ДИСКУСІЙНІ, АКТУАЛЬНІ ТА ПРОБЛЕМНІ ПИТАННЯ

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ORGANIZATION OF PRIORITY ACTIONS FOR MASS VICTIMS IDENTIFICATION AND CHRONOLOGY OF THE DISASTERS, WHICH HAVE TAKEN PLACE IN THE ODESSA REGION

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Resume. This article describes the massive disasters with large number of victims in Odessa region and pays attention on the most important actions, which were performed by the team of forensic experts of the Odessa regional bureau of forensic-medical examinations during the disaster victims identification.

Key words: disaster with massive victims; identification; organization of priority actions

Introduction. Massive disasters (either environmental or caused by anthropogenic factors) are usually accompanied with massive victims. Identification of these victims is of upmost importance in these situations for legal and compassionate reasons [1]. Very often team of forensic examiners faces unique challenges with various scenarios, involving many bodies or body parts to identify in remote locations with limited access to laboratory facilities and in extreme environmental conditions [2]. Forensic-medical examiners of the Odessa regional bureau of forensic-medical examinations had participated in the process of investigation of the disasters in the Odessa region, which had caused large number of victims, and accumulated an experience of solving all the issues related to the elimination of the consequences of the tragedy promptly and efficiently .

1. The shipwreck of «Admiral Nakhimov». On August 31, 1986, a collision of dry cargo ship "Pyotr Vasyov" and passenger ship "Admiral Nakhimov" had occurred [3]. 8 minutes after the collision, at 11:20 pm "Admiral Nakhimov" plunged under the water, leaving on the surface hundreds of people fighting for life, who were rescued by more than 60 ships in conditions of strong wind and waves up to 2 meters [4]. Of the 2,243 people on board, 423 died: 359 passengers (of the 897) and 64 crew members (of the 346). 23 children were among the dead. 267 people from Ukraine died. A large government commission came from Moscow, along with it – a large investigative group. The most numerous commission was from Ukraine, in particular from Odessa. Ukraine was represented by the leadership of the BSSC headed by the Minister of the Navy, the chairmen of the regional executive committees and the leadership of the regions and districts where the dead passengers were from. A large group of forensic experts, including forensic experts Azarova T.V. and Krivda G.F. from the city of Odessa, arrived on the scene of incident. The organization of work was on the highest level. The rescued passengers, who were in a state of extreme stress, were provided with psychological and medical assistance. Divers worked at the site of the catastrophe – they penetrated inside the hull, which was located at a depth of 47 meters, and extracted bodies through cut-outs in the Tsemesskaya bay area. Investigators and the forensic-medical experts were engaged in organizing the identification of the corpses of drowned people (on the first day after the tragedy – 83 corpses), after the identification of the dead persons they issued medical certificates of death. Initially, the bodies in the area of shipwreck were placed on a seiner with refrigerators, then – sent to the morgue of Novorossiysk, after – placed in railway carriages with refrigerators. To store corpses a sufficient number of railway carriages with refrigeration facilities were provided. After the identification, the bodies were placed in coffins and sent to the place of residence for burial. This work was organized extremely clearly.

2. Catastrophe at the railway crossing near the village of Novoselovka. On June 2, 2005, 14 people died in a terrible catastrophe at the railway crossing near the village of Novoselovka in the Odessa region. The tragedy occurred on the 147th kilometer of the Odessa railway, on an unguarded unregulated crossing, where a freight train crashed into a passenger bus "LAZ" with 30 passengers, including two children, who were traveling to Odessa. After the collision, the locomotive dragged the bus along the railway for 40 meters and then got off the rails. Rescuers with huge difficulties pulled heavily injured bodies from the wreckage of the bus. Emergency doctors promptly resuscitated the victims and delivered the injured to the Sarata Central Regional Hospital, where a woman died from incompatible injuries, one victim was in life-threatening condition, one – in a state of moderate severity, totally 5 people were delivered. Three were taken to the Odessa Regional Clinical Hospital in a severe condition with an open severe traumatic brain injury (TBI). A total of 14 people died. Upon the arrival of the forensic-medical expert Nan N.P. (he took part in the inspection of the scene of the incident) a decision was made to organize the transportation of corpses to commit identification and autopsy. As a result of joint organizational means, four corpses were sent to the Tatarbunary department of the Odessa regional bureau of forensic-medical examinations, four corpses were sent to the Arzyssk department and six corpses were taken to the morgue of the Sarat Central Regional Hospital, which were examined by a team of experts from the regional center, headed by the head of the bureau. All the investigated

