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The Medicolegal aspects of road traffic accidents (RTAs) and evidence of Tau protein as a prognostic factor

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Abstract

Background: Road traffic accidents (RTAs) are considered a fundamental public issue in Egypt and are responsible for about 12,000 deaths per year. Due to the increasing number of vehicles, changes in lifestyle, and risky attitude among the general population, RTAs are significant causes of injury and death. Tau protein is a microtubule centralized in the axons of neurons that can be released when there is neuronal damage. **Aim:** The aim is to study the medicolegal aspects of the RTAs and detect the possible role of Tau protein as a prognostic factor. **Method:** This is a cross-sectional study including 94 victims presented to EL Fayoum general hospital, El Fayoum city, Egypt with RTA from June 2021 to December 2021. Sociodemographic data, information about the accident and the outcomes of victims were recorded. A blood sample was taken and level of serum tau protein was measured for each victim. **Results:** The majority of victims were males within the age range of 15-30 years. Collision types of accidents and four-wheel vehicles were predominant. Most of the victims were vehicle passengers and pedestrians, and most of the injuries were limb and head injuries. Tau protein levels were high in head injuries and increased with the severity of the injury and were higher in non survivors than in others. **Conclusion:** RTAs pose a significant threat to population safety in Egypt. Tau protein level significantly correlates with the seriousness of head injury and death outcomes. **Recommendations:** The study recommends special permits for traffic rules, helmet use and regular road maintenance, and using of Tau protein as a marker for early brain damage in RTAs victims.

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Key words Pedestrians; Road traffic accidents; Tau protein; Victims

Background

Road traffic accidents (RTAs) are fatal or nonfatal injuries caused by a collision on a public road engaging at least one moving vehicle with another vehicle or pedestrians. They are a public health issue that costs a lot of money to individuals, families, communities, and countries (Abegaz and Gebremedhin, 2019).

There are 1.35 million fatalities and 50 million injuries annually, road traffic accidents were ranked as the eighth leading cause of death by the World Health Organization (WHO) in 2016. As stated by statistics, Egypt was reported to be one of the countries with the highest RTAs rates in Africa and Middle East (WHO, 2018).

As reported by Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS), there were 8,480 fewer fatal crashes in 2018 than were in 2017, which were 11,098. Road traffic accidents (RTAs) claim the lives of about 12,000 people annually, with a death rate of 42 per 100,000 people (CAPMAS, 2019).

Human factors like speeding, driving under the effect of alcoholic beverages or drugs, not wearing a seat belt or using a child safety seat are among the risk factors for traffic accidents that have been identified by the WHO. A further risk factor is preoccupied driving by using a cell phone while driving (Sanyang et al., 2017).

The high rate of RTAs in Egypt could be related to a variety of elements, comprising poor infrastructure and poor route quality. Additionally, regular road maintenance defects and overcrowding with trucks, automobiles, motorbikes, and crosswalks may be contributing concerns (Fouda et al., 2017).

Traumatic brain injury (TBI) is considered a serious health consequence frequently brought on by physical trauma, such as car accidents. Brain damage develops quickly after a TBI, causing several number of symptoms like brain edema, concussions, and even unconsciousness. In addition, patients may experience long-term impairments in their ability to think clearly, behave appropriately, or feel emotions (Chiu et al., 2007).

The microtubule-associated Tau protein, a novel serum marker, is mainly found in the axonal compartment of neurons. Tau generates axonal microtubule bundles by interacting with axonal microtubules and binding to them. When there is neuronal injury, these bundles can become crucial structural components of the axonal cytoskeleton that can be released (Arendt et al., 2016).

Objectives

The aim is to study the medicolegal aspects of the RTAs and detect the possible role of Tau protein as a prognostic factor for neurological damage.

Methods:

The current study is a cross-sectional study performed at EL Fayoum General Hospital in El Fayoum city, Egypt from June 2021 to December 2021.

Informed consent and adherence to all the regulations for medical research involving human subjects which were required by ethical committee of the faculty of medicine- Fayoum University fulfilled.

The selected patients were of both sex and in different ages with a history of Road Traffic Accidents (RTAs).

