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Original Article

Epidemiological investigation of 673 patients who resorted to the emergency department for mild head trauma complaints

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Abstract

Aim: Mild head trauma (MHT) or mild traumatic brain injury (MTBI) is an injury whose incidence is increasing in emergency services. This retrospective study carried out an epidemiological evaluation of patients with MHT, who underwent head computed tomography (HCT) with a 15-point score on the Glasgow Coma Scale (GCS).

Material and Methods: This study retrospectively evaluated 673 patients with MHT, who were examined by the department of neurosurgery in the emergency department of Istinye University, Canakkale Anatolian Hospital between 2015 and 2019. The cases were evaluated because of age, gender, cause of trauma, HCT findings, duration of admission to the emergency department, and other body traumas associated with head trauma.

Results:390 (57.95%) patients were male, while 283 (42.05%) were female. The mean age and standard deviation were calculated as 23.72 ± 24.87 years. Of the 673 cases, 494 (73.40%) were admitted to the emergency department due to non-high falls. After trauma, 642 (95.39%) patients were admitted to the emergency department within the admitted to the emergency department within the first two hours after injury. 656 (97.48%) of the patients were treated in the emergency department. 105 (15.60%) patients had a scalp incision and underwent a small surgical procedure. The most common accompanying body trauma detected was that of the maxillofacial region in 26 (3.86%) patients. HCT pathology was detected in 20 (2.97%) patients. These pathologies included; 14 (2.08%) non-surgical intracerebral hemorrhage, 2 (0.30%) skull base fractures, 1 (0.15%) traumatic subdural hematoma, 1 (0.15%) traumatic epidural hematoma, 1 (0.15%) pneumocephalus and 1 (0.15%) cerebral edema.

Conclusion: Head trauma is an important issue in this country. Brain CT may not be necessary in patients with a GCS score of 15. After a short observation, if patients live near the medical center, they can be sent home to return the next day for further evaluation.

Keywords: Epidemiology, head computed tomography, mild head trauma.

INTRODUCTION

Mild traumatic brain injury (MTBI) is an important public health problem. MTBI accounts for 70-90% of traumatic brain injuries (TBIs) (1,2). According to recent statistics in the European Union, it has been estimated that 2.5 mil cases of TBI occur every year (3), and, since at least 90% of TBI cases are mild (4), evidently MTBI is a major health issue. Prognosis after MTBI is an important issue in healthcare that is closely related to risk factors and treatment strategies. Head computed tomography (HCT) is the most commonly used method to detect structural brain injury after TBI (5]). Up to 15% of patients with MTBI have intracranial lesions in CT scans, and, among them, <1% requires neurosurgical intervention. However, the indications of a CT scan are debatable if the patient has a GCS score of 15 at the time of recourse. In various guidelines, the indications of CT scan vary based on a number of clinical predictors (6). Given the lack of contemporary guidance for managing patients with complicated mild head trauma (MHT) and a GCS score of 15, there is a critical need for research to help inform clinical decision-making. In this study, causes of trauma, age and sex distribution, duration of admission to emergency department, accompanying injuries and HCT findings were investigated in terms of the epidemiology

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of head trauma patients admitted to the emergency department of Canakkale Anadolu Hospital.

MATERIAL and METHODS

This study retrospectively evaluated 673 patients with MHT who were admitted to the emergency department of Canakkale Anadolu Hospital between 2015 and 2019 and were evaluated by the department of neurosurgery. Patients with HCT and a GCS score of 15 were included in the study. Canadian CT Head Rule (CCHR) criteria were used to detect all intracranial injuries after MHT. The cases were evaluated based on age, gender, cause of trauma, hospital admission time, HCT imaging findings and other traumas associated with MHT. The results were compared with the literature. No age limitation was made in this study.

