

techniques are leaving it impossible to estimate the diagnostic value of each feature which leads to subjectivity of expert's conclusions about the cause of death.

**Aim:** To improve the diagnostics of the death cause from drowning by means of mathematical justification of expert's conclusion on the cause of death.

**Tasks:** To measure frequency of external and internal signs of death drowning; to determine the significance coefficient of each feature.

**Material and methods:** Morphological, macro- and microscopic, toxicological, statistical, mathematical, applying Bayes' postulate. Male and female corpses of different age groups which died from drowning.

**Results:** It was found during the study that the majority of deaths from drowning is composed by middle aged employable men (81,1%). The most frequently encountered features are: Paltauf's hemorrhages (98%), liquid blood (98%), liquid in pleural cavity (90%), lungs volume increase (89%), hyperemia of internal organs (89%), subepicardial hemorrhages (84%), water in abdominal cavity (77%), subpleural hemorrhages (76%). By means of statistical probabilities of drowning signs it is possible to establish the conclusions veracity about the cause of death, using suggested table of diagnostic coefficients. If the sum of statistical probability of diagnostic features is 95% or higher than the expert's conclusion on the death cause should be considered as reliable, if coefficients' sum is 75-95% then experts' conclusions are possible, when the same sum is below 75% - doubtful.

**Conclusion:** Using of the proposed method for determining the reliability of expert's conclusions will provide an opportunity to increase the objectivity and accuracy of forensic medical diagnosis of death due to drowning.

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## FORENSIC-MEDICAL EXAMINATION CASES OF SUDDEN CARDIAC DEATH DURING SPORTS

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**Introduction:** Cases of sudden cardiac death (SCD), which arise in sporting activities, are not very common in forensic-medical practice, but at the same time they are very difficult to diagnosis. This is explained by the absence of any medical records, circumstances of death are unknown and morphological changes of heart are nonspecific.

**Aim:** the improvement of diagnostic SCD in athletes.

**Materials and methods:** analysis of clinical cases, analysis of published sources.

**Results.** SCD occurs directly during physical activities or in the first hour after the indications of cardiovascular disorders arose. All cases of this sudden death are grouped into the such categories: 1) "shaking heart" syndrome, when a sudden and powerful blow to the chest causes cardiac arrhythmia; 2) the death of young athletes (under 30 years), which is associated with hereditary heart disease; 3) the death due to a heart attack, which is associated with acute myocardial ischemia. The last category is the main cause of death in athletes over 30 years, and it occurs often during intense dynamic loading. Analysis of the literature showed that the basic mechanisms of SCD associated with restructuring of the ventricular myocardium and asystole, electromechanical dissociation cardiac structures, cardiogenic shock, acute left ventricular or right ventricular failure. In our opinion, the analysis of forensic-medical histological examination is crucial in the formulation of the

final forensic-medical diagnosis. At the same time the expert pays attention to such symptoms as muscle fiber fragmentation, miotsitoliz, atherosclerosis of the arteries of the heart, hypertrophy of cardiomyocytes, diffuse cardiosclerosis, fields of accumulations of lymphocytes and plasma cells, narrowing of the arteries of the heart, artery walls plasmatic impregnation, degeneration of cardiomyocytes, varicose veins and venous plethora of the internal organs and etc. Same factors that contribute to the emergence of "concussion of the heart" in sporting activities, in our opinion are: 1) traumatization directly cardiac region (bruises, abrasions, wounds, broken ribs, etc.); 2) strong and sudden blow; 3) asthenic thorax; 4) shot coincidence with the phase of repolarization of the cardiac cycle. Survival after "concussion of the heart" is low (15%), even when resuscitation conducted promptly.

**Conclusion:** Thus, the improvement of diagnostic SCD in athletes is one of the urgent problems of modern forensic medicine. Currently, scientific and practical research to improve forensic-medical diagnosis of SCD in its various forms, using morphological, mathematical and statistical methods and laboratory studies are conducted at the Department of Forensic Medicine, Medical Law of the Kharkiv National Medical University.

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### **INFLUENCE OF TOTAL FRACTIONATING LOW DOSE X-RAY IRRADIATION ON THE INDEXES OF IMMUNOLOGICAL REACTIVITY**

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**Introduction.** Row of accidents on NPPs, such as Chernobyl, NPP on Three-mile Island in Pennsylvania, recent catastrophe on Fukushima and permanent threat of injury of "dirty" bombs by terrorist organizations resulted in that the level of anxiety in society in connection with the risk of radiation infection rose sharply. Presently public is disturbed by development of nuclear energy in peaceful and military industry, that served pre-condition to high scale researches of genetic consequences of ionizing irradiation. Greater part of the researches from USA, Great Britain and Germany were sent to the study of consequences of influence of low dose ionizing irradiation on inbred lines of mice for the estimation of genetic risk. In spite of the fact that these researches were not crowned by complete success, they became basis for further researches in area of genetics, transplantology, etc.

**Aim:** to study the mechanisms of forming of the radiation-induced changes of immunological reactivity.

**Materials and methods:** studies were undertaken on 42 male rats of population of Wistar with mass of 180-200g that were divided into the following groups: I - The radiation-exposed rats (36 individuals). II- group were intact rats (6 individuals) as a control group. The fractionating total irradiation of animals was carried out three times with the 24 hours interval. During research work, the dynamics of indexes of level of cytokines of TGF- $\beta$ , IL-10, IFN- $\gamma$  and IL-4, phagocytosis, activity of complement system and level of CIC was examined.

**Results.** The fractionating x-rayed irradiation results in the systemic height of level of TGF- $\beta$ , that, in a complex with strengthening of synthesis of IL-10, creates conditions for oppressing of effector mechanisms of Th1/Th2 - specific immune answer, showing up the decreasing of levels of such serum cytokines as IFN- $\gamma$  and IL-4. Side by side with this, there is unstable deficit in the system of nonspecific immune defense.