Exclusion criteria;

Patients arrived at the hospital after death, patients passed away within eight hours of the accident, and any patients had injuries other than RTA.
In each case the following data was recorded;

A- Sociodemographic data:

It included; Age, gender, residence, and season at which the RTA happened.

B- Information about the accident: It included;
- Delay time since accident till reaching the hospital.
- Time of injury; day or night.
- Type of Road; highway road, agricultural road or residential and usual town road.
- Type of accident; collision or non-collision.
- Type of vehicle; four wheels or motorcycle.
- Type of the victim; driver, passenger, pedestrian or cyclist.
- Distribution of injuries; head & neck, chest, abdomen, limbs, and spines.
- Glasgow Coma Scale (GCS) at the time of presentation.

C- Patient's outcome:
- Survived cases.
- Non-survived cases.
- Referred cases.

D- Tau protein level:

Venous samples were collected from every victim on presentation to the hospital; samples were centrifuged at 3000 rpm for approximately 20 minutes and then stored at -80°C until all samples were analyzed simultaneously.

Laboratory measurement of Tau protein was done by Enzyme- Linked Immune-sorbent Assay (ELISA) technique using a commercial quantitative Sandwich ELISA Kit from MyBioSource Company following the industrialist instructions. The zone of detection of the kit was 15.6pg/ml-500pg/ml.

Statistical analysis:

Data was collected for statistical analysis using SPSS version 28 in windows 10. Quantitative data are described as Mean ± standard deviation (SD). ANOVA statistical analysis was used to compare between the groups. All qualitative data were expressed as frequencies (number of cases) and percentages. Qualitative variables were compared using the Chi-square ($\chi 2$) test. Pearson correlation was used to evaluate the strength of association between two quantitative variables.

Results

The socio-demographic criteria of the studied cases are displayed in table (1). It was distributed as follows; 41.5% of patients were between 15-30 years of age, and other age groups (30-45, >45, <15) showed 22.3%, 21.3% and 14.9% of patients, respectively. Most of the victims were males with a percentage of 77.7%. Patients from rural areas were 51% and 48.9% from urban areas. Most of the accidents occurred during day time (67%) and in the summer months (62.8%). The patients presented to the hospital with a mean delay time of 2.06 ± .801 hours.

Table (2) showed that 43.6% of all accidents occurred on highway roads, 34% on agricultural roads and 22.3% in residents or towns. Collision type of accident was predominant with the percentage of 59.6% and 73.4% of incidents involved four-wheelers, which made up the majority of the total. Majority of victims were vehicle passengers and pedestrians with percentages of 34% and 31.9% respectively while cyclists and drivers were 19.1% and 14.9% respectively. Majority of injuries were limb and head injuries as 37.2% and 31.9% respectively, chest and abdominal injuries were equal with a percentage of 10.6% each and spine injuries were 9.6%. Survival was the outcome for 61.6% of the studied patients, 20.2% died and referral to other hospitals was done for 18.1% of studied patients.

Increased levels of Tau protein were discovered in head injuries compared to other groups, demonstrating a considerable association between Tau protein and the distribution of injuries in the patients under study (Table 3). Additionally, there was a substantial inverse relationship between GCS and injury types, with head injuries having lower GCS scores than other categories.

Table (4) demonstrated a considerable relationship between Tau protein levels and collision-related accidents as well as a strong association between Tau protein levels and death outcomes as the levels of Tau protein are significantly increased in fatal victims than in survivors and patients who were referred.

Table (5) showed a highly significant negative correlation between GCS and outcomes, as it was 6.74±1.24 in non-survived, 11.93±1.705 in survived and 9.88±1.90 in the referred group.

Table (6) reported a significant correlation between outcomes of victims and distribution of injuries as head injuries were associated with a higher mortality rate (60%) compared to 23.3% who survived and 16.7% referred. Limb injuries are associated with 100% survival with no mortality or referral. Spine injuries associated with no mortality, 11% survival and most cases (89%) were referred to another hospital. Chest injuries are associated with 80% survival and equal percentage for death and referral (10% each).

Abdominal injuries were associated w0ith no mortality, 70% survival and 30% referral.

There wasn't any significant correlation between outcomes and type of victim, type of accident or type of road.

