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OCCURRENCE OF SEVERE AND MODERATE TRAUMATIC BRAIN INJURY IN PATIENTS ATTENDED IN A BRAZILIAN TEACHING HOSPITAL

Epidemiology and dosage of alcoholemy

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Abstract – This study aimed at observing aspects of epidemiology in order to investigate the use of alcohol in patients older than 18 with severe and moderate traumatic brain injury, which were attended in the Clinics Hospital of the University of Uberlândia. Positive alcoholemy was found in 39.3% of the patients. Of the 33 positive exams alcoholemy was found higher than 60 mg/dL in 28 (84.6%). There was not significant relation between alcoholemy levels and trauma severity. The major prevalence occurred on Saturdays nights. The most frequent types of external causes were transportation accidents (64.74) followed by accidental falls (17.27%) and physical aggression (16.55%). 93.9% of the patients with positive alcoholemy were men aged 20-29. 24.2% of the ones with positive alcoholemy died yet no significant difference was found in the study of the ones with negative alcoholemy (n=51) (p=0.93); RR= 0.9; IC95%=0.40-2.08.

KEY WORDS: alcohol, traumatic brain injury.

Resumo – Os objetivos deste estudo são investigar aspectos da epidemiologia e identificar o uso de álcool em pacientes com traumatismo cranioencefálico grave e moderado em maiores de 18 anos atendidos no Hospital de Clínicas da Universidade Federal de Uberlândia. Encontrou-se alcoolemia positiva em 39,3% dos pacientes. Nos 33 exames positivos, foram observadas alcoolemias superiores a 60 mg/dL em 28 (84,6%). Não houve relação significativa entre os níveis de alcoolemia e a gravidade do trauma. Maior prevalência ocorreu aos sábados, no período noturno. Os tipos de causa externa mais frequÐentes foram os acidentes de transporte (64,74%), seguidos de quedas acidentais (17,27%) e de agressões (16,55%). Dos pacientes com alcoolemia positiva, 93,9% eram do sexo masculino, com maior prevalência dos 20 aos 29 anos. Dentre aqueles com alcoolemia positiva, 24,2% vieram a falecer, não havendo diferença significante com os pacientes com alcoolemia negativa (n=51) (p=0,93); RR= 0,9; IC95%=0,40–2,08.

PALAVRAS-CHAVE: álcool, traumatismo cranioencefálico.

Traumatic brain injury (TBI) is responsible for deaths, functional, psychological, and physiological permanent sequels[1]. It is an important problem of public health in developed countries and those in development, and knowing the characteristics of the patients who suffer TBI is essential for a proper planning when of the attendance[2]. The use of alcohol is frequently a preceding factor that causes brain injuries[3,4]. This study tries to analyze the epidemiological profile of severe and moderate TBI in patients attended in the Emergency Room of the Clinics Hospital of the University of Uberlândia (CH-UFU), Minas Gerais. We tried to identify determinants which are susceptible to the modification of the risk factors, besides advising these patients for treatment and orientation in a recovery pro-

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gram after hospital liberation[5-8], once three quarters of a group of patients with acute alcoholic intoxication show evidences of chronic use.

In many studies interviews have been done with the trauma patient in order to clinically identify if he/she has drunken alcohol beverages. Some of the tests are Cage, MAST (Michigan Alcoholism Screening Test) and AUDIT (Alcohol use disorders identification test), without alcoholemy dosage. TWEAK and The History of trauma scale tests try to associate alcoholic blood levels with the clinical status of possible drunkenness[9,10]. The criteria for positive acute intoxication vary according to literature. Although the majority agrees on a 100 mg/dL blood level as a positive level, some authors consider a 1 mg/dL alcoholemy as being positive[3]. Alcohol blood concentration isn't frequently measured in American countries, and most of them don't have a pre-determination of the limitrophy levels to consider the individual as being legally intoxicated[11].

In Brazil, the level above 60 mg/dL doesn't allow drivers to drive their vehicles as the possibility of a fatal accident with vehicles is doubled for each increase of 2 mg/dL in the driver's alcoholemy[12]. The level of relation between alcoholemy and the injury depends on the information font used, and significant differences are found when information comes from the police department, on duty physicians or sheriffs[5]. These differences can also occur if the intoxication is based on behavior disturbances, blood or respiratory drug dosage[13,14]. When of the analyze of patients with brain injury, many authors verified the presence of alcohol in the blood stream in almost 50% of the patients[5,15-18], being the majority men aged 25-32 years old[10]. Positive alcoholemy is more frequent in patients that are victims of intentional injuries such as physical aggression, and when related to seasonality it is more common on weekends, holidays and at night[19,20]. A bibliographical revision in Brazil found that there aren't any studies that specifically consider alcoholemy in patients that are victims of TBI.

