ORIGINAL ARTICLE

Eastern Journal of Medicine

East J Med 27(2): 281-288, 2022
DOI: 10.5505/ejm.2022.62134

Late Psychiatric Consequences In Disability Patients Injured In Traffic Accidents

Yavuz Hekimoğlu[1], Melike Sari[2], Burak Taştekin[1], Mahmut Asirdizer[3*]

[1]High Security Forensic Psychiatric Hospital of Ankara City Hospital, Ankara, Turkey
[2]Department of Paediatric and Adolescent Mental Health and Diseases, Medical School of Yildirim Beyazit University, Ankara, Turkey
[3]Department of Forensic Medicine, Medical School of Bahcesehir University, Istanbul, Turkey

ABSTRACT

The present study aimed to describe the late psychiatric consequences in road traffic accidents (RTAs) victims who were referred to us for disability examination months or even years after the injury, and to evaluate according to to the civil and penal laws in force in Turkey.

A retrospective examination was made of the files sent by the courts to the expert committee chaired by the authors for the determination of applicants' disability rate over the 7-year period between 2014 and 2020.

Of 774 victims of RTA, 3.6% (n=28) had late psychiatric outcomes, including 1.9% post-traumatic epilepsy (PTE), 1.0% post-traumatic stress disorder (PTSD), and 0.6% frontal lobe syndrome (FLS). The 28 cases comprised 18 males and 10 females with a mean age of 25.6±14.4 years. Of these patients, 10 were pedestrians, 12 were passengers and 6 were drivers. Disability rates ranged from 5% to 90% in the patients with PTE, were 40% or 60% in patients with PTSD, and were 25% or 40% in patients with FLS.

In patients who have been exposed to serious traumas such as RTAs, providing psychiatric support during or after medical treatment is of undeniable importance for the patient's full health. In addition, this support, which will be included in the medical records, will prevent much loss of rights of the victims in countries that do not have regular psychological examination records.

Keywords: Road traffic accidents, psychiatric consequences, post-traumatic epilepsy, frontal lobe syndrome, post-traumatic stress disorder

Introduction

In both developed and developing countries, road traffic accidents (RTAs) are one of the most important causes of head injuries, which lead to serious injuries, deaths, or temporary or permanent disability (1-3). In addition to mild lesions such as blunt traumatic lesions of the scalp, severe lesions such as skull fractures and traumatic brain injuries (TBIs) may develop after a head trauma (3).

Intracranial complications such as delayed hematoma formation, post-traumatic seizures, infections, cerebrospinal fistulas, post-traumatic hydrocephalus, cranial nerve injury, and vascular injuries may occur days, weeks, or even years after TBIs and may cause some psychiatric consequences (4). It is thought that structural and neuropsychiatric factors may both be responsible for the effects of TBIs (5).

In RTA victims, whilst post-traumatic epilepsy (PTE), frontal lobe syndrome (FLS) and postconcussional syndrome occur associated with TBIs, post-traumatic stress disorder (PTSD), acute stress disorder, major depression, other mood disorders, driving phobias and other anxiety disorders can be seen regardless of TBIs (5-9).

The literature on late-stage psychiatric disorders after RTAs is limited. The present study aimed to describe the late psychiatric consequences in RTA victims who were referred to us for disability examination months or even years after the injury, and to evaluate according to the civil and penal laws in force in Turkey.

Materials and Methods

In this study, the files sent by the courts to the expert committee were retrospectively examined for the determination of applicants' disability rate

***Corresponding Author:** Mahmut Asirdizer, Head of Department of Forensic Medicine, Medical Faculty of Bahcesehir University, Istanbul-Turkey
E-mail: masirdizer@gmail.com, mahmut.asirdizer@med.bau.edu.tr, masirdizer@yahoo.com, Phone: +90 (505) 648 19 98
ORCID ID: Yavuz Hekimoğlu: 0000-0001-9990-6045, **Melike Sari:** 0000-0002-5937-0749, **Burak Taştekin:** 0000-0002-8617-1059, **Mahmut Asirdizer:** 0000-0001-7596-5892
Received: 20.01.2022, **Accepted:** 25.02.2022

over the 7-year period between 2014 and 2020. Cases with late psychiatric consequences following RTAs were included in the study.