RESULTS

390 (57.95%) patients were male, and 283 (42.05%) were female (sex ratio M:F=1.38:1). Mean age and standard deviation were calculated as 23.72 ± 24.87 years. The age range was between five months and five days to 93 years. 65 (9.66%) patients were two years old and under; 181 (26.90%) patients were older than two to five years; 139 (20.65%) patients were six to 18 years old; 220 (32.69%) patients were 19 to 65 years old; and 68 (10.10%) patients were classified as 66 or older (Table 1).

Of the 673 cases examined, 19 (2.82%) were caused by falls from high places; 494 (73.40%) were caused by other types of falls; 36 (5.35%) involved traffic accidents; six (0.89%) resulted from assault; and 118 (17.54%) patients were admitted for head trauma resulting from strikes with hard objects (Table 2).

642 (95.39%) patients were seen within the first two hours after trauma; nine (1.34%) were seen over two hours to six hours later; 12 (1.78%) were seen over six hours to 24 hours later; and ten (1.49%) were seen after 24 hours.

Six hundred fifty-six (97.48%) patients were followed up in the emergency department; 11 (1.63%) were followed up in the medical service; and nine (0.89%) were followed up in the intensive care unit (ICU). 105 (15.60%) patients had traumatic scalp injury and underwent a small surgical procedure; 59 (8.77%) had cephalic hematoma; 16 (2.38%) had abrasions; and ten (1.49%) had ecchymosis.

Accompanying traumas were maxillofacial in 26 (3.86%) patients, spinal (cervical) in 14 (2.08%), orthopedic in nine (1.34%), thorax in two (0.30%), and abdominal in two (0.30%) (Table 3).

In the HCT evaluation applied to all patients, 14 (2.08%) had intracerebral hemorrhage without surgery, 2 (0.30%) had skull base fractures, 1 (0.15%) had traumatic subdural hematoma, 1 (0.15%) had traumatic epidural hematoma, 1 (0.15%) had pneumocephalus and 1 (0.15%) had cerebral edema. In total, 20 (2.97%) patients had detected CT pathology (Table 4).

Six of these patients were female and 14 were male. Brain pathology was 2.33 times higher in males than in females. Twelve (60%) of these pathologies were in the age group for those six and over. Eight pathologies (40%) were in the age group for those five and under.

Table 1. Distribution of patients by age groups

Age groups	Number of patients (n)	Percent of patients (%)
2 years and under	65	9.66
Over 2 years - 5 years	181	26.90
6 years - 18 years	139	20.65
19 years - 65 years	220	32.69
66 years and over	68	10.10

A total of 673 patients were divided into 5 age groups

Table 2. Distribution of patients admitted to emergency department according to trauma

Trauma	Number of patients (n)	Percent of patients (%)
Other causes of falls	494	73.40
A hard object strike to head	118	17.54
Traffic accidents	36	5.35
Falling from high	19	2.82
Assault	6	0.89

The other causes of falls in our hospital (off ladder, chair, lap, bed, pushchair, at home, at school, in park and in match) are among the most common causes

Table 3. Distribution of other accompanying traumas		
Other accompanying traumas	Number of patients (n)	Percent of patients (%)
Maxillofacial	26	3.86
Spinal (cervical)	14	2.08
Orthopedic	9	1.34
Thorax	2	0.30
Abdominal	2	0.30
Total	53	7.88
The rate of accompanying other traumas to head trauma is 7.88%.		

Table 4. Pathological HCT findings		
Pathological HCT findings	Number of patients (n)	Percent of patients (%)
Cerebral intraparenchymal hemorrhage	14	2.08
Skull base fracture	2	0.30
Traumatic subdural hematoma	1	0.15
Traumatic epidural hematoma	1	0.15
Pneumosephalia	1	0.15
Serebral edema	1	0.15
Total	20	2.97
The rate of the detected CT pathology is 2.97%		

