Polymorphonuclear leukocytes predominate over macrophages. From 16 to 24 hours, the number of macrophages increases with a decrease in the number of polymorphonuclear leukocytes. In the thickness of the central zone, degenerative changes in the nuclei occur. After 32 hours, the necrosis zone is clearly delimited from the adjacent tissues. We have given the author's data in full, since his predecessors and successors were concise, and his works were actively used by his followers.

In the works of B. I. Mikhailichenko (1987, 1992), the lifetime of mechanical damage to the skin was determined by the quantitative content of free histamine (mediator of the early phase of the post-traumatic period). The level of increase in free histamine depended on the type and duration of skin injury. An increase in the level of histamine in the skin was noted by the author 5 minutes after the injury, the concentration of histamine in the tissues persisted up to 1 hour after the injury. As the period of survival of tissues increased, the possibility of detecting the content of histamine in tissues decreased.

The authors who conducted histochemical studies emphasized their unreliability, since some of the histochemically and biochemically detected changes continue after death (thrombus formation (Raekalio J., 1986)). The high sensitivity of the methods, the difficulty of repeating the results were noted.

At the next stage, histochemical methods began to be combined with biophysical methods for determination, but were not always the objects of study. In the work of M. A. Oganesyan (1984), histochemical and biophysical studies of blood parameters were carried out to establish the prescription of mechanical injury (biophysical methods for recording the rate of the recovery reaction of blood spin probes using electron paramagnetic resonance). The author established a significant dynamics of the reaction rate of recovery of spin blood probes in terms of 0, 1, 3, 6, 12, 24 hours of the post-traumatic period. The concentration of ethanol in the blood up to 2%0 had no significant effect on the dynamics of the recovery rate of spin probes.

The relevance of histochemical studies of damaged tissues was stated in the works of other foreign researchers without presenting their own data (Hernandez-Cueto C. et al., Adelson L., 2000).

To solve the problem, the researchers used various methods (spectrophotometry of the damaged (Bohnert M. et al., 2000), histological, histochemical, enzymological methods).

As a result of the analysis of the literature, it was revealed that the data presented are short, sometimes inconsistent, and the modern methods used are mostly laborious and expensive, which determines the ongoing relevance of the histological method of determination.

Conclusion. An analysis of the literature data shows that, despite the high incidence of soft tissue injuries with blunt objects, the issue of the time of injury formation in soft tissue injuries is still relevant and is not fully understood due to the exceptionally large variety of factors that directly or indirectly affect state of reactivity of tissues and organs. In particular, despite the fact that the morphometric research method, which makes it possible to objectify and clarify morphological phenomena, has already been widely introduced into practice, in the literature available to us there were only a few publications devoted to its application in relation to soft tissues. In these works (Gaibov A.G., 1970-1972), attempts were made to morphometry of the skin of head wounds caused by blunt and sharp objects, but only some single parameters were measured.

REFERENCES

1. Баринов Е. Х Установление прижизненности и давности механической травмы в детском возрасте по изменению толщины капсулы вилочковой железы. Современные вопросы судебной медицины. Ижевск, 1994. С. 100-101.
2. Баринов Е. Х, Соловьева М. О., Ромодановский П. О., Мальцев С.В. К вопросу о диагностике прижизненности механических повреждений по состоянию

микроциркулярного русла фасции голени и капсулы вилочковой железы в детском возрасте. Проблемы экспертизы в медицине. М., 2001. Т. 1. Номер 4. С. 36-37.