In Turkey, Civil courts, especially considering the problems experienced in the establishment of the causal link, have requested the creation of an independent expert committee with the participation of forensic medicine specialists, psychiatry or pediatric psychiatry specialists, neurosurgery or neurology specialists, and other medical specialists to be selected according to other health problems. The psychiatric diagnosis of all the cases in the current study was established by the psychiatry/pediatric psychiatry specialists in the independent expert committee according to DSM-5 and ICD-10 criteria. The causality was evaluated with the collaboration of psychiatrists and forensic experts, and child psychiatrists and neurosurgeons when necessary.

The cases included in this series were those diagnosed with PTE, FLS and PTSD.

The patient age used in this study was the age at the time of injury.

Statistical Analysis: Data were analyzed using SPSS for Windows version 21.0 software (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as mean and standard deviation (SD) values for continuous variables and as frequency (n) and percentage (%) for categorical variables. Fisher's Exact test was used to determine the relationship between categorical variables in crosstabs with an expected count less than 5. The level of statistical significance level was accepted as $p<0.05$.

Ethical Considerations: This study was carried out with the permission of the 2nd Clinical Research Ethics Committee Presidency of Ankara City Hospital (decision number: E2-22-1239, dated: 05.01.2022)

Results

Over the 7-year period between 2014 and 2020, a total of 774 individuals injured in traffic accidents were referred by the courts to the expert committee chaired by the authors for the determination of disability rate. Of these, 28 (3.6%) had late psychiatric outcomes, including 15 (1.9%) PTE, 8 (1.0%) PTSD, and 5 (0.6%) FLS. These 28 cases comprised 18 (64.3%) males and 10 (35.7%) females ($p>0.05$), with a mean age of 25.6±14.4 years (range, 2-53 years), and the highest number of cases (n=12; 42.9%) in the age group of 21-40 years ($p>0.05$). Of these cases, 35.7% (n=10) were pedestrians, 42.9% (n=12) were passengers and 21.4% (n=6) were drivers ($p<0.05$). There were no motorcyclists or cyclists in this series. The mean time between the date of the accident and the date of the disability examination was 27.6±19.4 months (Table-1).

Of the 15 patients with PTE, 60% (n=9) were male, with a mean age of 25.1±14.0 years. More than half of the patients (53.4%; n=8) were in the 21-40 years age group. Most were pedestrians (46.7%; n=7) and passengers (40.0%; n=6). The mean time between the date of the accident and the date of the disability examination in patients with PTE was 30.9±20.4 months (Table-1). A diagnosis was made of complex partial epilepsy in 80% (n=12), simple partial epilepsy in 13.3% (n=2), and generalized epilepsy in 6.7% (n=1). At the time of the trauma event, epilepsy findings were found in 8 cases (53.4%) on EEG, traumatic lesions were detected on magnetic resonance imaging (MRI) in 14 cases (93.3%), and skull fractures were determined on radiological examinations in 11 cases (73.3%). During the disability examinations, it was determined that all cases had epilepsy findings on EEG and 14 cases had TBI sequelae. Disability rates of the patients with PTE ranged from 5% to 90% (Table-2).

The 8 patients with PTSD comprised 62.5% (n=5) males and 37.5% (n=3) females, with a mean age of 23.0±15.0 years, half of the patients (50%; n=4) in the 1-20 years age group. More than half of the patients were passengers (62.5%; n=5). The mean time between the date of the accident and the date of the disability examination in patients with PTSD was 28.5±22.4 months (Table-1). At the time of the accident, traumatic lesions were detected on MRI in 6 cases (75.0%), skull fractures on radiological examinations in 3 cases (37.5%), and severe extracranial injuries were determined in 6 cases (75.0%). It was stated by 4 patients (50%) that relatives had died in the accidents. During the disability examinations, it was determined that only one (12.5%) of the cases had TBI sequelae. Disability rates of patients with PTSD were 40% or 60%, related to their clinical condition (Table-3).