Table (7) showed a strong negative correlation between Tau protein and GCS, where any increase in tau protein level is accompanied by a decrease in GCS scores and vice versa.

Table (1): Distribution of Sociodemographic characters of Road traffic accident (RTA) in the studied patients:

		Number	(%)
Age	> 15 Years	14	14.9%
	16-30 Years	39	41.5%
	31-45 Years	21	22.3%
	<46 Years	20	21.3%
Gender	Male	73	77.7%
	Female	21	22.3%
Residence	Urban	46	48.9%
	Rural	48	51.1%
Time of injury	Day	63	67%
	Night	31	33%
Season	Summer	59	62.8%
	Autumn	20	21.2%
	Winter	15	16%
Delay time (hours)	**Mean**	**SD**	
	2.06	.801	

SD= Standard deviation

Table (2): Distribution of different variables of Road traffic accident (RTA) in the studied patients:

		Number	(%)
Type of Road	High Way Road	41	43.6%
	Agricultural Road	32	34%
	Resident or Town	21	22.3%
Type of Accident	Collision	56	59.6%
	NON-collision	38	40.4%
Type of Vehicle	Four Wheel	69	73.4%
	Motor Cycle	25	26.6%
Type of victim	Driver	14	14.9%
	Passenger	32	34%
	Pedestrian	30	31.9%
	Cyclists	18	19.1%
Distribution of Injuries	Head	30	31.9%
	Chest	10	10.6%
	Abdomen	10	10.6%
	Limbs	35	37.2%
	Spine	9	9.6%
Outcome	Survived	58	61.7%
	Non-Survived	19	20.2%
	Referral	17	18.1%

Table (3): Relation between distribution of injures with Tau protein level and Glasgow coma scale (GCS) in the studied Road traffic accident (RTA) patients using ANOVA statistical analysis:

Variables	**Tau protein (pg/ml)**		**GCS**	
Distribution of injures	**Mean± SD**	**Std. Error of Mean**	**Mean± SD**	**Std. Error of Mean**
Head	200.77± 65.405	11.941	7.43± 1.478	.270
Chest	35.00± 7.134	2.256	10.10± 1.370	.433
Abdomen	29.20± 8.149	2.577	11.40± .966	.306
Limbs	26.37± 6.809	1.151	12.97± 1.043	.176
Spine	76.33± 11.916	3.972	10.67± 1.323	.441
F	100.664		80.603	
P- value	< 0.0001 **HS**		< 0.0001 **HS**	

P: < 0.0001 highly significant (HS), SD= Standard deviation, F= ANOVA test of analysis

Table (4): Relation of Tau protein level with outcomes and type of accident in the studied Road traffic accident (RTA) patients:

Variables		Tau protein (pg/ml)		T	P- value
		Mean± SD	Std. Error of Mean		
Type of accident	Collision **(N=56)**	106.38± 95.43	12.753	2.734	< 0.05 **S**
	Non-collision **(N=38)**	61.00± 65.47	10.621		
Outcomes				F	
	Survived **(N=58)**	43.90± 41.016	5.386	71.986	< 0.0001 **HS**
	Non-Survived **(N=19)**	217.63± 81.54	18.707		
	Referral **(N=17)**	93.76± 60.15	14.590		

N= number of cases, P: < 0.0001 highly significant (HS), P: < 0.05 significant difference (S), SD= Standard deviation, t= Student T- test was done, F= ANOVA test was done

Table (5): Relation of outcomes with Glasgow coma scale (GCS) in the studied Road traffic accident (RTA) patients using ANOVA statistical analysis:

Variables		Glasgow coma scale (GCS)		F	P- value
		Mean± SD	Std. Error of Mean		
Outcomes	Survived **(N=58)**	11.93±1.705	.224	71.430	< 0.0001 **HS**
	Non-Survived **(N=19)**	6.74±1.24	.285		
	Referral **(N=17)**	9.88±1.90	.461		

N= number of cases, P: < 0.0001 highly significant (HS), SD= Standard deviation, F= ANOVA test was done

Table (6): Relation of outcomes with some variables in the studied Road traffic accident (RTA) patients using Chai-square statistical analysis:

