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FEATURES OF IDENTIFYING THE AGE OF TRAUMATIC BRAIN INJURY

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Abstract

This article presents data on establishing the age of traumatic brain injury. Morphologically, these injuries often manifest as epi-, subdural, and subarachnoid hemorrhages. The nature of morphological changes, particularly the state of the hemorrhage, the presence of a clot, color, organization or resorption, density, and a number of other characteristics, can be used to accurately determine the age of the injury.

Introduction

Currently, due to the increase in exogenous factors affecting human health, there is an increased incidence of trauma in the population, with traumatic brain injury (Bakhriev I.I. et al., 2020) being the most common type of mechanical injury [1]. It is most often observed as a result of road traffic accidents and primarily in individuals of working age (Novokshonov A.V. et al., 2015) [3].

The greatest difficulties for both clinicians and forensic experts, along with assessing the severity of traumatic brain injury, are establishing the time of its infliction (Pigolkina E.Yu., et al., 2012) [6]. Difficulties are also caused by the presence of comorbidities (atherosclerosis, hypertension, coronary heart disease, etc.) (Pigolkin Yu.I., et al., 2018) [5]. In particular, diagnostic errors in the provision of medical care are the cause of incorrect forensic classification of harm caused to human health (Islamov Sh.E. et al., 2018; Makhmatmuradova N.N., et al., 2019) [7,8]. Therefore, these circumstances explain the need to improve the diagnosis of traumatic brain injury (Giyasov Z.A., et al., 2019) [2].

Determining the time of infliction of traumatic brain injury is of great importance in the investigation of crimes against human health and life, and therefore law enforcement agencies constantly raise this issue when resolving forensic medical examinations (Permyakova N.V., et al., 2018) [4].

The aim of the study was to determine the age of traumatic brain injury based on morphological changes in hemorrhages.

Material and Methods: A retrospective analysis of 40 forensic medical examination reports on corpses that died from traumatic brain injury was conducted at the Samarkand Regional Branch of the Republican Scientific and Practical Center for Forensic Medical Examination.

Study results

The data obtained indicate that traumatic brain injury, by gender, was more common in men (34 cases, 85%) than in women (6 cases, 15%). By age group, it was more common in individuals of working age (75%). Traumatic brain injury was more common (67%) than combined (24%) and isolated (9%).

The morphological characteristics of the identified changes in traumatic brain injury primarily manifested as epi-, subdural, and subarachnoid hemorrhages.

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Epidural hematomas appear as liquid blood with clots within 24 hours; on days 2-3 – a moist, shiny blood clot; on days 4-5 – dark red with a brownish tint, firm to the touch; by the end of the 1st week – pronounced brown in color, firm to the touch; by the 2nd week – dark brown in color, crumbling when pressed; by the end of the 2nd-3rd week, a more pronounced connective tissue capsule forms around it; later – cicatricial thickening of the dura mater with growths into the skull bones.

Subdural hemorrhages within 24 hours in the form of liquid blood with small, unformed clots; by the end of 2-3 days, the hematoma is in the form of a formed dark red clot; by the end of the 1st week, the blood clot is brown; by the end of the 2nd week, it grows relatively firmly together with the dura mater; after 2-3 weeks, a capsule begins to form around the hematoma with its gradual thickening; by the end of the month, the thickness of the outer layer of the capsule can be equal to the thickness of the dura mater; after several months, it acquires a brownish-gray color, over time they organize and slowly dissolve, even several years after the injury in the form of deposits on the dura mater.

Subarachnoid hemorrhages, usually as liquid blood, gradually fill the sulci, partially mixing with cerebrospinal fluid and reaching the cisterns at the base of the brain. Resorption of the blood occurs within a week. If blood enters the subarachnoid space, aseptic meningitis may develop. Diffuse subarachnoid hemorrhages spread across the entire surface of both hemispheres. In areas of the cortex affected by the subarachnoid hemorrhage, small focal hemorrhages and blood stasis in microvessels may be detected. With massive or repeated subarachnoid hemorrhages, cerebrospinal fluid absorption is impaired, and hydrocephalus may develop.

Conclusions

Thus, the results of the study indicate that morphologically, traumatic brain injury manifested itself as epi-, subdural, and subarachnoid hemorrhages. The nature of these changes, in particular the state of the hemorrhage, the presence of a clot, color, organization or resorption, density, and a number of other characteristics, can be used to accurately determine the time of injury.

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