3. Гайворонская В. И. Сравнительный анализ частоты возникновения повреждений мягких тканей, костей и внутренних органов грудной клетки при травмах от падения с высоты и столкновения движущегося автомобиля с пешеходом. Судеб.-мед. экспертиза. 1997. Номер 4. С. 11-14.
4. Гридасов Е. В., Виноградов О. В. К вопросу экспертной оценки морфодинамики посттравматических реактивных изменений. Материалы У1 Всероссийского съезда судебных медиков, посвященного 30-летию Всероссийского общества судебных медиков. Москва-Тюмень. 2005. С. 77.
5. Качина Н.Н. Исследование глюкозы и гликированного гемоглобина при экспертной оценке гликемического статуса потерпевших в случаях насильственной смерти: Автореф. дисс. ... канд. мед. наук. – М., 1993.
6. Зороастров О. М. Экспертиза острой смертельной алкогольной интоксикации при исследовании трупа. Изд-во Тюменского государственного университета, 2003 . 75 с.
7. Климова О.Ю. Биохимические критерии диагностики некоторых причин смерти //Судебно-медицинская экспертиза. 2007; 4:19-20.
8. Mogtnsen C.E. The kidney in diabetes: how to control renal and related cardiovascular complications //Am I Kidney Dis. 2001; 37:3-6.
9. Thader H. Relation of steatosis to cirrhosis //Clin. gastroenterol. 1985; 5:273-280.
10. Александров Э. П. Некоторые морфологиеские критерии определения давности ран. Первый всесоюзный съезд судебных медиков. Киев, 1976. С. 99-100. 8. Александрук Д. П. Ферритин и гемосидерин как факторы прижизненного гемолиза. Первый всесоюзный съезд судебных медиков. Киев, 1976. С. 128-130.
11. Алисиевич В. И. Морфологические и гистохимические изменения в надпочечниках человека при смертельной механической травме. Судебно-медицинская экспертиза и криминалистика [Сборник работ]. Ставрополь, 1967. 5. С. 128-131.
12. Ананьев Г. В. Активность лактатдегидрогеназы и малатдегидрогеназы тканей внутренних органов при механической травме. Первый всесоюзный съезд судебных медиков. Киев, 1976. С. 112-113.
13. Ананьев Г. В. Установление давности происхождения кровоподтеков на коже лица. Судебно-медицинское установление механизма, прижизненности, последовательнорсти. Обзор отечественной и иностранной литературы по тупой механической травме и давности образования повреждений при травме и давности механических повреждений. М., 1983. С. 3-6.
14. Балаев В. В. К механизму образования ссадин (комплексное исследование). Современные лабораторные методы судебно-медицинской экспертизы. М., 1972. Номер 2. С. 6-8.
15. Балаян Р. А. Смертельная травма в связи с падением с высоты. Автореферат дисс. канд. мед. наук. Ереван, 1976. 25 с.
16. Берзиныи У. Я. Макро - микроскопия повреждений кожи причиненных тупыми предметами. Материалы 5 Всесоюзной научной конференции судебных медиков. Л.гМедицина, 1969.С. 161-163.

17. Гаибов А. Г. Морфология эксперментальной кожной раны, заживающей в условиях жаркого климата. Здравоохранение Таджикистана. 1971.С. 5 - 48 - 49.
18. Гаибов А. Г. Местная ранняя морфологическая реакция при нанесении ран в области головы колюще-режущими или тупыми предметами в условиях пониженной температуры. Материалы годичной (XXI) научной конференции Таджикского госмединститута. Душанбе, 1972. С. 12- 15.
19. Гребеньков А. Б., Лунева 3. М., Телюк В. В.,Тенъкова А. А. Оценка давности травмы на фоне алкогольной интоксикации пострадавших. Перспективы развития и совершенствования судебно-медицинской службы Российской Федерации Мат. 3-го Всероссийского съезда судебных медиков. Москва-Астрахань. 2000. С. 170-171.
20. Гридасов Е. В., Виноградов О. В. К вопросу экспертной оценки морфодинамики посттравматических реактивных изменений. Материалы У1 Всероссийского съезда судебных медиков, посвященного 30-летию Всероссийского общества судебных медиков. Москва-Тюмень. 2005. С. 77.
21. Зороастров О. М. Экспертиза острой смертельной алкогольной интоксикации при исследовании трупа. Изд-во Тюменского государственного университета, 2003 . 75 с.
22. Asnals S. Mortality statistics and autopsy: reability of estimation of the mode of death in Copenhagen and a rural district of Sealand, Denmark. Forensic - Sci -Int. 1979. Nov; 14\ 3\: 177 - 80.
23. Benedetto G. et al. Anallisi retrospettiva de 1354 autopssie in casidi deces so per trauma. Minerva-Chir. 1989. May. 31; 44 MOV: 1521 - 3.
24. Bernatches SF et al. Histological characterisation of a delayed wound healing model in pig. Wound Repair Resen. 1998. May - Jun; 6 \3\;223-33.
25. Betz P. et al. Time-depended pericellular expression of collagen type 1Y, laminin and heparen sulfati proteoglycan in myofibroblasts. Int - J — Legal -Med. 1992; 105 \3\: 169 - 72.
26. Clark D.E. et al. Injury mortality in East Germany. Am. J. Occup. Saf. Erpon. 2000. Nov; 90 \ 11\; 1761 - 4.
27. Dinietro L. A. et al. Modulations of macrophage recruitment into wounds by monocytechemoattractant protein - 1. Wound Repair Regen. 2001. Jan-Feb; 9\1\: 28-33.