	Outcomes						
Variables	Survived (N=58)		Non Survived (N=19)		Referral (N=17)		P- value
	N	%	N	%	N	%	
Distribution of injuries							< 0.0001 **HS**
Head	7	23.3%	18	60.0%	5	16.7%	
Chest	8	80%	1	10%	1	10%	
Abdomen	7	70%	0		3	30%	
Limbs	35	100%	0		0		
Spine	1	11%	0		8	89%	
Type of victim							> 0.05 **NS**
Driver	6	42.9%	6	42.9%	2	14.3%	
Passenger	21	65.6%	4	12.5%	7	21.9%	
Pedestrian	23	76.7%	3	10 %	4	13.3%	
Cyclist	8	44.4%	6	33.3%	4	22.2%	
Type of Accident							> 0.05 **NS**
Collision	31	55.4%	15	26.8%	10	17.9%	
Non-collision	27	71.1%	4	10.5%	7	18.4%	
Type of Road							> 0.05 **NS**
High-Way Road	24	52.2%	13	28.3%	9	19.6%	
Agricultural Road	19	70.4%	5	18.5%	3	11.1%	
Resident or Town	15	71.4%	1	4.8%	5	23.8%	

N= number of cases, P: > 0.05 insignificant difference (NS), P: < 0.0001 highly significant (HS)

Table (7): Pearson Correlation for the Relation between Tau protein level and Glasgow coma scale (GCS) in the studied Road traffic accident (RTA) patients:

Correlations			
		Tau Protein	GCS
Tau Protein	Pearson Correlation	1	-.879**
	P value		<.001
	Number	94	94
GCS	Pearson Correlation	-.879**	1
	P value	<.001	
	Number	94	94

*****. Correlation is significant at p: < 0.001***

Discussion

The present study revealed that the preponderance of the patients (41.5%) in the current study was between the ages of 15 and 30 years, and Singh et al., (2014) reported similar findings. This might be attributed to a lack of traffic awareness and driving skills, which get better with more years of experience.

Males made up the majority of the victims in our study, which was consistent with Forouzanfar et al., (2014) and El Bakash et al., (2016). On the other hand, Yadukul, (2013) found that female victims were more than males. Male predominance in our study as, men applied daily for work and movement from one place to another more than women, in addition to being more commonly employed as drivers.

The majority of the accidents happened during the day. Singh et al., (2011) noted a similar outcome. However, Neeraj et al., (2012) found that the majority of accidents happened at night. The daytime predominance might be attributed to higher volume of traffic that occurs during the day as people drive to work and kids leave for school so the higher chance of accident involvement. However, fewer nighttime activities and travel result in a significantly lower number of accidents at night.

Regarding the type of roads, the current study reported that most accidents occurred in highway roads followed by agricultural roads with less percentage (22.3%) occurring on town. This was disagreed with Ansari et al., (2012) who found that majority of accidents occurred inside cities. This can be explained that all cities in EL-Fayoum government have overcrowded streets leading to a slow speed of driving decreasing the rate and severity of accidents in contrast to high ways or agricultural roads.

Regarding the type of accidents, most accidents in the current study were collision type, the same results observed by Mishra et al., (2010). The four-wheel vehicles were responsible for the majority of accidents rather than motorcycles, which is similar to the results of Mina et el., (2013) and against Labinjo et al., (2009) who found that the majority of accidents were due to motorcycles. This can be explained by that most of accidents included in the study occurred on highway roads which have a higher percentage of four-wheel vehicles than motorcycles.

Vehicle passengers and drivers represent the majority of victims which in agreement with Chalya et al., (2010) and in contrast to Ogendi et al., (2013) who reported that the pedestrians accounted for most of victims. This can be explained by that highway roads have a little number of pedestrians comparing to roads inside towns.

Regarding the distribution of injuries, most of the injuries were in the limbs followed by the head then chest, abdomen and finally the spine; these results were in agreement with Shamim, (2017) study in India which revealed that the most common RTA injuries were in lower extremities, followed by the head and neck, multiple injuries, upper extremities, abdomen, pelvis, and perineum, and finally the chest.

As regard the outcomes, most victims were survived and about one-fifth of the victims died which was consistent with Zaki et al., (2020) and Hassan et al., (2022).

