MEDICOLEGAL CHARACTERISTICS OF FATAL FALLS FROM A HEIGHT

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Abstract

Falling from a height can be defined as the movement of the body to a lower level than the state it is on, under the influence of gravity, due to carelessness, imbalance or voluntary actions of oneself or another person. The circumstances in which falls occur are always suicides, but sometimes they can be accidents and very rarely - homicides. An important indicator and predictor of expected traumatic injuries is height. Most authors accept its division into three groups: < 3m., 3-9m., >9m. The locations of injuries in falls from a height can be divided into several groups: head and neck, chest, abdomen, pelvis, upper and lower limbs.

Aim and objectives: to analyze the characteristics of traumatic injuries in falls from a height at different heights. Materials and methods: retrospective study in the department of forensic medicine in Plovdiv over a period of 5 years on cadavers of people over 18 year-old who died as a result of a fall from a height.

Results and discussion: the results show male predominance - 71% of all cases. Regarding the height from which the fall occurred, the most cases are in the group over 9m - 77%, and the least from under 3m - 9.6%. The circumstances under which the death occurred show that in 76% of the cases it was a suicide, and in the remaining 24% it was an accident. The most frequent location of the identified injuries is in the chest area (95.2%), followed by the head and neck - 92.3%.

Conclusion: Falls from height rank among the top injury-related deaths, accounting for a high percentage of injuries from a blunt trauma.

Keywords: *fall from a height, traumatic injuries, accident, suicides*

Introduction

Falls in forensic pathology's practice represent a specific type of trauma which in a number of cases can be a serious challenge to the forensic expert regarding the determination of the manner of death, as well as the determination of the type and cause of death. Falling from a height can be defined as the movement of the body to a lower level than the state it is on, under the influence of gravity, due to carelessness, imbalance or voluntary actions of oneself or another person. The circumstances in which falls occur are always suicides, but sometimes they can be accidents and very rarely - homicides. An important indicator and predictor of expected traumatic injuries is height. Most authors accept its division into three groups: < 3 m., 3-9 m., >9 m., groups which determine the type, location and characteristics of the received injuries.

Materials and methods

The present study covers cases - remains of people who died as a result of a fall from a height, which were the subject of research in the Department of Forensic Pathology at the "St. George" UMBAL - Plovdiv for the period 2017-2021. The information was collected on the basis of pre-prepared statistical maps using established exclusion criteria, after which the same was processed with a descriptive analysis using the statistical processing program SPSS IBM v.19.

Results and Discussion

The retrospective study included 104 cases of deaths due to falls from different heights, autopsied in the Department of Forensic Pathology, Plovdiv, over a 5-year period (2017-2021). The results of the prepared statistics based on the statistical maps show a significantly higher percentage in favor of the male gender – 71.2%, compared to the female gender – 28.8% (see

Fig. 1). The percentage ratio found coincides with that of Çakı et al., 2021 (3) for the studied period of 2020 that men are more frequent victims of falls from a height.

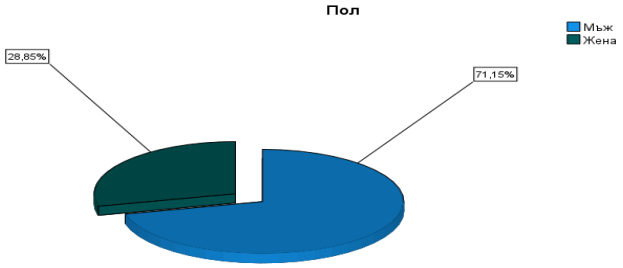

Fig. 1 Frequency distribution by gender

One of the most important factors affecting mortality is the height of the fall. The results presented in the current project are divided into three groups - below 3 meters; between 3 and 9 meters and over 9 meters. The results show that the largest percentage of cases - 76.9% were in falls from a height of over 9 meters, 13.5% were in falls from 3 to 9 meters and 9.6% - below 3 meters in height (see fig. .2).

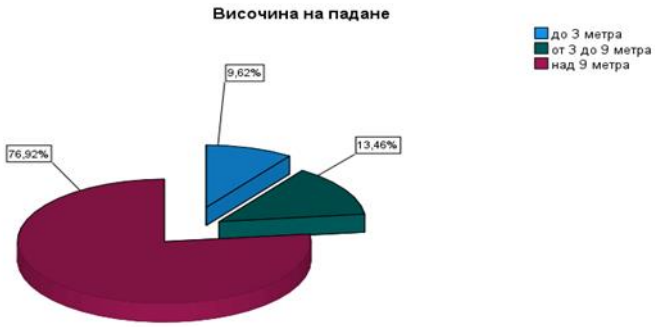

Fig. 2 Distribution by the height

In the studied cases, two types of death are observed - suicides and accidents. In the reviewed 104 cases, no homicides by falling from a height were found. A higher percentage are suicides - 76%, and accidents - 24% (see fig. 3).