The 5 patients with FLS, comprised 80% (n=4) males and 20% (n=1) females, with a mean age of 31.2±15.0 years, and 80% (n=4) of the patients were drivers. The mean time between the date of the accident and the date of the disability examination in patients with FLS was 16.6±2.5months (Table-1). There were generalized TBIs on the MRIs dated from the accident and in the disability examination of all patients with FLS.

Table 1. Distribution of Cases by Gender, Age Groups, and Position of Casualties during Road Traffic Accident

		PTE		PTSD		FLS		Total		P values *
		n	%	n	%	n	%	n	%	
Gender	Male	9	60.0	5	62.5	4	80.0	18	64.3	>0.05
	Female	6	40.0	3	37.5	1	20.0	10	35.7	
Age (years) (mean ± SD)		25.1±14.0		23.0±15.0		31.2±15.0		25.6±14.4		-
Age Groups (years)	1-20	5	33.3	4	50.0	2	40.0	11	39.3	>0.05
	21-40	8	53.4	3	37.5	1	20.0	12	42.9	
	≥41	2	13.3	1	12.5	2	40.0	5	18.8	
The position of casualties	Pedestrian	7	46.7	3	37.5	0	0	10	35.7	>0.05
	Passenger	6	40.0	5	62.5	1	20.0	12	42.9	
	Driver	2	13.3	0	0	4	80.0	6	21.4	
Mean time between the date of the accident and the date of the disability examination (months) ± SD		30.9±20.4		28.5±22.4		16.6±2.5		27.6±19.4		-

PTE: post-traumatic epilepsy, PTSD: post-traumatic stress disorder, FLS: frontal lobe syndrome, SD: standard deviation, TBI: traumatic brain injury. (*) P values were calculated for total

Skull fractures were detected in 60% and severe extracranial injuries in 20%. There was no history of relatives' death in the accident in any of the cases. Disability rates of patients with FLS were 25% or 40%, related to their clinical condition (Table-4).

Additionally, epilepsy was diagnosed in 4 patients and PTSD was diagnosed in 2 patients in late-stage following road traffic accidents. But these patients filed the late lawsuit after at least 19 months after the event, they could not submit medical documents indicating that they had received psychiatric treatment between the date of the accident and the date of the lawsuit, and health records of the pre-accident. As a result, causality could not be established between RTAs and late psychological consequences.

Discussion

In research covering the period 2002-2006, Christensen (7) stated that 17.3% of TBIs were associated with RTAs. In examinations of 188 patients one year after injury in RTAs, Mayou et al. (9), defined psychiatric outcomes including mood disorder, phobic travel anxiety and PTSD that would cause permanent disability in 37 (19.7%) patients. In the current study, psychiatric consequences including PTE, PTSD, and FLS were found at the rate of 3.6% in disability examinations performed on average 27.6 months after the accident. The reason for this difference can be explained by the relative decrease in the rates of serious injuries due to the high demand for disability even in minor injuries in the region where the study was conducted, and the fact that this study included later examinations.

It has been previously stated that the majority of the cases injured as a result of traffic accidents are males (75%-94%), and the cases were concentrated in young adults (3,10). Similarly, in this study, it was found that 64.3% of the patients were males and 42.9% were in the 21-40 years age group. The reason of to have a greater number of males among patients with trauma and disability applications was associated with the more involving of males in working and social life, and that men are generally more prone to violence and committing crimes (11). It was reported that of patients who developed TBI after RTAs, 30% were drivers, 23.1% were pedestrians, 17.3% were passengers, and the rest were cyclists and motorcyclists (12). In the present study, 50% of the patients were pedestrians, 42.9% were passengers and 7.1% were drivers. It is thought that this difference is related to the relative decrease in the number of lawsuits filed by the drivers who are more at fault, due to the fact that people injured in traffic accidents in disability cases sue the other party or their insurance company, thus causing the number of drivers to remain low in this series.