Because clinical and radiologic evaluations of the magnitude of a head injury possess substantial limits, there has been a lot of interest in creating and employing biochemical tests to detect the degree of brain damage and enhance outcomes prediction (Raabe et al., 1998).

Increased levels of tau protein were reported in head injuries than in other groups in the current study. This was consistent with Ost et al., (2006) who discovered that Tau protein level was respectably increased in TBI than in control group. It is also in agreement with Shaw et al., (2002) who examined blood tau protein levels in 28 people with TBI and found that serum tau protein had a sensitivity of 53% and a specificity of 91% for detecting injury. This can be explained by the fact that tau protein forming crucial structural components in the axonal cytoskeleton that can be released when there is neuronal damage (Arendt et al., 2016).

The current study reported a negative correlation between Tau protein level and GCS score as severe injury with less GCS score was associated with higher Tau protein levels, which is in agreement with Kavalci et al., (2007) who found that GCS score was negatively related to serum tau protein level.

The current study revealed that there was a considerable correlation between the Tau protein level and the outcomes of cases, as its levels were higher in dead victims than survivors, which supported by results of Jagoda et al., (2002). Similarly, Ost et al., (2006) discovered that tau protein could be used as a predictive of mortality and outcomes. The mean levels of tau protein in the blood of TBI cases with unpleasant outcomes were higher than those who had amended long-term revival after trauma, according to Liliang et al,. (2010).

Bulut et al., (2006) and Bazarian et al., (2006) discovered that the diagnostic opportunity of tau protein for categorizing patients with a mild brain injury at risk for supplementary deterioration is not as widely understood. They advise conducting additional future research to validate the role of tau as a justified serum biomarker in TBI. On the other hand, Thelin et al., (2019) demonstrated that tau protein provided a highly significant predictor of outcome and mortality following TBI. Also, Hossain et al., (2020) revealed that the results of patients with mild TBI were substantially connected with the amounts of tau protein present at the time of admission. Therefore, tau protein may be able to predict the sequelae of mild TBI.

On the contrary, Ma et al., (2008) concluded that tau is unpleasant predictor of post-concussion symptoms after mild TBI, irrespective of the outcome of a head CT.

According to Kavalci et al., (2007), there is no connection between the amount of serum tau protein

and the type of trauma, the existence of other wounds, age, or gender. Similarly, the current study revealed no discernible relationship between the amount of serum tau protein and the mentioned variables.

Conclusion

Road traffic accidents (RTAs) more common in middle age men and most of the accidents occur in the day time and in the summer months. Most of the accidents are collision type with four-wheel vehicles. The majority of victims are vehicle passengers and pedestrians, majority of injuries are limb and head injuries. Tau protein levels are higher in victims with head injuries and in non-survived, there is a worthy correlation between Tau protein and GCS and death outcome. Tau protein level at the time of presentation may play a role as a marker for neurological damage and outcome.

Recommendations

The current study strongly recommends general public education programs on road safety, special permits for traffic rules, helmet use and regular road maintenance. The study also recommends the demonstration of Tau protein concentrations as a marker for early brain damage in RTAs victims.

References

Abegaz T and Gebremedhin S (2019): Magnitude of road traffic accident related injuries and fatalities in Ethiopia. PloS one, 14(1): e0202240.

Ansari-Moghaddam A, Martiniuk AL, Mohammadi M, et al., (2012) The Pattern of Injury and Poisoning in South East Iran. BMC International Health and Human Rights; 12:17.

Arendt T, Stieler JT, Holzer M (2016): Tau and tauopathies. Brain Res Bull;126:238–92.

Bazarian JJ, Zemlan FP, Mookerjee S et al., (2006): Serum S-100B and cleaved tau are poor predictors of long-term outcome after mild traumatic brain injury. Brain Inj.;20: 759-765.

Bulut M, Koksal O, Dogan S et al., (2006): Tau protein as a serum marker of brain damage in mild traumatic brain injury: preliminary results. Advances in therapy, 23 (1), 12-22.

CAPMAS (2019): Car Accidents in Egypt Down by 23.6 % in 2018 Available at: https://egyptianstreets.com/2019/04/14/capmas-car-accidents-in-egypt-down-by-23-6-in-2018/

Chalya PL, Mabula JB, Ngayomela IH et al., (2010): Motorcycle injuries as an emerging public health problem in Mwanza City, north-western Tanzania. Tanzan J Health Res.; 12:214-221.

