

Research Article

Demographic Profile and Pathological Patterns of Head Injury in Albania

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Abstract. Introduction: Head injury (HI) is a serious morbid state caused by structural changes of the scalp, skull, and/or its contents, due to mechanical forces. Generally, the most frequent cause of HI is road traffic accident (RTA), followed by homicidal and falling injuries. The aim of present study is to assess epidemiology data, causes and patterns responsible for HI among Albanian subjects. **Methodology:** All HI cases (1000) are collected by the Forensic Institute of Albania, based on medical and forensic records of traumatized subjects between 2007- 2012. The prospectively-collected and descriptive information is focused on demographic data, responsible factors, type and level of cranial and brain injury, as well as their outcome. **Results:** The majority of HI victims were male (84%) of age range of 15yrs -35yrs (70%). RTA was the HI cause in 88%, followed by homicides (3.8 %), falling (3%) etc. With respect to injury mechanisms, extra-dural hematoma was found in 93% of cases, followed by cerebral edema (61%), cerebral contusion (37 %), skull bone fractures (35%), etc. Severe alteration of the consciousness was observed in 57% of the cases, while amnesia lasted longer than 4 weeks in 44% of the subjects included in our study. **Discussion:** This survey demonstrates that the majority of HI victims' is young and middle age males target group exposed to RTA. The increase of vehicles' use in placecountry-regionAlbania is more evident than RTA-related HI, indicating that driving newer vehicles with safer technology or helmets use while motorcycling can potentially decline the fatal outcome.

Keywords: Demography, head injury, injury mechanisms, road traffic accidents.

1. Introduction

Head injury (HI) is a serious morbid state, caused by structural changes in the scalp, skull, and/or its contents, due to direct or indirect mechanical forces [1, 2]. The most frequent HI cause is road traffic accident (RTA), while homicidal injuries are quite infrequent but the head due to

its anatomic properties is the most affected part of the body [2].

RTA was an exceptional event before political changes (year 1990) in placecountry-regionAlbania. Meanwhile, non-fatal head/neck injuries represented 58% of RTA cases during year 1998, and the majority of them were males aged between 21yrs and 50yrs [3]. The aim of present study is to assess the

actual demographic data, causes and patterns responsible for HI in our country.

2. Materials and Methods

All the HI cases (1000) were recorded by the Forensic Institute of Albania during the period 2007-2012. Patients were treated at the "Service of Trauma" of "Mother Theresa" PlaceTypecountry-regionSchool of PlaceNamecountry-regionMedicine, in Tirana – placecountry-regionAlbania. The prospectively-collected and descriptive information was focused on demographic data, responsible factors, type and level of cranial and brain injury, as well as their outcome. The data has been collected and analyzed via MS excel program.

3. Results and Discussion

3.1. Results. The large majority of HI victims included in our study were male (84%). Young adults to middle aged people (70%), females (16%) and males over 45 years (14%). The age-group of 15–25 years was the most affected age range by HI (37%), followed by age-group of 26–35 years (20%) and the age-group of 36–45 years (13 %) (Table 1). 41% of all subjects included were employed, 44% unemployed, 13% students, and 2% of them householders.

The HI majority was caused by RTA (88%), followed by homicide, falling and suicide (3.8%, 3%, and 2% respectively). Thirty-one percent of all RTA-victims and 33% of injured drivers had consumed alcohol. Personal vehicles in 62% of cases, other vehicles such as vans and buses and trucks 20%, motorcycles in 5% etc. were the category of vehicles involved in RTA. Sixty five per cent of the injured subjects were pedestrians, followed by passengers and drivers in 18% and 10% respectively as well as motorcyclists and bicyclist in 3% and 4% of the cases respectively. Most of RTA reported consists of vehicle—pedestrian crashes in more than 60% followed by vehicle—vehicle accidents in more than 20% of the cases. Rarer type of crashes consisted of crashes with fixed barriers, crashes of non motorized vehicles with other vehicles, vehicle falling or undefined type of accidents.

Clinic/pathological and radiological examination revealed cerebral edema (61%), subdural hematoma (13%), cerebral contusion (37%), cranial fracture (35 %), etc. (see Table 1 and Table ??). The HI were also associated with different forms of intracranial hemorrhage, as well as with different grades of consciousness alteration – moderated Glasgow coma scale (GSC) (9–12 score) in 20% and severe GCS (3–8 score) in about 57% of subjects (see also Table 1 and Table ??). HI-related long and medium term amnesia (lasting many days and weeks) was observed in nearly 97% of subjects (see Table ??). In general, a fatal outcome was observed mostly in young and middle aged males as a consequence of RTA (88%),

followed by fire arm injuries (3.8%). Half of the 20 fatalities occurred within 2 hours due to hemorrhage-induced HI.

3.2. Discussion. The most outstanding data which results from this survey is that victims' majority consists of young and middle age males and the main cause of HI is RTA. Similar results are also observed in other countries [2, 4–6]. Thus, Zangoonei et al. have reported that male/female overall ratio was 3.4 and the highest male/female ratio was related to motorcycle accidents [6]. Further studies confirm that, not only RTA but falling, blunt weapons or fire arms as well are consistent HI causes [2, 7].

