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### COMMISSION FORENSIC-MEDICAL EXAMINATIONS AT DETERMINING THE SEVERITY OF CLOSED CHEST INJURIES

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*Victims with closed blunt trauma to the chest often become the object of commission forensic medical examination. The work aimed to determine the possibility of improving the effectiveness of forensic diagnostics of closed blunt chest injury based on the results of the analysis and expert assessment of bodily injuries based on the conclusions of commission forensic examinations. Forty-two conclusions of the commission's forensic medical examination, conducted in the Kharkiv Regional Bureau of Forensic Medical Examination regarding closed blunt chest trauma, were analyzed. According to the mechanism of closed blunt chest injury, blunt objects were impacted on the chest. Modern approaches to the expert assessment of bodily injuries in the case of this injury have been determined. Severe injuries were found in 19 (45.2%) cases of damages with the occurrence of life-threatening phenomena, namely, acute respiratory and pulmonary-cardiac insufficiency. Injuries of moderate severity were established in 21 (50%) cases, mainly injuries with rib fractures due to the absence of danger to life. Light injuries were found in 2 (4.8%) cases, primarily injuries with the occurrence of pneumothorax. It has been established that there is no single scientific and methodical approach for objectively assessing closed blunt chest injury. Based on the research results, the ways of further unifying the morpho-clinical approach in the forensic assessment of the specified injuries were determined.*

**Key words:** commission forensic medical examination, closed blunt chest injury, diagnostic criteria, degree of severity of bodily injuries.

#### Connection of the publication with planned research works.

The scientific work is a fragment of the scientific topic "Determination of the time of death and severity of bodily injuries by forensic diagnostic signs" (state registration number O121U110929).

#### Introduction.

Law enforcement agencies appoint commission forensic medical examinations in complicated cases and are one of the most complex types of expert research [1]. At the same time, fatal and non-fatal closed blunt chest injury (CBCI) victims often become the object of commission forensic medical examination [2, 3]. At the same time, law enforcement agencies require the resolution of several issues, including the determination of the nature and mechanism of the injury, the means of its infliction, as well as, in cases of fatal injury, the determination of the cause of death [4, 5]. One of the main issues raised by law enforcement agencies is determining the severity of bodily injuries [6, 7].

When determining the degree of severity of physical injuries of the specified injuries, the approaches of forensic doctors differ regarding the application of certain qualifying signs of the severity of physical injuries. The study of particular literary sources testifies to this [8-14]. Controversial is the forensic medical evaluation of CBCI when classifying them as life-threatening [2, 9, 12]. As life-threatening, some experts propose to classify all CBCI with intrapleural injuries, in particular, hemopneumothorax, regardless of its nature, volume, and life-threatening phenomena in the event of their occurrence [10, 11, 13]. At the same time, serious bodily injuries must be established only in the presence of life-

threatening phenomena listed in clause 2.1.3 "o" of the "Rules for forensic-medical determination of the severity of bodily injuries" (enacted by order of the Ministry of Health of Ukraine № 6 of 17.01.1995). It is the opinion of other scientists following the current normative documents of Ukraine [1, 5, 6, 14].

#### The aim of the study.

Determination of the possibility of improving the effectiveness of forensic diagnostics of closed blunt chest injury based on the results of the analysis and expert evaluation of bodily injuries based on the conclusions of the commission's forensic medical examinations.

#### Object and research methods.

The material for the analysis was the conclusions of the commission's forensic medical examinations of the CBCI victims. Forensic medical examinations were carried out by us based on the commission forensic medical examination department of the Kharkiv Regional Bureau of Forensic Medical Examination (KRBfME) during 2011-2023. We also analyzed the archival conclusions of experts of the department of commission forensic medical examinations of the KRBfME for the specified period. A total of 42 conclusions of the forensic medical examination were processed retrospectively. Of these, 26 conclusions were related to non-lethal CBCI and 16 examinations were conducted in cases of victims' death.

During the research, the following methods were used: registration method – the obtained data were entered into specially developed registration cards; statistical – the standard descriptive statistics method; forensic – determined the nature of injuries and established the degree of severity of bodily injuries.