corpses were found massive multiple, diverse, combined, incompatible with life, injuries of the head, cervical spine, thorax, abdominal organs and limbs. The bus driver, who remained alive, violated the traffic rules, ignored the sound and light alarm, warning of the train arrival, and decided to «slip» the crossing. Thanks to a clear organization of the forensic experts' work, until 10 a.m. of the next day, all the corpses were identified, examined and the causes of death were determined. Operative clear organization of actions and participation of forensic experts in the identification of bodies were the primary tasks.

3. Catastrophe on the unguarded crossing Tashbunary.

On May 16, 2004, at the crossing of Tashbunary near Izmail, as a result of the collision of the "LAZ" bus with freight train 18 people died, 15 of them on the scene of incident, and 29 were injured. Corpses were urgently examined in the morgue of the Izmail branch of the Odessa regional bureau of forensic-medical examinations.

In the elimination of the consequences of these tragedies, one of the leading functions was played by experts of the Odessa regional bureau of forensic-medical examinations

4. **Catastrophe in the border guard.** On March 27, 2008 at about 11:30 am the helicopter MI-8, flying from Vilkovo to Zmeyinij Island crashed and fell in the area of the Danube floods from a height of 300 m to shallow water. As a result of the catastrophe, 13 of the 14 people, who were flying, died – almost the entire command structure of the Izmail border guard detachment. One officer from the passengers remained alive after a severe closed craniocerebral injury, a fracture of limbs, hypothermia and shock of the third degree. Corpses of the deceased were taken to the morgue of the Izmail branch of the Odessa regional bureau of forensic-medical examinations, where they were identified and examined by a group of experts from the city of Odessa. There were no difficulties in identifying issues. Experts took part in the inspection of the scene of incident. The victims died from severe combined injuries of the head, chest, abdomen and limbs. One of the reasons for the fall of the helicopter could be birds caught in the helicopter's engine. They muffled the engine, the rotors froze and the helicopter fell down.

5. Events on May 2, 2014 in Odessa.

On May 2, 2014, a tragedy that was unprecedented in the history of Odessa took place.

As a result of clashes on the Greek square in the center of Odessa, 5 people were killed and one was wounded from pneumatic weapons. The first corpse was delivered at 05:40 pm and others at 7:40 pm, which were identified and investigated in the first hours after delivery. Two of them died at the hospital.

As a result of events on the Kulikovo field, after the fire at the «House of Trade Unions», after the collision at 8:30 pm, 8 people died due to a fall from the height; of these, 1 person died in the hospital. 9 people died as a result of poisoning with carbon monoxide; 2 had burns of the body; 3 – burns of the respiratory tract and body; burns of the respiratory tract and body in combination with poisoning by uncertified gases (combustion products) – 5 persons; burns of the respiratory tract in combination with poisoning by uncertified gases (products of combustion) – 1 person; poisoning by uncertified gases, smoke and vapor – 14 people. According to objective data, on the bodies of 42 dead during a fire people on the Kulikovo field no injuries were found, caused by an extraneous hand, including 8 people, died in the result of falling from height. The youngest of the dead was born in 1992 (22 years old), and the oldest one – in 1944 (70 years).

At 07:44 pm a fire had began. Fire trucks arrived at 08:16 pm. By that time, everything had already been burned down and people were already dead. Fortunately, the firefighters managed to withdraw from the building more than 300 people. A team of experts from a regional bureau of 4 people, headed by the Bureau chief, arrived at the science of incident at 11:20 pm. The experts had begun the description of 7 corpses that fell out of the windows of the building. Taking to consideration the danger of the territory of the fire, investigative actions in the «House of Trade Unions» until the morning of May 3 were suspended. At 02:45 am, on May 3, 7 corpses were delivered to the Bureau from Kulikov's field. At 4:00 pm on May 3, other corpses were delivered to the morgue of bureau. On the morning of May 3, a team of experts from the bureau with the investigators examined the bodies of 34 corpses, which were taken to the morgue of bureau and identified. The autopsies of the corpses were performed until 12:00 am on May 4.

