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ESTABLISHMENT OF LIFETIME AND PRESCRIPTION OF INJURY IN FORENSIC MEDICAL PRACTICE (literature review)

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Abstract. Assessing survival and prescription of injury establishment in forensic medical practice (literature review). Erhard N.M., Biliakov A.M., Volobuiev O.E. Determining the prescription of organ and tissue damage in forensic practice is of pivotal role in establishing an objective picture of the facts and circumstances. Nowadays, when the latest research methods and modern laboratory and instrumental equipment appear, there is a need to improve forensic diagnostics to establish the prescription of injuries. Although experts and scientists are trying to invent new methods and techniques for diagnosing the age of injury, this area of research will not lose relevance, given the complexity of solving problems. The purpose of this work is to analyze literature data on the use of various diagnostic methods in forensic practice to establish the prescription of injuries and assessing survival. In our study we analyzed scientific papers and data of international scientific literature on the problem of various diagnostic methods in forensic practice to establish the prescription of injuries and assessing survival. Methods used: scientific research, analytical and generalizing. The authors cite publications that set out the methods and criteria to address this issue. In particular, promising areas of application of histological, immunohistochemical methods, postmortem computed tomography are shown. The issues of establishing the prescription of cranio-cerebral injuries are considered. The role of manifestations of the body's systemic response to trauma, in particular, the neuroendocrine system, is also shown. Examples of the use of non-ischemic heart disease to diagnose the duration of dying are given. The role of troponin I, creatine kinase, brain natriuretic peptide (NT-pro BNP) in the diagnosis of the duration of the traumatic process is shown. Based on a review of the literature, the authors conclude that new methods and criteria for assessing survival and prescription of injuries in forensic practice in order to unify the results of the study and avoid diagnostic errors are promising.

Scientific development of issues related to determining the duration of fatal injuries during forensic examination is an urgent task for forensic experts.

The study of the prescription of death coming and lifelong reactions to injury were conducted by many scientists in various fields of medicine [20, 27]. This issue was paid attention to in the works of Ukrainian forensic scientists, including B.V. Mykhailychenko, A.M. Biliakov, I.G. Savka, O.I. Herasymenko, B.T. Barchynsky, O.M. Hurov, B.O. Olkhovskyi and others.

The purpose of this work is to analyze the literature on the use of various diagnostic methods in forensic practice in assessing survival and prescription of injuries. Methods used: scientific research, analytical and generalizing.

Recently, scientists have used post-mortem computed tomography (CT) to diagnose the prescription of death coming. The authors proved that the sensitivity of CT in the diagnosis of traumatic brain injury is 95.2%, although erroneous results are possible with damage to the heart and aorta [23, 33]. United Kingdom, the Netherlands, and Japan make extensive use of postmortem CT and MRI scans [9, 27]. In Switzerland currently comparative studies of postmortem CT and MRI with traditional autopsy are possible with damage to the heart and aorta [23, 33]. The term viroscopy has become widely used – a method of postmortem examination of the body [18]. Used viroscopy to examine a person who has died due to mechanical asphyxia [10].