#### Research results and their discussion.

**Table – Morpho-clinical variants of closed injuries of the chest during forensic examination**

Nature of injury	Total	%
CBCI, fractures of several ribs	21	50
CBCI, fracture of one rib	7	16,6
CBCI, fractures of several ribs, the presence of complications and combined injuries:		
- hemothorax	2	4,7
- pneumothorax	1	2,4
- hemopneumothorax, contusion, rupture of the lungs	3	7,1
CBCI, without rib fractures, presence of intrapleural injuries and complications:		
- hemothorax	1	2,4
- hemothorax, lung rupture	1	2,4
- pneumothorax	2	4,8
- pneumothorax, clavicle fracture	1	2,4
- hemopneumothorax, lung rupture	1	2,4
- hemopneumothorax	1	2,4
- lung contusion	1	2,4
In general	42	100

The analysis of observations showed that the number of commission forensic medical examinations concerning persons in whom CBCI was detected is, on average, 1.1% per year of their total number. CBCI was predominant in men – 31 (73.8%) cases, and more than half of the victims – 32 (76.2%) cases were of working age 20-50 years. Domestic injuries are in first place among CBCI. According to the mechanism of the occurrence of CBCI, blunt, hard objects were impacted on the chest.

We systematized the identified lesions in the patients in the observation groups and highlighted the morpho-clinical variants of CBCI (table).

According to their structure, CBCIs were distributed as follows during the forensic medical examination. In the first place are injuries of the bone frame of the chest – fractures of one rib and several ribs – 34 (80.9%) cases. At the same time, fractures of several ribs occurred in 27 (64.3%) observations, and fractures of only one rib in 7 (16.6%) observations. The second place is occupied by 8 (19.1%) cases of chest injuries in the absence of rib fractures. In 2 (4.7%) victims of this category, a hemothorax occurred; in 1 (2.4%) case, it was with a lung rupture. In 2 (4.7%) cases, there was a pneumothorax; in 2 (4.7%) cases, hemopneumothorax; and in one case, there was a lung rupture. 1 (2.4%) victim had a lung contusion.

In the case of CBCI with rib fractures, a contusion or a contusion with a rupture of the lungs was confirmed in 3 (7.1%) cases by objective research methods. At the same time, the presence of hemothorax, pneumothorax or hemopneumothorax was established in 6 (14.3%) cases.

In addition, in 16 (38.1%) cases, experts noted the occurrence of pulmonary and cardiac failure, leading to the victims' deaths. In 3 (7.1%) non-fatal cases of CBCI without rib fractures, acute respiratory failure (ARF) occurred.

When analyzing the reasons for appointing commission forensic medical examinations, it was established that they were most often appointed when the investigator, lawyers, or accused persons had doubts about the established degree of severity of bodily injuries. In 4 (9.5%) cases, there were contradictions in the established degree of severity of bodily injuries during the initial and subsequent examinations; in 1 (2.4%) case, there were doubts about the connection between lung

pathology and trauma; in 3 (7.1%) observations, additional medical data were available; in 25 (59.5%) it was necessary to establish the mechanism of formation of bodily injuries; for any other reasons, the examination was ordered in 7 (16.7%) cases, in 2 (4.8%) observations, there were no clear reasons for the appointment of the examination.

As a rule, in our observations, the victims' deaths occurred during their hospital treatment stay. Fatal injuries were accompanied by more severe post-traumatic changes, which led to the emergence of a life-threatening phenomenon, namely acute pulmonary and cardiac failure, which arose during the pathology and could no longer be eliminated by providing appropriate medical care. Thus, the direct cause of death of the victims in our observations was a pulmonary-cardiac failure due to a closed chest injury caused by the impact of blunt, hard objects. The severity of bodily injuries in these cases was assessed following the "Rules...".

According to the results of the forensic medical assessment of the CBCI, the experts established the following degree of severity of bodily injuries. Bodily severe injuries, according to the "danger to life" criterion of the "Rules..." were established by experts in 16 (38.1%) fatal cases of CBCI with several rib fractures and the development of pulmonary and heart failure. At the same time, in 3 (7.1%) cases, the formation of a hemopneumothorax, a ruptured lung, and in 1 (2.4%) case, a hemothorax occurred. In addition, severe bodily injuries were found in 3 (7.1%) cases of non-fatal CBCI, of which 1 (2.4%) in the case of hemothorax, 1 (2.4%) case of lung rupture, hemopneumothorax, in 1 (2.4%) of a case of hemopneumothorax. 3 (7.1%) expert opinions mentioned the clinical symptoms of 1st-3rd ARF degree.

Damage of moderate degree of severity according to the criteria "duration of health disorder" and "absence of danger to life" of the "Rules..." established by experts in 12 (28.7%) cases of CBCI with fractures of several ribs, in 7 (16.6%) in cases with fractures of one rib. At the same time, pneumothorax was established in 1 (2.4%) and hemothorax in 1 (2.4%) cases. In addition, according to the same criteria, the experts classified the following criteria as moderate-severity injuries: 1 (2.4%) case of CBCI with pneumothorax and clavicle fracture, 1 (2.4%) case with a lung contusion. In these forensic examinations, experts tried to confirm the duration of the health disorder with the results of objective research methods and the dynamics of pathological changes.