PTE is defined as the occurrence of one or more unprovoked late seizures in persons exposed to TBI, and PTE is one of the most well-known consequences of TBIs constituting 5-6% of all

Table 2. Characteristics of Patients Diagnosed with Posttraumatic Epilepsy

	n=15	%
Type of Seizures		
Simple Partial Epilepsy	2	13.3
Complex Partial Epilepsy	12	80.0
Generalized Epilepsy	1	6.7
Event-Dated EEG Findings		
Normal	7	46.6
Focal Epilepsy Findings	4	26.7
Generalized Epilepsy Findings	4	26.7
Event-Dated MRI Findings		
Normal	1	6.7
Focal Traumatic Lesions	10	66.6
Generalized Traumatic Lesions	4	26.7
Skull Fracture		
Yes	11	73.3
No	4	26.7
EEG Findings on the Date of Disability Examination		
Normal	0	0
Focal Epilepsy Findings	14	93.3
Generalized Epilepsy Findings	1	6.7
MRI Findings on the Date of Disability Examination		
Normal	1	6.7
Focal Traumatic Lesions	13	86.6
Generalized Traumatic Lesions	1	6.7
Prognosis and Disability Rates for this Disease*		
Patient with uncontrollable seizures of severity and frequency that completely interfere with daily activities (with 90% Disabilities)	1	6.7
Patients with seizures of frequency and number that allow daily activities to be performed with preventive measures or with the help of someone else (with 70% Disabilities)	1	6.7
Patients with frequent seizures that prevent some daily activities (with 40% Disabilities)	2	13.3
Patients with seizures that do not prevent daily activities but make it difficult to perform (with 15% Disabilities)	5	33.3
Patients who do not have seizures but are at risk of having seizures (with 5% Disabilities)	6	40.0

EEG: electroencephalogram, MRI: Magnetic resonance imaging, (*) Disability rates due to causes other than PTE are not included

epilepsy patients (13,14). Likewise, TBIs have been held responsible for 14-30% of epilepsy developing between the ages of 15-34 years (7,13). In the present study, PTE was detected in 1.9% of the cases referred for disability examination after RTAs. The distributions of PTE patients by gender and age and the position of RTA casualties did not differ from the general population in this study. Aslan et al. (15), reported that in 50% of PTE patients following head trauma, no signs of intracranial trauma were detected on MRI. In the current study series, TBIs were detected in 100% of MRIs of the patients with PTE in the examinations performed at the time of the accident, and TBI sequelae were found in 93.3% on the MRIs during the disability examinations performed after an average of 30.9 months. In addition, electroencephalogram findings were positive in all cases. While epilepsy attacks were under control with treatment in 11 patients, epilepsy could not be controlled in 4. The pathophysiology of PTE developing after TBI has

Table 3. Characteristics of Patients Diagnosed with Posttraumatic Stress Disorder

	n=8	%
Event-Dated MRI Findings		
Normal	2	25.0
Focal Traumatic Lesions	5	62.5
Generalized Traumatic Lesions	1	12.5
Skull Fracture		
Yes	3	37.5
No	5	62.5
Severe Extra-cranial injuries		
Yes	6	75.0
No	2	25.0
Death of a Relative in the Accident		
Yes	4	50.0
No	4	50.0
MRI Findings on the Date of Disability Examination		
Normal	7	87.5
Focal Traumatic Lesions	1	12.5
Generalized Traumatic Lesions	0	0
Prognosis and Disability Rates for this Disease*		
Patients whose functionality did not improve with treatment (with 60% Disabilities)	1	12.5
Patients whose functionality was partially improved with treatment (with 40% Disabilities)	7	87.5

(*) Disability rates due to causes other than PTSD are not included

not yet been fully explained, and it is thought that the pathophysiology varies according to the type of injury (16).