In Albania, the largest majority of RTA is caused by personal cars; however and similarly to various surveys [2, 6, 8], heavy vehicles and especially motorcycle accidents are consistent contributors of RTA-related fatalities. This is because personal cars are widely used in Albania compared to motorcycles. Albanian population has increased by 4% during the time span 1998–2010 and vehicles number registered by more than 189%. Despite this enormous traffic circulation growth, there has not been recorded an enormous RTA increase rate considering that during 1998 HI was reported in 58% of non-fatal RTA, followed by low extremities by 34% [3].

The major part of HI has been reported on pedestrians, followed by passengers and less on drivers of smaller motorized vehicles. Similarly to our findings, Zangoonei et al. reported that the overall HI ratio to other organ injuries (torso and underbody) was 2.5 and pedestrians had the largest amount of HI (38%) [6]. While the thorax region had the highest incidence of injury in fatal motorcycle-barrier crashes, HI predominates during the fatal motorcycle crashes in all single and multi-vehicle crash situations [9]. Results showed that acute subdural hematoma is more likely to occur in cases of simple fall, assaults and cyclists, while diffuse axonal injury is more typical for vehicular traffic accidents and cases of falling from a considerable height [10].

About one-third of Albanian victims/drivers with HI had consumed alcohol by the time of the accident, which on the other side represents a significant risk factor for RTA [8]. It is reported that majority of fatal HI occurs within first 24 h from the RTA [2], while in our study half of them occurred within 2 hours from the crash. According Kanchan et al., HI was responsible for nearly 3/4th of deaths, and the mean duration of survival after RTA was 6–7 days [4]. These may indicate that the importance of RTA as mortality/morbidity cause consists in the increasing number of vehicles usage, changes in lifestyle and the risky behaviors among general population [2, 4].

The cerebral edema/contusion as well as skull bone fractures is largely more prevalent during HI, while intracranial hemorrhage leads to increased risk for fatal outcome [2, 11]. The most frequent HI mechanism moving vehicle hitting is followed by stationary object hitting, which results in death usually from severe blunt force trauma [8]. Different

Table 1: Mechanisms of head injury and their association with sex and age ($N = 1000$).

Age	15–25	26–35	36–45	46–55	56–65	>65	Total
Male / Female	370/70	200/10	130/30	90/20	35/25	15/5	840/160
Radiological Imagery Finding							
Cerebral edema	170	145	80	50	90	75	610
Subdural hematoma	40	30	20	10	20	10	130
Extradural hematoma	345	305	140	60	55	25	930
Cerebelar hemorrhage	25	15	5	6	6	3	60
Cerebral contusion	160	80	50	30	30	20	370
Cranial fracture	130	70	40	40	45	25	350
Intraventricular hemorrhage	6	4	1	1	2	1	15

Table 2: Causes and mechanisms of head injury, and their association with consciousness alteration and amnesia ($N = 1000$).

Injury Parameter	Patients nr
Injury cause	
Falling from height	30
Road traffic accidents	880
Homicide	38
Suicide	20
Electric shock	7
Other	25
Conscience level (GCS)	
Range 3–8	568
Range 9–12	200
Range 13–15	232
Amnesia duration	
No amnesia	34
1–59 min	87
1–24 h	54
1–7 days	155
1–4 weeks	234
> 4 weeks	436
Examination Finding—Injury Type	
Superficial skin injury—with/without brain edema, skull bones fracture, intracranial hemorrhage)	930
Skull fracture	350
Cerebral edema	610
Cerebral contusion	370
Subdural hematoma	130
Epidural hematoma	70
Cerebelar hemorrhage	60
Ventricular hemorrhage	15
Intracranial hemorrhage	40

studies suggest that the commonest fractured cranial bones are parietal and temporal, followed by frontal and occipital bone [2, 8, 12]. The combination of HI-related fracture and hemorrhage in cases of instantaneous deaths demonstrated that crash injury was responsible for severe brain damage

and grey matter involvement [2]. HI can be also caused by domestic violence, traumas directed to the head, face, and neck areas. According to Curca et al., severe lesions were found in less than 10%, but sexual aggression was not observed in such cases [12].

Similarly to our results, the traumatic HI is associated with consciousness alteration, long and middle term amnesia in the majority of cases, predominantly with a low GCS score as a consequence of hypertensive responsiveness followed by a prolonged systemic hypotension mechanism and radiological examinations could be helpful when physical examination results as normal [2, 13]. In addition, the emotion recognition test could be the only index that is significantly related to post-traumatic amnesia duration, GCS score, and the presence of prefrontal lesions [14]. Radiological abnormalities correlate with consciousness alteration, the presence of vomiting, amnesia, as predictors of abnormal computerized tomography even in patients with normal GCS score [15, 16].

4. Conclusions

This survey demonstrates that the HI victims' majority consists of young and middle age males, mainly involved in RTA. The age-profile seems to be in a status quo, comparing with a previous study conducted in our country 15 years ago [3]. There is an increase of RTA-related HI in our country (130 vs. 200 cases year), versus an enormous increase of vehicles' usage during this period of time in Albania. This slight increases figure indicates the contribution of newer vehicles, seat belts, air bags, or helmets usage as risk lowering factors for fatal outcomes [2, 17–19]. On the other hand, the implementation of stricter traffic laws, emergency healthcare, and infrastructure as well as traffic signalization improvement could play a supportive role to the risk lowering for the potential fatalities. [4–6]. Strict weapons' prohibition law in addition may decline fatalities as well, during personal rivalries and family quarrels [2, 12, 20].

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