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ANALYSIS OF EXPERT SHORTCOMINGS OF FORENSIC MEDICAL EXAMINATION OF VICTIMS

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Abstract

Traumatic brain injury (TBI) is one of the most significant problems in both clinical and forensic aspects, and is also one of the leading causes of death and disability. Foreign researchers describe various methods of forensic diagnosis of TBI. In order to improve the quality of forensic medical examinations of TBI in Ukraine, there is a need to study the defects of expert assessment. 100 forensic medical commission examinations on the assessment of TBI in injured persons, conducted at the SI "Main Bureau of Forensic Medical Examination of the Ministry of Health of Ukraine", in cases of changed "Expert Conclusions", were studied. The largest number of changed "Conclusions" during the forensic medical examination of corpses in cases of TBI was due to an incorrectly established injury diagnosis of 16±7.2%. Defects that directly affected the experts' incorrect establishment of the diagnosis, mechanism, age and severity of TBI were: insufficient clinical data in medical documentation materials (92±5.3%), incorrect interpretation of clinical data by experts (48±9.8%), lack of involvement of consultants (43±9.7%), failure to take into account

accompanying pathological conditions (23±8.2%). Ignoring concomitant pathology in victims had a statistically significant ($p<0.05$) influence on determining the severity of TBI (85.7±25.9%).

Key words: **forensic medical examination; traumatic brain injury; defect.**

Introduction. Traumatic brain injury (TBI), presents significant challenges in forensic assessments of living persons. Forensic assessment of TBI requires a comprehensive evaluation of the patient, considering both clinical and forensic aspects. Bertozzi et al. [1] discuss the clinical examination of TBI, emphasizing the importance of assessing symptoms and signs such as consciousness, pupil response, and motor activity. However, errors can occur during this assessment, leading to inaccurate diagnosis or underestimation of the severity of the trauma. These errors may be attributed to the complexity and variability of TBI presentations, which can result in missed or misinterpreted clinical indicators. In addition to clinical examination, the use of additional methods, including biochemical and immunological tests, has been suggested as indicators of traumatic brain injuries [1]. However, the standardization and implementation of these tests in forensic assessments of TBI in living persons may be lacking. This can lead to inconsistent or inadequate use of these tests, compromising the accuracy and reliability of the assessment.

Furthermore, the establishment of the mechanism and antiquity of TBI presents significant challenges. Murray and Starzinski [2] highlight the difficulties in determining the exact mechanism of injury, especially in cases where external evidence is scarce or unreliable. The lack of standardized protocols and guidelines for assessing the mechanism of TBI may contribute to inconsistencies and errors in forensic evaluations.

Similarly, establishing the antiquity of TBI is a complex task. Finnie [3] points out that the timing of injuries is crucial in forensic assessments, as it can impact legal implications and potential criminal charges. However, accurately determining the antiquity of trauma solely based on clinical findings can be challenging, and errors can occur. The utilization of additional diagnostic tools, such as imaging techniques or biomarkers, could potentially enhance the accuracy of determining the antiquity of TBI.

In summary, defects and errors in the forensic assessment of TBIin living persons can occur during the diagnosis, mechanism determination, and antiquity assessment. These errors may arise due to the complexity and variability of TBI presentations, the lack of standardized protocols for utilizing additional diagnostic methods, and the challenges in establishing the

mechanism and antiquity of trauma. Future research and the development of standardized guidelines and protocols are necessary to improve the accuracy and reliability of forensic assessments in cases of TBI.

The aim of the study was to identify the main groups and causes of expert defects that arise during the forensic assessment of TBI in victims by conducting an analysis of commission forensic medical examinations of the SI "Main Bureau of Forensic Medical Examination of the Ministry of Health of Ukraine".

Materials and methods. The material of the 100 studies were forensic medical commission examinations on the assessment of TBI in victims, conducted at the SI "Main Bureau of Forensic Medical Examination of the Ministry of Health of Ukraine", in cases of changed "Expert Conclusions" (taken from the annual reports of the bureau).