Chiu WT, Huang SJ, Tsai SH et al., (2007): The impact of time, legislation, and geography on the epidemiology of traumatic brain injury. J Clin Neurosci;14:930–935.

El Bakash O, Kabbash A, Gohary M, et al., (2016): Evaluation of the Patterns of Injuries in Road Traffic Accidents in Great Cairo, Egypt. The Egyptian Journal of Forensic Sciences and Applied Toxicology; 16: 79-95.

Forouzanfar MH, Sepanlou SG, Shahraz S et al., (2014): Evaluating Causes of Death and Morbidity in Iran, Global Burden of Diseases, Injuries, and Risk Factors Study 2010. Archives of Iran Medicine; 17:304-320.

Fouda E, Youssef M, Emile S et al., (2017): Pattern of major injuries after motorcycle accidents in Egypt: The Mansoura Emergency Hospital experience. Trauma, 19(1):39 45.

Hassan R, Abdel-Rahim A, and Hadhoud R (2022): Study of Road Traffic Accidents Cases admitted to Ain Shams University Hospitals during Years 2017 and 2018. Ain Shams Journal of Forensic Medicine and Clinical Toxicology;38: 1-10

Hossain I, Mohammadian M, Takala R S et al., (2020): Admission levels of total tau and β-amyloid isoforms 1–40 and 1–42 in predicting the outcome of mild traumatic brain injury. Frontiers in neurology, 11, 325.

Jagoda AS, Cantrill SV, Wears RL et al., (2002): Clinical policy: neuroimaging and decision-making in adult mild traumatic brain injury in the acute setting. Ann Emerg Med;40:231- 49.

Kavalci C, Pekdemir M, Durukan, P et al., (2007): The value of serum tau protein for the diagnosis of intracranial injury in minor head trauma. The American journal of emergency medicine, 25(4), 391-395.

Labinjo M, Juillard C and Kobusingye O (2009): The burden of road traffic injuries in Nigeria: results of a population- based survey. Injury Prevention; 15[3]: 157- 162

Liliang PC, Liang CL, Weng HC et al., (2010): Tau proteins in serum predict outcome after severe traumatic brain injury. J Surg Res;160: 302-307.

Ma M, Lindsell CJ, Rosenberry CM, Shaw GJ and Zemlan FP (2008): Serum cleaved tau does not predict postconcussion syndrome after mild traumatic brain injury. Am. J. Emerg. Med. 26,763–768.

Mina S, Verma R, Singh YPB, and Hasan SU. (2013): Road rage: prevalence pattern and web based survey feasibility. Hind J Psychiatry;14(2):08.

Mishra B, Sinha ND, Sukhla SK and Sinha AK (2010): Epidemiological Study of Road Traffic Accident Cases from Western Nepal. Indian Journal of Community Medicine;35 (1): 115-121

Neeraj K, Sanjay G, Atul V and Athavale A (2012): Epidemiological Study of Road Traffic Accident Cases Attending Tertiary Care Hospital in Bhopal, Madhya Pradesh. National Journal of Community Medicine; 3, 395-399.

Ogendi J, Odero W, Mitullah W, and Khayesi M (2013): Pattern of Pedestrian Injuries in the City of Nairobi: Implications for Urban Safety Planning. Journal of Urban Health: Bulletin of the New York Academy of Medicine; 90[5].

Ost M, Nylen K, Csajbok L et al., (2006): Initial CSF total tau correlates with 1-year outcome in patients with traumatic brain injury. Neurology; 67:1600Y1604.

Raabe A, Grolms C, Keller M et al., (1998): Correlation of CT findings and serum brain damage markers following severe head injury. Acta Neurochir (Wien);140:787-792.

Sanyang E, Peek Asa C, Bass P et al., (2017): Risk Factors for Road Traffic Injuries among Different Road Users in the Gambia. Journal of Environmental and Public Health: 8612953.