K.V. Surkov, M.V. Fedulova and others revealed the prospects of using immunohistochemistry methods of assessing survival and age of mechanical damage establishment in forensic practice [21, 19]. In particular, the possibility of: quantitative determination of cell adhesion molecules (CAMs) of
leukocytes and endothelial receptors to them in the tissues of skin wounds is shown; expression of so-called "early genes" that encode transcription factors in tissues in traumatic brain injury; P-selectin as a marker of early life reaction in damaged soft tissues; IHC-staining for fibrinogen of alveolar transudate in asphyxia; expression of proliferating cell nuclear antigen (PCNA), markers of keratinocyte apoptosis and connective tissue cells in the skin from the wound area; heat shock proteins in body tissues and fluids; CD3 (T-lymphocytes in general), CD4 (T-lymphocyte helpers) and CD20 (B-lymphocytes) in splenic injury; vascular endothelial growth factor (VEGF) at the site of injury; expression in reactive gliocytes of vimentin and glial fibrillar acidic protein (GFAP), markers of wounds lasting for a few minutes-hours (TGFβ1, TGFα, fibronectin, ILβ, IL6, TNFα, ICAM-1, VCAM-1, E- and L-selectin) wounds lasting for several days (tenostin, collagen III, V, VI, I, p53). A.V. Shai and others have determined the duration of axonal injuries in traumatic brain injury by the number of proteins released from neurons during their damage and found that they differ significantly on the first day [22]. D.V. Bavikin and others have determined the expression of immunohistochemical markers of proliferative activity of Ki-67 and antiapoptosis of Bcl-2 in gunshot wounds less than 1 hour of prescription [2]. D.V. Bogomolov and others have confirmed the importance of immunohistochemical study in assessing survival establishment and severity of gunshot wounds of soft tissues by IHC-reaction of expression of vimentin and fibrinogen [4]. Some authors have used polyclonal antibodies to common cytokeratins, fibrinogen, fibronectin and CD117 to study deaths due to various types of mechanical asphyxia [5, 28, 29]. CD117 has been proved to give significant focal expression in neurons during their damage and found that they differ significantly on the first day [22]. D.V. Bavikin and others have determined the expression of immunohistochemical markers of proliferative activity of Ki-67 and antiapoptosis of Bcl-2 in gunshot wounds less than 1 hour of prescription [2]. D.V. Bogomolov and others have confirmed the importance of immunohistochemical study in assessing survival establishment and severity of gunshot wounds of soft tissues by IHC-reaction of expression of vimentin and fibrinogen [4]. Some authors have used polyclonal antibodies to common cytokeratins, fibrinogen, fibronectin and CD117 to study deaths due to various types of mechanical asphyxia [5, 28, 29]. CD117 has been proved to give significant focal expression in neurons during their damage and found that they differ significantly on the first day [22]. D.V. Bavikin and others have determined the expression of immunohistochemical markers of proliferative activity of Ki-67 and antiapoptosis of Bcl-2 in gunshot wounds less than 1 hour of prescription [2]. D.V. Bogomolov and others have confirmed the importance of immunohistochemical study in assessing survival establishment and severity of gunshot wounds of soft tissues by IHC-reaction of expression of vimentin and fibrinogen [4]. Some authors have used polyclonal antibodies to common cytokeratins, fibrinogen, fibronectin and CD117 to study deaths due to various types of mechanical asphyxia [5, 28, 29]. CD117 has been proved to give significant focal expression in neurons during their damage and found that they differ significantly on the first day [22]. D.V. Bavikin and others have determined the expression of immunohistochemical markers of proliferative activity of Ki-67 and antiapoptosis of Bcl-2 in gunshot wounds less than 1 hour of prescription [2]. D.V. Bogomolov and others have confirmed the importance of immunohistochemical study in assessing survival establishment and severity of gunshot wounds of soft tissues by IHC-reaction of expression of vimentin and fibrinogen [4]. Some authors have used polyclonal antibodies to common cytokeratins, fibrinogen, fibronectin and CD117 to study deaths due to various types of mechanical asphyxia [5, 28, 29]. CD117 has been proved to give significant focal expression in neurons during their damage and found that they differ significantly on the first day [22]. D.V. Bavikin and others have determined the expression of immunohistochemical markers of proliferative activity of Ki-67 and antiapoptosis of Bcl-2 in gunshot wounds less than 1 hour of prescription [2].
of the corpse to develop criteria for determining the duration of the agonal period [25].

Another promising study is the research of brain natriuretic peptide (NT-pro BNP), which is associated with a significant effect on the endocrine, cardiovascular and urinary systems and may be an indicator of the stress response of the heart to hemodynamic changes in the body [25]. Increased secretion of BNP and proBNP by the ventricles of the heart is associated with increased stretching of certain areas of the myocardium, so they are widely used in cardiology in the diagnosis of heart failure [25]. That is, the study of the content of NT-pro BNP in the blood plasma of corpses of persons whose death occurred from mechanical trauma is appropriate and relevant to determine its duration.

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