On May 4, 2014, according to the data of the operational headquarters of Odessa, 226 people administered to the hospital, 88 of them were hospitalized, 13 of them with firearms, 8 with burns, 53 with craniocerebral traumas, 7 with stab-incised injuries, 13 – with poisoning with carbon monoxide, including 22 police officers, 2 of them with gunshot wounds.

In summary: the total number of victims of this terrible May Day reached 48 deaths and about 300 injured persons, including 70 law-enforcers. Experts from the regional bureau quickly and efficiently fulfilled their functional responsibilities.

6. **The shipwreck of the boat «Ivolga (Oriole)».** On October 17, 2015, the boat «Ivolga» had sank near the village of Zatoka at a distance of 60 km from the city of Odessa, the reasons of which were: the excess of the number of people (44 people instead of the permitted 12 passengers and 3 for the crew – triple overload); the radar system was switched off; the rescue equipment on the boat was closed in the cockpit; the crew was not instructed; lack of crew (instead of 3 sailors only 1). In addition, the boat went to sea for 12 miles instead of 2 allowed.

Weather conditions were critical: the wind reached 14 m per second, and the waves were more than 2 meters high. Approximately 200-300 meters from the shore, it toppled over. All passengers found themselves in cold water (water was +10-120C), the depth was solid. More than 50 specialists participated in the rescue operation. A total of 22 people died and one of them is still missing. 20 people were taken to the hospital. Several refused from medical care.

The chief of the Odessa regional bureau of forensic-medical examinations convinced the prosecutor to transport 14 corpses of Odessa citizens to Odessa for identification and research. Thanks to this, the corpses were quickly identified and

examined. The remaining 8 corpses were identified and examined in the Belgorod-Dniester branch of the Bureau during the next day. One is still not found.

The cause of death of all dead was drowning in the water. There were no problems with the identification of corpses. Injuries on the corpses (such as bruises, wounds, abrasions) were not related to the cause of death. Among the dead were men from 39 to 78 years old.

***7.*Tragedy in the camp «Victoria».** On the night of September 16, 2017 at 11:34 pm in the municipal children's sports camp «Victoria» a fire occurred in one of the buildings, which resulted the death of 3 girls, who lived in the same room above the epicenter of the fire in the building together with other 42 children. 2 teenagers of this camp had rescued from the fire 23 children (participants of the choreographic collective «Adele»). Two of the survivors, who inhaled the products of combustion, and the third girl, who jumped out of the window and received the spinal cord injury, were delivered to the hospital.

Table 1

Total number of the deceased citizens of Odessa region (1986 – 2017)

№		Number of deaths
1.	«Admiral Nakhimov»	423
2.	Catastrophe at the railway crossing near the village of Novoselovka	14
3.	Catastrophe on the unguarded crossing Tashbunary	18
4.	Catastrophe in the border guard	13
5.	Events on May 2, 2014 in Odessa	48
6.	The shipwreck of the boat «Ivolga»	22
7.	Tragedy in the camp «Victoria»	3
	Total	**541**

Conclusion. Disasters with massive victims, unfortunately, have been occurring more often in today's world. As our practice has shown, only coordinated cooperation of all members of the investigative group on the scene of incident can provide timely examination and identification of dead bodies. Each participant of the process should follow an appropriate sequencing and not to waste time, contributing to successful process of investigation.

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ОРГАНІЗАЦІЯ ПРІОРИТЕТНИХ ДІЙ ПРИ ІДЕНТИФІКАЦІЇ МАСОВИХ ЖЕРТВ ТА ВИЗНАЧЕННЯ ХРОНОЛОГІЇ КАТАСТРАФ, ЩО ТРАПИЛИСЯ В ОДЕСЬКІЙ ОБЛАСТІ

Кривда Г.Ф.[1], Кривда Р.Г.[1], Слюсаренко О.О.[2], Уманський Д.О.[1]

Резюме. У цій статті описано масштабні катастрофи з великою кількістю жертв в Одеській області та звертається увага на найважливіші дії, які виконувала команда судових експертів Одеського обласного бюро судово-медичної експертизи під час проведення ідентифікації жертв катастрофи.