The victims were divided according to the following criteria: gender and age of the victim, history of trauma, time of injury, diagnosis at the initial forensic examination, mechanism, history of TBI, presence (absence of alcohol intoxication). The quality and completeness of the forensic examination was also taken into account: evaluation of clinical data in medical documentation materials, involvement of consultants, consideration of concomitant pathological conditions that can change the manifestations of TBI, criteria for determining the severity of physical injuries.

The following statistical indicators were determined: arithmetic mean values (M±σ), where σ is the root mean square deviation, frequency of cases (N) and (P±95%CI), where 95%CI is a 95% confidence interval. Determination of the reliability of differences in proportions was carried out according to the Student's test for relative values (t). The significance level was $p<0.05$

Results and discussion. The average age of the deceased is 42.5±12.5 years. Among the victims, 65 are male and 35 are female. The average age of the deceased: men - 41.3±10.2 years, women - 42.7±11.2 years.

We divided all the examinations in the forensic medical assessment of TBI victims with changed results into the following groups:

I. Defects in establishing the diagnosis of TBI – 16±7.2%.

II. Defects in establishing the the TBI mechanism - 7±5.0%.

III. Defects in establishing the duration of TBI – 5±4.3%.

IV. Defects in establishing the severity of bodily injuries - 7±5.0%.

V. Combination of defects – 65±9.3% (Fig. 1).

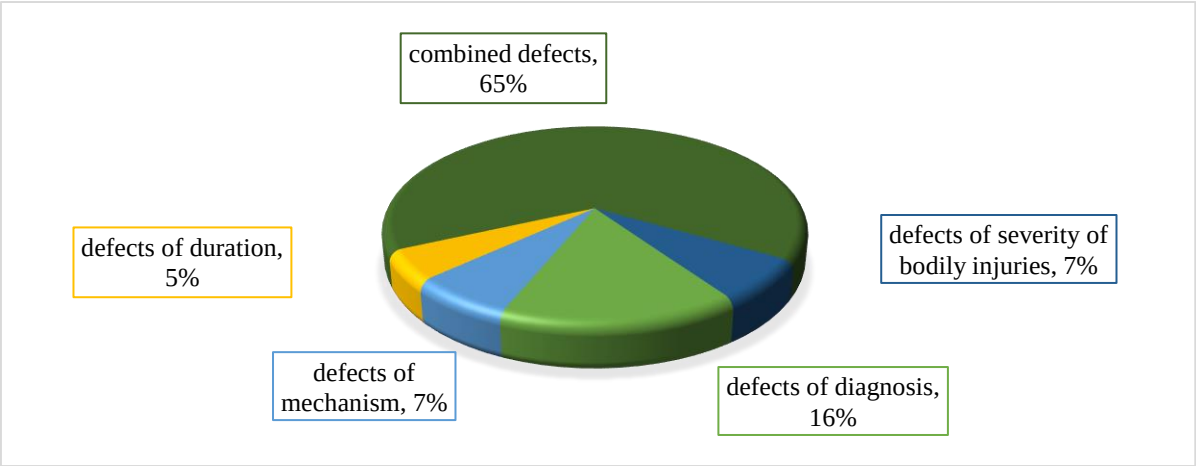

Fig. 1. Distribution of expert defects that arise during forensic medical examination of TBI in victims

During a detailed analysis of each of the groups, defects were identified that directly affected the incorrect diagnosis, mechanism, age, and severity of TBI by experts:

1. insufficient clinical data in the medical documentation materials (absence of neurological research data, additional examination methods, insufficient or poor description in the medical documentation, including head injuries) - 92±5.3%;

2. incorrect interpretation of data by clinical data experts was found in 48±9.8%;

3. lack of involvement of consultants was found in 43±9.7%;

4. failure to take into account concomitant pathological conditions that can change the manifestations of TBI was found in 23±8.2% (Table 1).