PTSD is a pervasive and devastating psychiatric disorder, which generally develops following the experience of major and life-threatening traumas, such as rape, physical assault, natural and industrial disasters, and RTAs. Flashbacks and dissociation symptoms of the event can often be observed in these patients. Over time, avoidance behaviors develop against reminders that recall the event (17). RTAs have been identified as one of the most important sources of traumatic stress in the modern world, and it has been reported in several studies that PTSD develops in 6.3% to 58.3% of RTA casualties (18-20). The distributions of PTSD patients by gender, age group and the position of RTA casualties did not differ from the general population in this study. Lin et al. reported that PTSD is more common in females than males following RTAs (20). Although Malt et al. (21), suggested that psychiatric outcomes after RTAs were more common at later ages. Blackhart et al. (19), stated that they did not observe any age-related difference in the development of PTSD after RTA. Blackard et al. (19), reported that there was no statistically significant relationship between the position of the injured person during the accident and the development of PTSD. Although there were no drivers with PTSD in the current study series, the low number of cases in this series prevents an accurate interpretation. While personality traits such as low socioeconomic status and low education level, previous traumas and neuroticism are defined as risk factors for PTSD, the perception of a direct threat to life, peritraumatic dissociation, severity of the physical injury, and the death of relatives during the accident have been defined as factors triggering the onset of PTSD (17,18). In the present study, 87.5% of the patients had intracranial injuries, 75% had extracranial injuries, and 37.5% had skull fractures in the first post-accident examination, and 50% of this group reported the death of a relative in the RTA.

FLS is defined as a clinical condition that manifests with significant and permanent changes in personality, social adaptation and behavior, especially as a result of damage to the prefrontal cortex due to cerebrovascular disease, tumor, infection or head trauma (22). In RTAs, the

Table 4. Characteristics of Patients Diagnosed with Frontal Lobe Syndrome

	n=5	%
Event-Dated MRI Findings		
Normal	0	0
Focal Traumatic Lesions	0	0
Generalized Traumatic Lesions	5	100.0
Skull Fracture		
Yes	3	60.0
No	2	40.0
Death of a Relative in the Accident		
Yes	0	0
No	5	100.0
Severe Extracranial injuries		
Yes	1	20.0
No	4	80.0
MRI Findings on the Date of Disability Examination		
Normal	0	0
Focal Traumatic Lesions	0	0
Generalized Traumatic Lesions	5	100.0
Prognosis and Disability Rates for this Disease*		
Patient's functionality has not improved with treatment (patient with 40% disabilities)	4	80.0
Patient's functionality has been partially improved with treatment (patient with 25% disabilities)	1	20.0

(*) Disability rates due to causes other than FLS are not included

dorsolateral and ventral frontal cortex located at the anterior pole of the frontal lobe are affected, and then counter-coup injuries occur. With the mechanical effect of trauma, structures within the skull may be damaged focally or diffusely, and extensive axonal damage may develop in patients. These injuries can cause FLS in the future (23). FLS following RTAs are often found in the literature in the form of case reports (22-27). In 6 cases in the literature, 5 were male, of which 2 were under 20 years of age, and in the 5 cases within the scope of the present study, 4 were male, and 2 were under 20 years of age (22-27). That all the cases in the current study were drivers and passengers, and severe generalized TBIs were present in all were consistent with the literature information described above (23).

In the evaluation of late psychiatric consequences following RTAs according to the civil and penal laws in force in Turkey, the first thing to do will be to establish a causal relationship between the RTAs and the late psychiatric consequences. In the establishment of the causation, the medical documents of the psychiatric treatments received by the patient, starting from the date of the event, are the most important pillars.

When causality is established, it will be evaluated whether the injury causes weakening or loss of sensory or organ function within the scope of Article 89 of the Turkish Penal Code in criminal cases and whether the determined disease is within the scope of an incurable disease (28).

In addition, compensation is awarded by the civil courts, taking into account the rate of disability in the patient determined by medical experts or health committees within the framework of compensation law.