Ключові слова: катастрофа з масовими жертвами; ідентифікація; організація пріоритетних дій.

ОРГАНИЗАЦИЯ ПРИОРИТЕТНЫХ ДЕЙСТВИЙ ПРИ ИДЕНТИФИКАЦИИ МАССОВЫХ ЖЕРТВ И ОПРЕДЕЛЕНИЕ ХРОНОЛОГИИ КАТАСТРАФ, КОТОРЫЕ ИМЕЛИ МЕСТО В ОДЕССКОМ РЕГИОНЕ

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Резюме. В этой статье описано масштабные катастрофы с большим количеством жертв в Одесской области и обращается внимание на важнейшие действия, которые выполняла команда судебных экспертов Одесского областного бюро судебно-медицинской экспертизы при проведении идентификации жертв катастрофы.

Ключевые слова: катастрофа с массовыми жертвами; идентификация; организация приоритетных действий.

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THE ROLE OF POST-MORTEM COMPUTED TOMOGRAPHY (PMCT) IN MASS DISASTER AND IDENTIFICATION OF VICTIMS

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Summary. During the last years, the use of modern imaging techniques such as radiological methods have pioneered post- mortem investigations. The most rapid way to investigate and document the inside of the body is Post-mortem Computed Tomography. The implementation of Post-mortem Computed Tomography in the investigation of victims of mass disasters is extremely useful.

Key words: Post-mortem Computed Tomography; mass disaster; identification.

Cases of natural catastrophe or mass disaster of other origin always present a situation of acute crises in which the fast intervention of first aiders, security and police are demanded. Once there is no more possibility to save lives and emergency units withdraw, there is often need of forensic pathologist. Their role is to identify victims, to diagnose their causes of death and to help investigating the mechanism that lead to the catastrophe. In order to be able to intervene rapidly, the forensic pathologists have to be organized and need to have a detailed plan of intervention that is ready at any time. Therefore organizations like DVI (Disaster Victim Identification) units exist. The aim of such teams is the coordination of the intervention of specialized persons and their formation. Their role is also to increase the quality of the intervention and to propose different and new approaches that could be useful for investigating such catastrophes.

During the last years, the use of modern imaging techniques such as radiological methods have pioneered post- mortem investigations. The most rapid way to investigate and document the inside of the body is Post-mortem Computed Tomography (PMCT). The obtained radiological data enable visualization of foreign bodies such as medical implants, projectiles and many more. It also gives a detailed overview about the skeletal system including its pathological changes due to existing diseases or due to the acute event that lead to death. Although the visualization of soft tissue such as muscles and organ parenchyma is limited by using PMCT alone, it still allows to identify major traumatic lesions and preexisting modifications of the anatomy due to malformation or pathologies.

For these reasons, the implementation of PMCT in the investigation of victims of mass disasters is extremely useful. In a first step, the radiological images give information about the identity of the victims. Today, different possibilities for performing a radiological identification of bodies exist. If ante-mortem radiological data are available, information such as old fractures, surgical intervention, malformations, tumors and metastatic spreading or even degenerative changes can be used to identify a victim. Other possibilities are the comparison of the paranasal sinuses or the pattern of sesamoid bones. Additionally, if no hint to the victim's identity is available, the use of anthropological methods for estimating sex, age and size of the investigated body is possible by examining the "virtual skeleton" on the CT-images.

Once the first acute intervention including the identification of the victims is done, the PMCT-data remain available for a detailed investigation including the definition of the cause of death. Many studies have shown the utility of PMCT for investigating especially traumatic death, such as it is mostly the case in mass disaster. Also more complex reconstructions are possible based on PMCT-data such as the reconstruction of bullet's trajectories in cases of ballistic trauma, as it can be observed in terrorist outrages for example. Those digital data can be explored even a long time after the body has been restituted to the family, allowing a good compromise between a rapid identification and restitution and the possibility to perform medico-legal investigations.

As all the described advantages are obvious, the use of PMCT for investigating mass disasters has already been