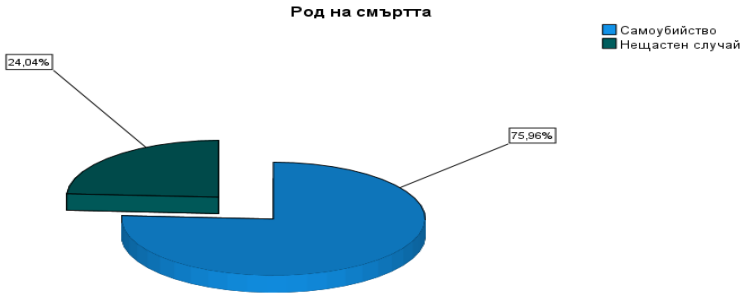

Fig.3 Distribution by the manner of death

In the study that was carried out, 6 main groups were distinguished, divided by anatomical features: head and neck, chest, abdomen, pelvis, upper and lower limbs. In each of the described groups there are subgroups showing traumatic damage to the skin, soft tissues, bones and internal organs in the observed areas.

In summary, it can be said that head and neck injuries are present in 92.3% of the cases; damage to the chest - in 95.2%; on the abdomen – 71.2%; on the pelvis – 60.6%; upper limbs – 75% and lower limbs – 76%.

The percentage distribution of the skin injuries on the head and neck is as follows - 74% have the following damage: abrasions (47.1%), contusions (39.4%) and lacerations (45.2%). Soft tissue injuries occurred in 76.9%. There are bone fractures in 69.2% of the cases, presented as cranial vault fracture 43.3%, skull base fracture 49%, cervical vertebral fracture 32.7%. For the intracranial injuries (62.5%), there are: brain contusions (42.3%), subdural hematoma (15.4%), subarachnoid hematoma (43.3%) and epidural hematoma (2.9%).

In the chest injuries, it is found that the skin injuries occur in 41.3% - abrasions (31.7%), contusions (27.9%), lacerations (1%); 65.4% have soft tissue damage. Regarding the distribution of the broken bones of the thorax, the following is found: in 88.5% of the cases there is a fracture of the bone/s of the thorax, with left rib fractures occurring in 76%, right rib fractures in 77.9%, fracture of scapula/s – 6.7%, fracture of clavicle/s – 25%, fracture of sternum – 28.8% and fracture of thoracic vertebrae – 38.5%. Damage to internal organs is found in 74% of cases, with contusions in right and left lung in 60.6%, and lacerations in 38.5%; damage to the heart + (consisting of contusions and lacerations) – 32.7%; damage to the aorta – 23.1%.

Abdominal injuries are represented in the following several groups: skin damage (24%) – abrasions (15.4%), contusions (15.4%), lacerations (1.9%); soft tissue injuries (15.4%); fractures of the lumbar vertebrae (27.9%); liver injury - contusion (4.8%), lacerations (44.2%); spleen injury - contusion (2.9%), lacerations (33.7%); contusions of left kidney (25%) and left kidney (25%) and lacerations of left kidney (4.8%) and right kidney (1.9%); laceration of the mesentery occurs in 20.2% of cases with trauma in the abdominal region.

In the pelvic injuries (60.6%), the following distribution of traumatic injuries is observed: skin injuries (15.4%) - abrasions (6.7%), contusions (10.6%), lacerations (1 %); soft tissue injuries (52.9%); the fracture of the bones of the pelvic ring (57.7%).

Upper and lower limb injuries occur in a very large percentage of cases, 75% and 76% respectively.

Similar studies were performed by Rowbotham et al. 2018 and 2019; Abder-Rahman et al. 2018; Türkoğlu et al. 2019; Çakı et al. 2021 (1,2,3,4,5) as the results of the relevant indicators show identical values, which is of a confirmatory nature compared to the previously revised statistical data.

Conclusion

Falls from a height rank among the top injury-related deaths, accounting for a high percentage of injuries related to blunt trauma. They are also the most common cause of death in occupational accidents in Bulgaria. Detailed analysis of the type of traumatic injuries would ease the work of forensic doctors and anthropologists in complicated cases of falls from a height.

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