It is defined as follows within the scope of the "Regulation on Disability Assessment for Adults" in force: "The disability rates of PTE (under appropriate and adequate treatment) are 5% in patients who do not have seizures but are at risk of having seizures, 15% in patients with seizures that do not prevent daily activities but make it difficult to perform, 20% if seizures are rare, 40% if they are frequent, in patients with seizures that prevent some daily activities, 70% in patients with seizures of frequency and number that allow daily activities to be performed with preventive measures or with the help of someone else, and 90% in patients with uncontrollable seizures of severity and frequency that completely interfere

with daily activities. The disability rates of PTSD are 0% in patients whose functionality improved completely with treatment, 40% in patients whose functionality was partially improved with treatment, and 60% in patients whose functionality did not improve with treatment. The disability rates of FLS are 0% if the patient's functionality has fully recovered with treatment, 25% if the patient's functionality has been partially improved with treatment, and 40% if the patient's functionality has not improved with treatment" (29). In the current study, regarding late psychiatric outcomes, disability rates were defined as 90% in 1 patient, 70% in 1 patient, 60% in 1 patient, 40% in 13 patients, 25 in 1 patient, 15% in 5 patients, and 5% in 6 patients.

In Turkey, according to Article 25 of the Law on Civil Courts Procedure (30), civil courts decide according to the documents submitted by the defendant and plaintiff parties, documents are requested from the defendant or the plaintiffs, and in cases where it is not presented, the decision is made according to the available evidence. In the present study, although PTE and PTSD were detected in 6 patients, it was not possible to establish a causality due to lack of medical evidence between the accident and these late psychological consequences.

Limitation of the study: Since the patients were referred to the expert committee in the late period, there were no patients diagnosed with the postconcussional syndrome or acute stress disorder.

In survivors of RTAs, temporary or permanent physical damage caused by injuries, losses in labor and economic fields, and psychological problems are important public health issues that negatively affect quality of life.

Psychiatric examinations of RTA victims should be performed without neglecting psychological problems such as PTE, FLS, postconcussional syndrome, acute stress disorder, major depression, and PTSD, which may occur in the short or long term.

Unfortunately, in many developing or underdeveloped countries, post-injury treatment is considered to consist only of wound healing, and many patients who are exposed to serious traumas such as RTAs are deprived of psychiatric support to resolve existing or developing psychological problems.

Likewise, it becomes difficult to establish causality in these patients, and it can cause the victims to lose their rights both in criminal cases and in compensation cases.

In patients who have been exposed to serious traumas such as traffic accidents, providing psychiatric support during or after medical treatment is of undeniable importance for the patient's full health. In addition, this support, which will be included in the medical records, will prevent much loss of rights of the victims in countries that do not have regular psychological examination records.

References

1. Bener A, Rahman YS, Mitra B. Incidence and severity of head and neck injuries in victims of road traffic crashes: In an economically developed country. *Int Emerg Nurs* 2009; 17: 52-59.
2. Deore PR, Mistry RR. Etiopathological study of head injury cases admitted in Urban set up: retrospective study. *Indian Journal of Basic and Applied Medical Research; Surgical Speciality Issue.* March 2019; 8: 19-22.
3. Yavuz MS, Asirdizer M, Cetin G, et al. The correlation between skull fractures and intracranial lesions due to traffic accidents. *Am J Forensic Med Pathol* 2003; 24: 339-345.
4. Pilitsis JG, Rengachary SS. Complications of head injury. *Neurological Research* 2001; 23: 227-236.
5. Hasanovic M, Salihovic D, Kurt A. Mental changes in a patient with unrecognized commotio brain after a traffic accident with trauma brain injury. *J Neurol Stroke* 2014; 1: 00005.
6. Blanchard EB, Veazey CH. Mental disorders resulting from road traffic accidents. *Current Opinion in Psychiatry* 2001; 14: 143-147.
7. Christensen J. The Epidemiology of posttraumatic epilepsy. *Semin Neurol* 2015; 35: 218-222.
8. Pickelsimer EE, Selassie AW, Gu JK, et al. A population-based outcomes study of persons hospitalized with traumatic brain injury: operations of the South Carolina Traumatic Brain Injury Follow-up Registry. *J Head Trauma Rehabil* 2006; 21: 491-504.
9. Mayou R, Bryant B, Duthie R. Psychiatric consequences of road traffic accidents. *BMJ* 1993; 307: 647-651.
10. Dunne J, Quiñones-Ossa GA, Still EG, et al. The epidemiology of traumatic brain ınjury due to traffic accidents in Latin America: A narrative review. *J Neurosci Rural Pract* 2020; 11: 287-290.
11. Hekimoglu Y, Gumus O, Kartal E, Etli Y, Demir U, Asirdizer M. The evaluation of relationship between disability rates and age and gender. Van Medical Journal 2017; 24: 173-181.
12. Majdan M, Mauritz W, Wilbacher I, et al. Traumatic brain injuries caused by traffic

accidents in five European countries: outcome and public health consequences. *Eur J Public Health* 2013; 23: 682-687.