Table 1

Gradation	Indicator	N, Abs.	P, %	95%CI, %
Gender of the victim	Male	65	65	9,3
	Female	35	35	9,3
Clinical data in medical documentation materials	not enough	92	92	5,3
	enough	8	8	5,3
Interpretation of clinical data by experts	not enough	48	48	9,8
	enough	52	52	9,8
Involvement of consultants	not enough	43	43	9,7
	enough	57	57	9,7
Taking into account concomitant pathological conditions	enough	77	77	8,2
	not enough	23	23	8,2

The insufficiency of clinical data in the medical documentation was found in 87.5±16.2% (14 cases) of victims from group I (defects in establishing the diagnosis of TBI), from group II (defects in establishing the mechanism of TBI) – 71.4± 33.4% (5 cases), from the III group (defects in determining the duration of TBI) – 60±42.9% (3 cases), from the IV group (defects in determining the severity of bodily injuries) – 71.4±33, 4% (5 cases), with V (combination of defects) – 100±0% (65 cases). The lack of clinical data had a statistically significantly greater ($p<0.05$) influence on the diagnosis of TBI.

Incorrect interpretation of data by clinical data experts was found in victims from group I (defects in establishing the diagnosis of TBI) in 75±21.2% (12 cases), from group II (defects in establishing the mechanism of TBI) – 28.6±33.4 % (2 cases), from the III group (defects in determining the duration of TBI) – 60±42.9% (3 cases), from the IV group (defects in determining the severity of bodily injuries) – 28.6±33.4% (2 cases), with V (combination of defects) – 44.6±12.0% (29 cases). The difference between the proportions in the groups did not reach a statistically significant level.

The absence of the involvement of consultants was noted in 62.5±23.7% (10 cases) of victims from the I group (defects in establishing the diagnosis of TBI), from the II group (defects in establishing the mechanism of TBI) – 28.6±33.4% (2 cases), from group III (defects in determining the duration of TBI) – 40±42.9% (2 cases), from group IV (defects in determining the severity of bodily injuries) – 14.3±25.9% (1 case), with V (combination of defects) – 43.1±12.0% (28 cases). The difference between the proportions in the groups did not reach a statistically significant level.

Failure to take into account concomitant pathological conditions that can change the manifestations of TBI was found in victims from Group I (defects in establishing the diagnosis of TBI) in 18.8±19.1% (3 cases), from Group II (defects in establishing the mechanism of TBI) – 0 ±0% (0), from the III group (defects in determining the duration of TBI) – 60±42.9% (3 cases), from the IV group (defects in determining the severity of physical injuries) – 85.7±25.9% (6 cases), with V (combination of defects) – 16.9±9.1% (11 cases). The difference between the proportions in the groups did not reach a statistically significant level. (Fig. 2.)

