FORENSIC ISSUES OF DEATHS CAUSED BY POLYTRAUMA IN SIBIU COUNTY – RETROSPECTIVE STUDY BETWEEN 2007 AND 2016

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Abstract: *Purpose: Deaths due to polytrauma are a global issue that affects all sectors of society. Materials and Methods: We conducted a longitudinal retrospective study over a 10-year period, on a total of 418 cases, from the casuistry of the Sibiu County Forensic Service. We aimed at the epidemiological distribution by age groups, gender, background, distribution of cases according to the circumstances they occurred, the mechanism of production and the death-inducing syndromes of polytrauma. Results: The study showed that about 40% of the total deaths from mechanical traumatic injuries were due to polytrauma. About 80% of these occur mainly in males and in urban residents. The IV to VI decades register the highest share of deaths secondary to polytrauma, and more than two thirds occur as a result of traffic accidents. Predominant death-inducing syndrome is represented by internal haemorrhage.*

INTRODUCTION

Polytrauma is a frequent cause of death in forensic casuistry, generating important social and economic issues.(1,2,3) The majority of the death-inducing polytraumas is represented by accidents (traffic, domestic and work-related accidents), but heterogressions and suicides (precipitation) are also significant.(4,5,6) Most studies evaluate trauma as the main cause of mortality in the population under 40, with 20-25% of all traumas.(6,7,8) According to most statistics, road accidents represent the main etiological factor of polytrauma. The main mechanisms for producing injuries in road accidents are: frontal impact, lateral impact, rolling, deceleration; hitting from hard objects inside the vehicle, projection.(9,10,11)

PURPOSE

The paper aims at conducting an epidemiological study on the deaths caused by polytrauma in the Sibiu County for a period of 10 years, during the period 2007-2016, in order to quantify the phenomenon, their production circumstances, the identification of the groups at risk and also, to develop a prevention strategy.

MATERIALS AND METHODS

The material taken into study is represented by the infobiographic and medical data available in the archives of the Sibiu County Forensic Service, as well as of Sibiu County Emergency Clinical Hospital. The method used is the retrospective longitudinal survey, with the full study of the study material.

RESULTS AND DISCUSSIONS

Between 2007 and 2016, 418 deaths secondary to polytrauma were reported in the Sibiu County Forensic Service and in Medias Forensic Office. Out of the total number of deaths due to polytrauma, 77.51% occurred in males and 22.48% in females.

Following the distribution of cases according to the origin environment of the deceased, secondary to multiple trauma, a share of 58.13% was represented by persons from the urban area and 41.86% was represented by rural population.

Table no. 1. Distribution of deaths due to polytrauma according to persons' gender

Gender	No.	%
Masculine	**324**	77,51
Feminine	**94**	22,48
Total	**418**	**100**

Table no. 2. Distribution of deaths due to polytrauma according to the origin environment of the deceased

Origin environment	No.	%
Urban	**243**	58,13
Rural	**175**	41,86
Total	**418**	**100**

The IV, V and VI age decades recorded the highest rates of deaths caused by polytrauma, respectively 19.61%, 17.46% and 16.26%. Equal weights of deaths from polytrauma were found in people aged between 20-29 years and 60-69 years (13.15%), respectively. A percentage of 10.52% was due to polytrauma in people aged 70-79 years. A percentage of 5.02% has been found in people aged over 80. The lowest weights, 3.34% and 1.43%, were registered in the first and second decades of age.

Table no. 3. Distribution of deaths due to polytrauma according to victim's age

Age (Years)	Nr.	%
0-9	6	1,43
10-19	14	3,34
20-29	55	13,15
30-39	82	19,61
40-49	73	17,46
50-59	68	16,26
60-69	55	13,15
70-79	44	10,52
Above 80	21	5,02
Total	**418**	**100**

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The distribution of deaths due to polytrauma, according to the circumstances of production, registered a maximum share consecutively to road accidents / railway accidents (74.40%), followed by 13.39% of domestic accidents. The suicides represented 5.74%, while heterogressions were recorded in a percentage of 4.30%. In 2.15% of cases, death occurred as a result of work-related accidents.

Table no. 4. Distribution of deaths due to polytrauma according to the mechanism of production

Circumstances in which death occurred	Nr.	%
Suicides	**24**	5,74
Aggression	**18**	4,30
Domestic accident	**56**	13,39
Road/railway accidents	**311**	74,40
Work-related accident	**9**	2,15
Total	**418**	**100**

Table no. 5. Distribution of deaths as a result of polytrauma according to their mechanism of production

Production mechanism	Nr.	%
Falling	**16**	3,82
Falling from height	**58**	13,87
Hitting from a hard object	**22**	5,26
Hitting from a blunt object	**4**	0,95
Hitting from a harsh object/compression (road accident)	**225**	53,82
Collision	**67**	16,02
Compression	**9**	2,15
Railway accidents	**17**	4,06
Total	**418**	**100**

Following the distribution of deaths secondary to polytrauma, according to the mechanism of production, most of them (53.82%) were produced by hitting from harsh objects and / or compression (in the case of road accidents to passengers). 16.02% were due as a result of collision (in pedestrian traffic accidents), and a 13.87% share by falling from height. In 5.25% of cases, the injuries occurred by hitting from hard objects. The smallest weights were recorded by railways accidents, (4.06%), simple fall (3.82%) and compression (other than road accidents) - 2.15%.

The study of mechanical traumatic tanatogenesis revealed that the main anatomo-pathological entity involved is internal haemorrhage (35.64%), followed by cerebral dilaceration (15.07%) and external haemorrhage (13.39%). A percentage of 11.72% was represented by meningo-cerebral haemorrhage as a result of the polytrauma, and in 9.56% of cases, death was due to haemorrhagic and traumatic shock. A share of 6.93% was due to hemopneumothorax, and in 5.50% of cases, bronchopneumonia occurred in evolution. Percentages below 1% (0.95%, 0.71% and 0.47%, respectively) were recorded after the toxic-septic shock, pulmonary thromboembolism and pulmonary arterial aspiration.

Table no. 6. Repartition of deaths according to death-inducing syndrome of polytrauma

Death-inducing syndromes	Nr.	%
Meningo-cerebral haemorrhage	**49**	11,72
Cerebral dilacerations/cranial explosion	**63**	15,07
Internal hemorrhage	**149**	35,64
External hemorrhage	**56**	13,39
Traumatic and haemorrhagic shock	**40**	9,56
Hemopneumothorax	**29**	6,93
Mechanical asphyxia by pulmonary aspiration / compression	**2**	0,47
Bronchopneumonia	**23**	5,50
Toxic-septic shock	**4**	0,95
Pulmonary thromboembolism	**3**	0,71
Total	**418**	**100**

CONCLUSIONS

Regarding the analyzed cases, 418 deaths due to polytrauma were recorded in the Forensic Service of Sibiu County. Approximately 80% of all these cases occurred in men.

There were recorded approximately equal weights of the distribution by residence area, the urban area being predominant.

More than half of the cases have been encountered between 30 and 69 years old.

The maximum share of deaths as a result of polytrauma was due to traffic accidents.

The major mechanism of injuries in passengers was hitting by hard objects and/ or compression from inside the car.

The death-generating syndrome most commonly encountered in the case of polytrauma in the analyzed cases was the internal haemorrhage.

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