Light bodily injuries, which caused a short-term health disorder, were established in 2 (4.7%) CBCI cases with pneumothorax.

It is necessary to emphasize that according to the results of those mentioned above forensic medical assessment, after the commission of forensic medical ex-

aminations in 4 (9.5%) cases, the degree of severity of bodily injuries was changed. The degree of severity of bodily injuries in 2 (4.8%) examinations was changed from severe bodily injuries to light bodily injuries that caused a short-term health disorder since, during the initial examinations, the experts did not assess the final result of the injury. In 1 (2.4%) examination, the degree of severity of bodily injuries was changed from severe bodily injuries to moderate injuries due to the absence, in the opinion of the commission of experts, of life-threatening phenomena in the victim. The degree of severity of physical injuries in 1 (2.4%) examination was changed from light bodily injuries to injuries of moderate severity, due to which, during the initial examination, the expert did not fully assess the final result of the injury.

The study of expert material also made it possible to establish the following. The medical documentation provided to experts does not always record signs of ARF. At the same time, it is necessary when applying a morpho-clinical approach to determining the severity of physical injuries. As a result, experts have no opportunity to establish the existence of a danger to life and correctly assess the degree of severity of bodily injuries. In medical institutions and the course of examinations on radiological methods of diagnostic studies, computer tomography is not always performed, which allows detection of the related injuries of the chest. When carrying out separate commission examinations, experts do not send the victims to a specialized hospital for additional diagnostic tests. It is necessary to determine the degree of impaired function of damaged organs and the consequences of their damage.

### Conclusions.

1) During the commission forensic medical examinations of damage to the bone chest frame prevail (80.9% of cases). The most difficult issue in cases of such examinations for forensic medical experts is the substantiation of the presence of clinical signs of danger to life caused by trauma.

2) Commissioned forensic medical examinations on CBCI constitute 1.1% of the total annual number of expert studies of the KRBFME.

3) According to the expert qualification of CBCI, severe bodily injuries are established in 45.2% of cases when life-threatening phenomena occur, namely acute respiratory or pulmonary-cardiac failure. Injuries of moderate severity are established in 50% of cases, mainly in injuries with rib fractures without danger to life. 4.8% of cases of CBCI are classified as light injuries due to the absence of rib fractures.

4) Increasing the effectiveness of forensic medical diagnostics of CBCI can be solved by developing professional scientific and methodological support. Relevant materials must contain clear diagnostic criteria of expert assessment for predicting the consequences and final results of the specified injuries when determining the severity of physical injuries. When examining such cases, a precise algorithm of expert actions should be introduced into expert practice.

### Prospects for further research.

They consist of the performance of scientific studies to determine all the available clinical and morphological signs of chest trauma, followed by the determination of the sequence of actions and their unification during the commission of forensic medical examinations in these cases.

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## КОМІСІЙНІ СУДОВО-МЕДИЧНІ ЕКСПЕРТИЗИ ПРИ ВИЗНАЧЕННІ ТЯЖКОСТІ ЗАКРИТИХ ТРАВМ ГРУДНОЇ КЛІТКИ

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*Потерпілі з закритою тупою травмою грудної клітки нерідко стають об'єктом комісійної судово-медичної експертизи. Метою роботи стало визначення можливості підвищення ефективності судово-медичної діагностики закритої тупої травми грудної клітки за результатами аналізу та експертної оцінки тілесних ушкоджень за висновками комісійних судово-медичних експертиз. Проаналізовано 42 висновки комісійної судово-медичної експертизи, яка проведена у Харківському обласному бюро судово-медичної експертизи з приводу закритої тупої травми грудної клітки. За механізмом виникнення закритої тупої травми грудної клітки мала місце ударна дія тупих твердих предметів на грудну клітку. Визначено сучасні підходи до експертної оцінки тілесних ушкоджень при даній травмі. Тяжкі тілесні ушкодження встановлені в 19 (45,2%) випадках травм з виникненням небезпечних для життя явищ, а саме гострої дихальної та легенево-серцевої недостатності. Ушкодження середньої тяжкості встановлені в 21 (50%) випадках переважно травм з переломами ребер за відсутністю безпеки для життя. Легкі тілесні ушкодження встановлено в 2 (4,8%) випадках переважно травм з виникненням пневмотораксу. Встановлено відсутність єдиного науково-методичного підходу для об'єктивної оцінки закритої тупої травми грудної клітки. За результатами проведеного дослідження визначено шляхи подальшої уніфікації морфо-клінічного підходу при судово-медичній оцінці вказаних тілесних ушкоджень.*

**Ключові слова:** комісійна судово-медична експертиза, закрита тупа травма грудної клітки, діагностичні критерії, ступінь тяжкості тілесних ушкоджень.