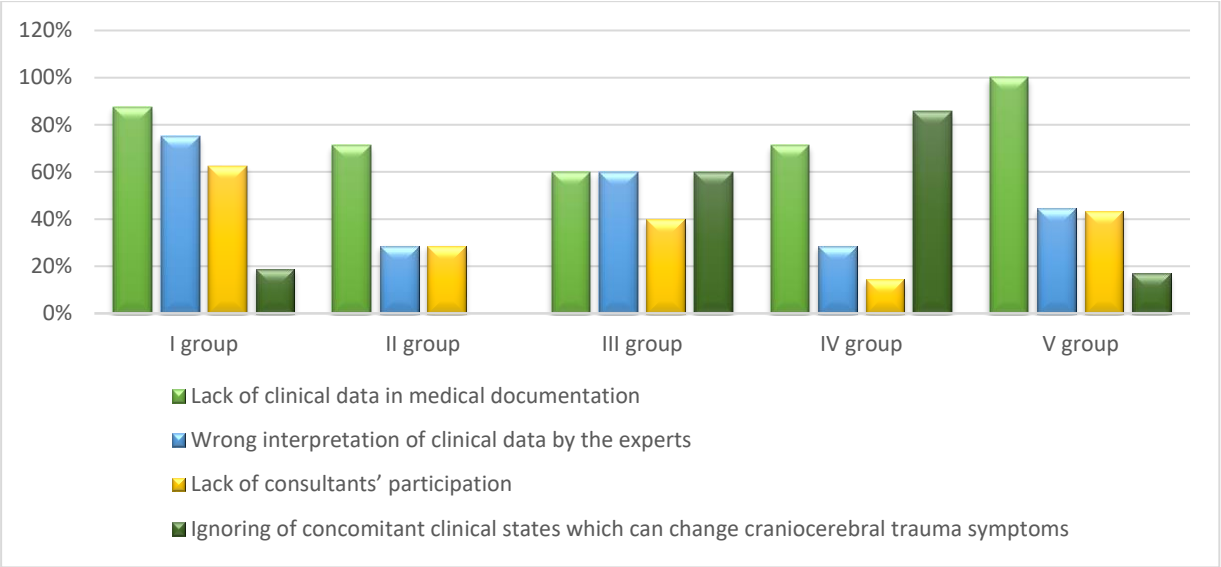

Fig. 2. Distribution of the causes of expert defects in TBI in different groups (during the examination of victims).

During the detailed analysis of forensic medical examinations, it was found that during the examinations in the bureau, the experts also made a number of defects that affected the forensic assessment of TBI in living persons (victims). For example, for the assessment of medical documentation, the expert commission did not always involve relevant specialists - a neurosurgeon, neuropathologist, otorhinolaryngologist, radiologist, etc., medical documents containing information about the state of health of the injured person for the period preceding the injury were not studied, were not taken into account the factors that determined the extension of the recovery period (untimely seeking medical help, receiving TBI while intoxicated, receiving outpatient treatment after the injury, rather than the inpatient treatment necessary in such cases), were also ignored, the lack of a diagnostic and therapeutic lumbar puncture, the presence of indications, the results of the rheo-encephalographic examination of the vessels of the brain, computed tomography of the brain were not evaluated, the injured were not examined by the members of the expert commission, the additional examinations of the victims necessary to establish the nature of the injuries were not prescribed (CT, MRI, etc.). It should be noted that TBI in children and in people of senile and old age was also incorrectly assessed. At the same time, in the elderly, concomitant pathology, in particular vascular, aggravated and sometimes imitated the manifestations of TBI, especially in cases of brain concussion.

Precisely because of the reasons given above, the commission of the Bureau attributed clinically mild forms of craniocerebral trauma to injuries of a moderate severity based on the

duration of the health disorder and even to severe bodily injuries, and during repeated forensic medical examinations, these cases were almost a third of all changes (31.8±2.6% of the total number of examinations of victims with TBI – 1224). In particular, in only 32 cases, clinically mild forms of craniocerebral injury - brain concussion and cerebral contusion were changed by commissions of the bureau, and classified as light injuries after previous expert commissions classified these forms of TBI as medium degree of severity according to the criterion of a long-term health disorder, only on the basis that the injured had signs of asthenia, arterial or dystonia, pain syndromes, etc. for a long time after the event. In all these cases, the medical documents contained information about the presence of chronic diseases of the spine, cardiovascular, and nervous systems before the event, the course of which worsened after the injury, which made it possible to explain the long-term health disorder, and the fact that it was not due to the nature of the injury itself TBI.

Conclusions and prospects for further research

1. The largest number of changed "Conclusions" during the forensic medical examination of victims in cases of TBI was caused by an incorrectly established injury diagnosis of 16±7.2%.

2. The shortcomings that directly affected the experts' incorrect establishment of the diagnosis, mechanism, age and degree of severity of TBI were:insufficient clinical data in medical documentation materials (92±5.3%), incorrect interpretation of data by clinical data experts (48±9.8%), lack of involvement of consultants (43±9.7%), failure to take into account accompanying pathological conditions (23±8 .2%).

3. Ignoring concomitant pathology in victims had a statistically significant ($p<0.05$) impact on determining the severity of TBI (85.7±25.9%). When examining with a combination of defects, the mechanism of their appearance did not depend on the type of defect, since they were practically all of them.

4. The nature of the identified expert deficiencies in the assessment of TBI indicates the need to organize additional courses with an in-depth study of the specifics of TBI. In addition, it is necessary to ensure compliance with the rules and scope of research, to introduce and improve quality control systems of examinations in institutions of forensic medical examination, organizational and procedural changes that would regulate the workload of forensic medical experts, as well as to improve the working conditions and expand the capabilities of forensic laboratories.

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