



DIAGNOSTICS OF FAT EMBOLISM IN FRACTURES OF LONG TUBULAR BONES

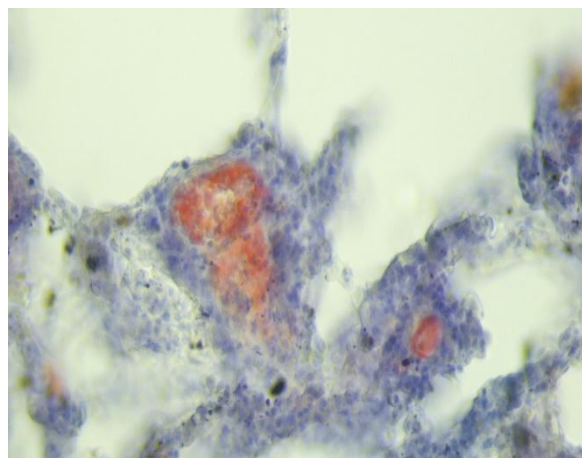
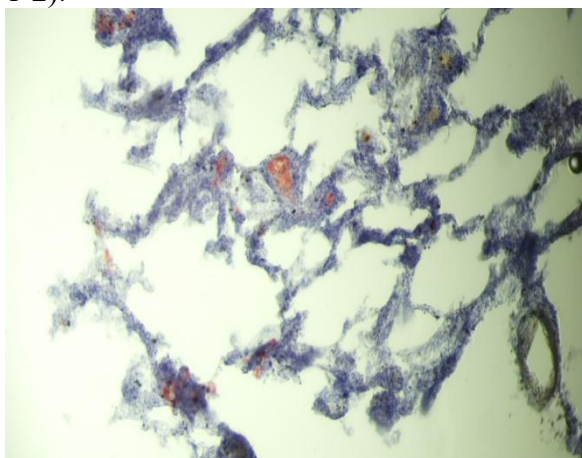
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Abstract: The article covers a problem of a fatty embolism as a heavy complication of a mechanical trauma that often can be cause of death of the victim or playing a fundamental role in a thanatogenesis. The article briefly clears up the questions of an etiology and pathogenesis, clinical diagnostics and generally touches on an issue of morphological (primary – microscopic) diagnosis of a fatty embolism.

Keywords: syndrome of a fatty embolism, fractures of bones, morphology of a fatty embolism, traumatic illness.

In recent years, the world's mortality rate due to injuries has been in third place. Injuries are the leading cause of death in the 20-60 age group, and are twice as common as cardiovascular diseases and cancer. 15-20% of victims of severe combined injuries die from complications of the traumatic disease. One of these complications is fat embolism (FE)... . Severe mechanical damage to the musculoskeletal system, such as fractures of long bones, often leads to the development of FE. Macroscopic forensic diagnosis of UE in internal organs is considered difficult, and it is possible to solve questions that should be solved mainly on the basis of microscopic examination of the lungs, brain, kidneys and heart. Therefore, the pathogenesis, clinical course and manifestations of UE, treatment and prevention are one of the urgent problems of modern medicine. According to various authors, the degree of complication of UE varies, and in injuries with multiple fractures of long bones and fractures of the pelvis, it can occur from 0.5% to 30%. The mortality rate, despite intensive modern treatment methods, ranges from 3% to 67% [3-5]. According to the International Classification of Diseases-10 (ICD-10), UE is classified by the code T79, of which T79.1 fat embolism (traumatic) is included.

Changes in the lungs had a certain sequence depending on the hours the victim lived after the injury. If death occurs immediately at the site of injury, microfocal emphysema, atelectasis, small clusters of erythrocytes and, in some cases, small fat emboli in capillaries are seen in the lungs (pic. 1-2).

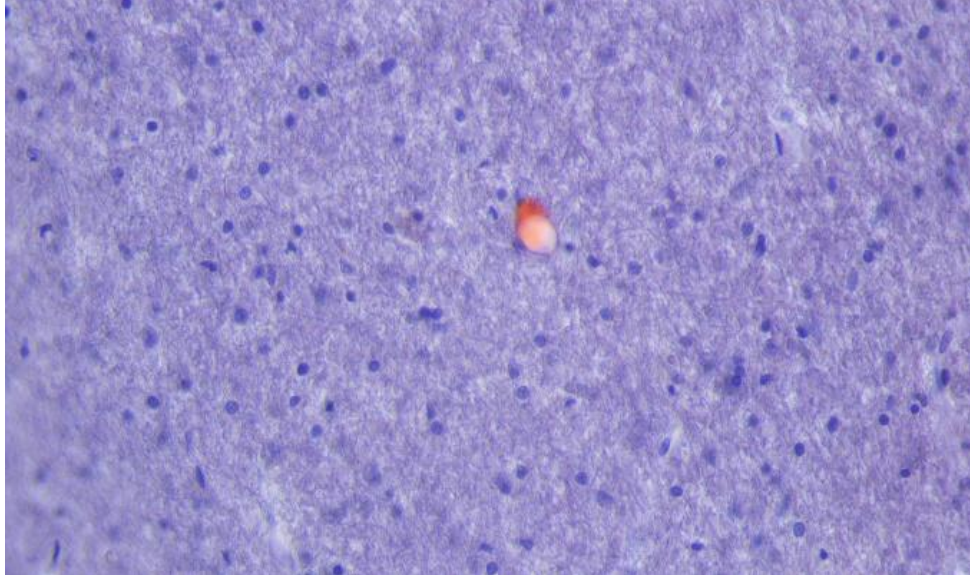


Pic 1. Micro-localized emphysema in the lungs, atelectasis, small groups of erythrocytes, small fat emboli in the capillaries. Stain Sudan III. x100. x400

