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DIFFUSE AXONAL BRAIN INJURY COURT - MEDICAL EVALUATION

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Cost and necessity. A number of scientific studies are being conducted around the world to develop optimal approaches to the forensic assessment of morphological criteria for diffuse axonal injury. In this regard, the issue of distinguishing the viability of axonal injuries from possible artifacts is of particular scientific and practical importance, and this is of fundamental importance in determining the cause-and-effect relationship between traumatic exposure and the occurrence of death. Since it is an important scientific and practical basis for scientifically assessing deaths associated with brain injuries, ensuring the objectivity of expert opinion, and improving diagnostic standards in practice.

Certain measures are being implemented in our country aimed at developing the health care system, adapting the medical field to the requirements of world standards, including preventing death and disability among the population due to brain damage .

The level of study of the problem. Diffuse axonal damage in traumatic brain injury is the subject of numerous clinical, experimental, and morphological studies (Sarsenov T.K., 2013; Khalikov A.A. et al., 2022; Khodchenkova V.V. et al., 2020; Chichanovskaya L.V. et al., 2022; FratiA. et al., 2017; Koludarova EM et al., 2021) .

The purpose of the study is to develop objective morphological criteria for forensic assessment of diffuse axonal injury in cases of brain injury.

The object of the study was the brain tissue and its structural components of individuals who died as a result of head injuries with diffuse axonal damage .

General description of the research materials . The study is based on the results of personal research materials (24) and a retrospective analysis of forensic medical reports on 180 cases of severe traumatic brain injury resulting from road accidents (146), falls from a height (37) and domestic injuries (17). All victims were undergoing inpatient treatment at the Republican Scientific Center for Emergency Medical Care and the Republican Specialized Scientific Center for Neurosurgery of the Ministry of Health of the Republic of Uzbekistan . 12 of the victims survived and were sent to outpatient clinics and rehabilitation centers for further treatment, in 192 cases, traumatic brain injury ended in death, which was 94%. The bodies of those who died as a result of severe traumatic brain injury were sent to the Tashkent branch of the Republican Scientific and Practical Center for Forensic Medical Examination, where a forensic medical examination was conducted based on the decision of the investigative bodies. The overall distribution of all victims with severe head injuries is presented in Table 1.

Table 1

Brain injury distribution of victims by gender and age

Gender	Age (years)						
	8-18	19-29	30-40	41-50	51-60	61-70	70 years old and above
Male	9	38	35	20	21	32	7

Woman	2	9	6	2	3	4	2
Total	11	47	41	22	24	36	9
%	7	29	14	15	22	8	5

As can be seen from Table 1, severe brain injury was more common in men (148) than in women (28). In children (8-18 years old), severe brain injury was observed in 19 cases, which was only 49%.

The highest number of severe and fatal brain injury cases was observed in the age group from 30 to 50 years (29%), that is, in the period of greatest working capacity, which characterizes the importance of the problem not only from a medical and legal point of view, but also from a social point of view.

Distribution of victims by type and character of injury is presented in Table 2.

Table 2

Distribution of victims by types of injuries

No.	Total injuries	Number of observed cases	%
1.	Traffic accident	146	72
2.	Falling from a height	37	17
3.	Household (family viy)	17	8.4
4.	Production	4	1.7
5.	School	2	0.9
6.	Sports	-	-

The data in Table 2 show that the largest number of brain injuries was due to road traffic accidents (72%), followed by domestic (family) injuries (8.4%). Industrial injuries accounted for only (1.9%). Most often, there were falls from a height (17%), all of which ended in death. The smallest number of brain injuries was due to injuries received at school. There were only 2 cases (0.9%). It should be noted that we did not encounter sports injuries in our observations, but this does not indicate the absence of brain injury's during sports activities.

Brain injury diagnosis, treatment, outcome, and forensic evaluation are highly dependent on the prehospital care provided to victims and the length of time they are hospitalized. The results of the distribution of patients according to the type of BMJ and the time of medical care are presented in Table 3.

Table 3

Medical care of patients affected by BMJ distribution according to time

Type of brain injury	Hospitalization time					
	Up to 1 hour	Up to 6 hours	Up to 12 hours	Up to 24 hours	Up to 48 hours	More than 72 hours

Concussion			8		3	
Cerebral palsy		110	40			
Diffuse action injury		3				
Total		113	48		3	

As can be seen from the data in Table 3, the majority of victims in our observation were hospitalized within 6 hours of receiving a of brain injuries. In 20% of cases, victims were delivered after 6 hours, but not more than 12 hours . Only 3.5% of patients presented within 1 day. Cases of mild of brain injuries were noted in victims who sought medical help within 48 and 72 hours after the injury. One of the most important signs of of brain injuries is loss of consciousness , which was observed in 1.5% of cases; only 7 patients did not lose consciousness.

Were interested in determining the seasonality of the BMR, especially in traffic accidents (Table 4).

Table 4

Number of BMPs received by season

Spring	Summer	Autumn	Winter
52	46	28	78

As can be seen from the table, severe of brain injuries occurred in most cases during the summer-spring season.

It is important to note that in a retrospective analysis of forensic medical reports, we did not find a single case in which diffuse axonal brain injury was noted in the expert reports. Most often, death from of brain injuries was caused by deformation and leakage of the brain substance at the site of the non-life-threatening event (20%), large intracranial hemorrhages (epidural , subdural and intracerebral hemorrhages) (20%), and fractures of the skull and brain base (60%).

Death in patients receiving hospital care after receiving a of brain injuries was most often due to deep coma (15%) and various sequelae of severe brain injury (10%). In-hospital deaths from severe of brain injuries occurred at various times after the injury (from several hours to 30 days or more).

Conclusions. The study was based on a retrospective analysis of forensic medical reports on 180 cases of severe traumatic brain injury and the results of 24 individual morphological studies. The majority of victims were men, with the highest incidence among the working-age population aged 30–50 years. The main cause of of brain injuries was road traffic accidents (72%), with 94% of cases resulting in death.

Morphologically, most cases showed external injuries, skull fractures, and intracranial hemorrhages; in some cases, isolated brain contusions were assessed as possible diffuse axonal injury. The causes of death were mainly related to skull base fractures, massive intracranial hemorrhages, and destruction of the brain substance.

In the framework of the research, improved fixation of brain tissue , spatial reconstruction based on serial sections and topographical-anatomical study of midline structures, as well as

clinical-instrumental data analysis made it possible to evaluate the pathomorphology and thanatogenesis of severe of brain injuries on a scientific basis.

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