DISCUSSION

Head trauma is an important social health problem. In some studies, the most common cause of head trauma is automobile accidents. The majority of MHT patients admitted to the emergency room in North Carolina were zero to four years old and were male. The most common cause of injury was falling (7). In a study conducted in North American hospitals, the most common injuries were caused by motor vehicles (34.7%); 20% of the patients had penetrating injuries, and the overall mortality rate was 9.0% (8). In a study conducted in a developing African country, motorcycle accidents accounted for 57% of head trauma associated with highways. The average age of the victims was 33.1. The victims consisted mainly of males, those of low socioeconomic status, and those aged 20 to 40 (9). In the present study, the mean age of the patients with a GCS score of 15 was 23.72. Among all patients admitted to the emergency department in this research, males were more prevalent than females, and other types of falls (e.g., those that were not from high places) were the most common.

In a 2002 study, 2,000 patients with MHT reported their cranial computed tomography scan findings in Curialiba, South Brazil. The mean age of the patients in the series was 30.8 ± 19, and the male-female ratio was found to be 2:1. In addition, only 16.2% of patients with mild head injury had car accidents (10). In the present study, traffic accidents (5.35%) were fewer in patients with mild head injury.

Dalbayrak et al. (11), in an article published in 2011, listed the risk factors for positive CT findings in head trauma patients: coagulopathy, loss of consciousness, amnesia, skull fracture, basilar skull fracture, old age, white race, type of trauma, severe headache, nausea or vomiting, type of subarachnoid hemorrhage, diffuse axonal injury, edema, cranial soft tissue injury, focal neurological deficiency, low GCS at baseline, and decreased GCS Emergency in the compartment and after exposure to ethanol poisoning.

A retrospective analysis, published in 2010, showed that standard 24-hour observation may not be necessary for adult patients with a single intracranial hemorrhage less than 5 mm in diameter, with no history of bleeding coagulation, intoxication or multiple injuries (12).

In a previous study, routine and emergency cranial CT scans were recommended for patients with head trauma and loss of consciousness. According to this idea, in 1992, researchers concluded that clinical observation and head radiography were insufficient to rule out intracranial lesions in MHT (13). They reported that abnormalities were seen on the initial CT scan (in 18% of patients) and (in 5% of patients) required surgery for mild head injury (14). In

2018, Kauffman et al. reported the incidence of clinically significant TBI as 5.4% (15). In this present random retrospective study, the pathology rate (2.97%) was lower in brain tomography. No patient required surgery. This may be because this research did not include patients with GCS scores of 13 to 14 in the study.

Calcagnile et al. found a 4.7% intracranial pathology in brain tomography. They did not encounter any significant complications in the follow-ups of these patients (16). According to a very comprehensive study carried out in the United States, the most common cause of MTBIs was falls. The patients who went to the emergency department with MHT were most commonly aged zero to four (17). In the present research study, 246 (36.55%) patients were aged five and under.

In 2000, Haydel et al. (18) identified seven findings: headache and vomiting, age over 60 years, drug or alcohol poisoning, short-term memory loss, clavicular trauma and seizure. The presence of these findings was reported to be 100% sensitive for detecting patients with pathological HCT. Based on the clinical findings, patients with MHT who needed to undergo HCT were identified. Therefore, CT scans were not recommended for all patients with MHT (18).

Another study in Tehran showed that a large number (37%) of patients with MHT, who underwent CT scan in the emergency departments, showed no indications in those CTs; in addition, the majority (86.5%) of CT results were normal (19). HCT was normal in 353 (94.64%) of patients admitted to the emergency department due to MHT in the present study. This shows that HCT does not require hurrying. As an option, patients can be followed up in the emergency room for two hours. They can also be called to the outpatient clinic after 24 hours.

CONCLUSION

In this study, the rate of the detected CT pathology after MHT was 2.97%. None of these pathologies required surgical intervention. Therefore, patients with a GCS score of 15 are in the low risk group. Neurological deterioration after MHT is rare, and there is usually no need for neurosurgical intervention. If patients live near the medical center, they can be sent home after a short observation to return the next day, and the doctor can examine them again the next day in the outpatient clinic.

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