In the histological examination of the brain, fat emboli are found mainly in the cerebral cortex, in



the gray matter tissue, that is, in the areas where the vascular network is widely developed (pic 2).

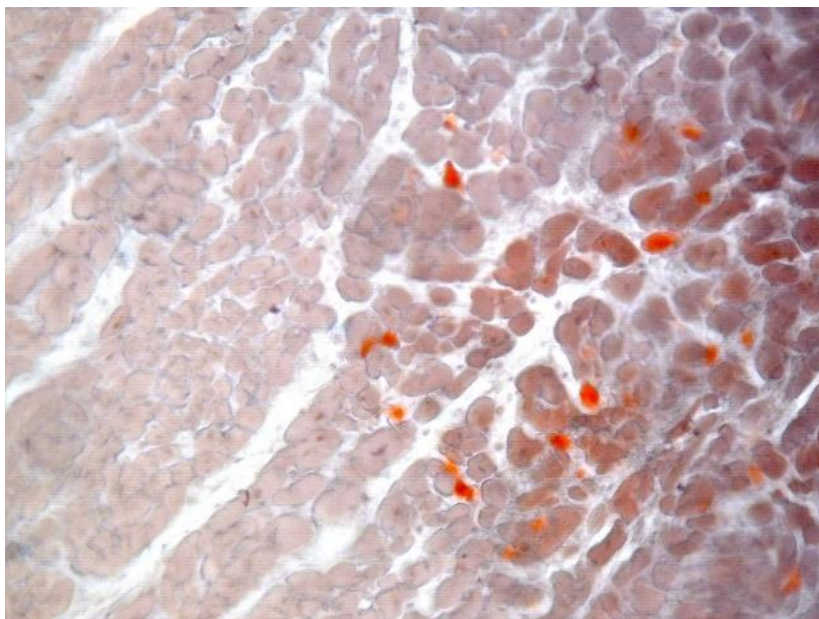


Pic 2. Fat emboli in cerebral vessels. Stain Sudan III. x100.

The study of the brain at different times of the victim's death showed that macroscopic changes in the brain are usually not detected in cases of death within 1-2 days after the development of a stroke, and microscopically, hemorrhages are not observed, but small foci of ischemic necrosis are detected in the gray and white matter of the cerebral hemispheres and the cerebral cortex. Fat droplets can be seen in the center of foci of necrosis, similar to "rosettes", and along the periphery - unstructured masses, often without sharp boundaries, passing into unchanged brain tissue.

Macroscopically, small hemorrhages are observed in the heart under the endocardium and epicardium of both ventricles. Histologically, emboli are most often seen in the areas of branching of the coronary arteries and in the myocardial capillaries. Micromyomalacia of various sizes, sometimes with a border of leukocytes, are detected (Fig. 17). Therefore, if ischemia does not lead to necrosis, areas of various sizes with the presence of small sudanophilic inclusions in the cardiomyocytes are noted.

In these foci, the transverse striation of cardiomyocytes is not clearly visible, but their nuclei are slightly changed. Fragmentation of cardiomyocytes and accumulation of erythrocytes along the elements of the conduction system of the heart are also observed. With OE, fat emboli are detected in the vessels supplying the conduction system of the heart, which leads to sudden death of the patient.



Pic. 3. In coronary arteries and myocardial capillaries fat embolism. Dye Sudan III. x100.

Conclusions. In cases of fractures of long clavicles as a result of severe combined injuries, in the early period after the injury, death in most cases occurs as a result of fat embolism of the lungs, brain and heart vessels due to causes directly related to traumatic effects. The specific morphological features of various variants of fat embolism in victims with fractures of long clavicles were systematized on the basis of forensic medical analyzes and the specific features of expert assessment in forensic diagnosis of fat embolism were substantiated. Expert criteria for the forensic diagnosis of fat embolism in victims with fractures of long clavicles were developed based on the data of biochemical research, based on the specific morphological changes in the internal organs and tissues of the corpses in forensic medical practice.

Practical recommendations. In forensic diagnostics of fat embolism, it can be used in expert assessment of the thanatological significance of morphological signs in various variants of fat embolism in victims with fractures of long bones. In order to diagnose fat embolism, it is recommended to conduct a comprehensive assessment of the data of histological and biochemical research methods. In cases of fat embolism, an increase in the concentration of interleukin-6 (IL-6) can be used as a marker indicating the intensification of shock and inflammatory reactions in the body, as well as the mechanism of death.

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