13. Xu T, Yu X, Ou S, et al. Risk factors for posttraumatic epilepsy: A systematic review and meta-analysis. *Epilepsy Behav* 2017; 67: 1-6.
14. Rao VR, Parko KL. Clinical approach to posttraumatic epilepsy. *Semin Neurol* 2015; 35: 57-63.
15. Aslan K, Bozdemir H, Demir T. Traumatic head injury in epileptic patients and relation with prognosis. *Epilepsi* 2011; 17: 46-52.
16. Uslu Kuzudisli S, Geyik S, Geyik AM, et al. A clinical problem that should not be forgotten in head trauma: post-traumatic epilepsy. *Turkish J Neurosurgery* 2015; 25: 296-301.
17. Koren D, Arnon I, Klein E. Acute stress response and posttraumatic stress disorder in traffic accident victims: a one-year prospective, follow-up study. *Am J Psychiatry* 1999; 156: 367-373.
18. Holeva V, Tarrier N. Personality and peritraumatic dissociation in the prediction of PTSD in victims of road traffic accidents. *J Psychosom Res* 2001; 51: 687-692.
19. Blanchard EB, Hickling EJ, Taylor AE, et al. Who develops PTSD from motor vehicle accidents? *Behav Res Ther* 1996; 34: 1-10.
20. Lin W, Gong L, Xia M, et al. Prevalence of posttraumatic stress disorder among road traffic accident survivors: A PRISMA-compliant meta-analysis. *Medicine (Baltimore)* 2018; 97: e9693.
21. Malt UF, Hoivik B, Blikra G. Psychosocial consequences of road accidents. *Eur Psychiatry* 1993; 8: 227-228.
22. Cevik B, Yildirim A, Aksoy D, et al. Frontal lobe syndrome developing after head trauma: case report. *Anatolian Journal of Psychiatry* 2015; 16: 223-226.
23. Kartalci S, Unal S, Ozdemir S. Forensic aspect of the frontal lobe syndrome: a case report. *Anatolian Journal of Psychiatry* 2011; 12: 160-162.
24. Tosun DG, Essizoglu A, Kosger F, et al. Differential diagnosis of frontal lobe syndrome: a case report. *Journal of Mood Disorders (JMOOD)* 2016; 6: 74-78.
25. Sebit MB, Acuda W, Chibanda D. A case of the frontal lobe syndrome following head injury in Harare, Zimbabwe. *Cent Afr J Med* 1996; 42: 51-53.
26. Nagasawa J, Amano N, Takahashi M, et al. A case of traumatic brain injury developing frontal lobe syndrome after a long incubation period. *Psychogeriatrics* 2001; 1: 147-150.
27. Metin O, Tufan AE, Cevher Binici N, et al. Executive functions in frontal lob syndrome: a case report. *Turk Psikiyatri Derg* 2017; 28: 135-138.
28. Turkish Penal Code. Available: https://www.mevzuat.gov.tr/MevzuatMetin/1.5.5237.pdf (2004, Accessed: 02 November 2021)
29. Turkish Regulation on Disability Assessment for Adults (Official newspaper, numbered: 30692, dated: February 20, 2019). Available: https://www.resmigazete.gov.tr/eskiler/2019/02/20190220-2.htm (2019, Accessed: 02 November 2021)
30. Turkish Law on Civil Courts Procedure. https://www.mevzuat.gov.tr/MevzuatMetin/1.5.6100.pdf (2011, Accessed: 02 November 2021)