Singh A, Bhardwaj A, Pathak R, and Ahluwalia SK (2011): An Epidemiological Study of Road Traffic Accident Cases At A Tertiary Care Hospital In Rural Haryana. Indian Journal of Community Health;23 (2):53-55.

Singh R, Singh HK, Gupta S and Kumar Y (2014): Pattern, Severity and Circumtances of Injuries Sustained in Road Traffic Accidents: A Tertiary Care Hospital- Based Study. Indian Journal of Community Medicine : Official Publication of Indian Association of Preventive & Social Medicine, 39, 30.

Shamim M, (2017): Pattern of injuries from road traffic accidents presented at a rural teaching institution of Karachi. Indian journal of surgery; 79(4): 332-337.

Shaw GJ, Jauch EC, and Zemlan FP (2002): Serum cleaved tau protein and clinical outcome in adult patients with closed head injury. Ann Emerg Med.; 39:254-257.

Thelin E, Al Nimer F, Frostell et al., (2019): A serum protein biomarker panel improves outcome prediction in human traumatic brain injury. Journal of neurotrauma;36 (20), 2850-2862.

WHO (2018): Global status report on road safety 2018. Available at: https://www.who.int/news room/fact sheets/detail/road traffic injuries. accessed at 20 March 2021.

Yadukul S, (2013): A Study of Preventive Risk Factors in Fatal Road Traffic Injuries with Special Emphasis to Helmets and Seatbelts. Bangalore Medical College and Research Institute Bangaluru. M.D. in Forensic medicine. Pp: 68-103

Zaki AR, Ghaleb S, El-Galad G and Farag GM (2020): Retrospective study of patterns of injuries and permanent infirmity in road traffic accidents between 2010- 2014 in Egypt. International Journal of Medical Toxicology & Legal Medicine; 23 (3-4)322-332.

العنوان العربي غير موجود

عمرو عبدالغني صالح و أحمد صلاح السيد [١]

الملخص العربي

المقدمة: تعتبر حوادث الطرق قضية عامة رئيسية في مصر وتتسبب في حوالي ١٢٠٠٠ حالة وفاة سنويًا. و تعد من الأسباب الرئيسية للإصابات والوفيات بسبب العدد المتزايد من المركبات ، وتغييرات نمط الحياة ، والسلوكيات المحفوفة بالمخاطر في عموم السكان. بروتين تاو عبارة عن أنبوب دقيق موضعي في محاور الخلايا العصبية ، والذي ينطلق عند حدوث تلف في الخلايا العصبية.

الهدف من البحث: دراسة الجوانب الطبية الشرعية لحوادث الطرق واكتشاف الدور المحتمل لبروتين تاو كمؤشر على تلف الخلايا العصبية للمخ.

طريقة البحث: الدراسة الحالية عبارة عن دراسة مقطعية شملت على ٩٤ ضحية لحوادث الطرق قدمت إلى مستشفى الفيوم العام بمدينة الفيوم بمصر خلال الفترة من يونيو ٢٠٢١ إلى ديسمبر ٢٠٢١. تم تسجيل بيانات ديموغرافية للضحايا ومعلومات حول الحادث ونتائجه وكذلك تم أخذ عينة دم وقياس مستوى بروتين تاو لكل ضحية.

النتائج: أشارت نتائج الدراسة الى أن معظم الضحايا كانوا من الذكور وأعمارهم تتراوح بين (١٥-٣٠) سنة. كان الاصطدام بالمركبات ذات الدفع الرباعي هو الأكثر شيوعا. وكان معظم الضحايا من ركاب السيارات والمشاة وكانت معظم الإصابات في الأطراف والرأس. كانت مستويات بروتين تاو عالية في إصابة الرأس وتزداد مع شدة الإصابة وكانت أعلى في المتوفين مقارنة بالناجين.

الخلاصة: خلصت الدراسة الى أن مستوى بروتين تاو يتناسب بشكل كبير مع شدة إصابة الرأس ونتائج الوفاة و لذك يمكن استخدامه كمؤشر على شدة الإصابة.

التوصيات: توصي الدراسة باتباع قواعد المرور واستخدام الخوذة وصيانة الطرق. و توصي أيضًا باستخدام بروتين تاو كعلامة مبكرة لتلف الدماغ في ضحايا حوادث الطرق.

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