The objectives of this study are: a) to investigate aspects of this epidemiology and; b) to identify the use of alcohol in patients attended in a Brazilian university hospital who had severe and moderate TBI.

METHOD

In order to know the epidemiology a prospective study was carried out with 139 patients having severe and moderate TBI, age ≥18 years old, which were attended in the Emergency Room of the CH/UFU, in Uberlândia-MG (500,488 inhabitants), from January-December 2002.

We considered as having TBI the trauma patients that would match the definition proposed by Jennett[21] and that were considered as having severe and moderate TBI, respectively those patients who had a score between 3-8 and 9-13 points in the Glasgow Coma Scale (GCS). Patients with mild TBI were also included (GCS 14 or 15) that is, the ones that in the first 24 hours of internship had the consciousness level decreased for values ≤ 13 in the GCS.

Data were collected in interviews with their families, helpers or witnesses being used a protocol containing, among others, information related to the patient identification, day, time and type of trauma, means of transportation for the hospital, activity developed during the event and socioeconomic class. Data were later stored in a Microsoft Access® data bank with an interface developed in Delphi 6.0.

For alcoholemy dosage a sub-group of 56 patients was formed. They were attended in sequence with GCS between 3-13 points (TBI severe and moderate) for a period of 4 consecutive months, which were conveniently chosen from August-November 2002. A second sub-group with 28 patients with GCS of 14 and 15 (mild TBI) was formed for comparison, also in a sequential way. Samples were collected during 2 non-consecutive weeks chosen by random (by simple raffle) in the period of collection of the first sub-group.

A term of consent was explained and applied. The protocol was approved by the Committee of Ethics in Research of UFU.

Laboratory test

Using Axsym® System we used the TDx®/TDxFLx® Ethanol test for total blood ethanol quantitative determination, considering positive alcoholemy values higher than 10 mg/dL. Information was analyzed without the patient identification.

Statistical methods

For comparison between proportions qui-square method and Fisher's scale were used as appropriate. Risk reasons were also calculated with reliability intervals of 95%. For statistic calculations software EpiInfo 6.04d was used (Centers for Disease Control and Prevention, Atlanta, GA, EUA).

RESULTS

The age of the 84 patients evaluated on alcoholemy varied between 18-85 years old, average of 40.6 and 34.8 years old, respectively for severe, moderate and mild TBI. 89.2% of the mild TBI and 76.8% of the severe and moderate TBI were in an age range of 18-49 years old. (Table 1).

There was no significant difference in the comparison between gender and average of age related to the trauma severity. The most frequent types of external causes were transportation accidents (64.74%), followed by accidental falls (17.27%) and physical aggressions (16.55%).

Regarding alcoholemy there was positivity in 39.3% (levels ≥100 mg/dL). Of the 33 detected positive exams, 4 (12.1%) had alcoholemy between 10 mg/dL and 50 mg/dL; 4 (12.1%) between 50 mg/dL and 100 mg/dL and 25 (75.6% >100 mg/dL. Alcoholemy higher than 60 mg/dL were observed in 28 (84.6%) patients.

Table 1. Distribution according to gender and type of external cause. Patients with severe, moderate and mild TBI (n=84), selected for blood collection for alcohol dosage; age ≥18 years old; patients attended in the ER of CH of UFU.

Variable	Severe and moderate		Mild	
	N	%	N	%
Gender				
M	49	87.5	19	67.9
F	7	12.5	9	32.1
Type of external cause				
Transportation accident	35	62.5	15	53.6
Physical agression	14	25.0	8	28.5
Falls	6	10.7	5	17.8
Self-provoked	1	1.0	—	—

Table 2. Relationship between the alcoholemy levels and trauma severity in patients with TBI attended in the ER of CH of UFU.

Alcoholemy level (mg/dL)	Severe and moderate (N=22)		Mild (N=11)	
	N	%	N	%
10–49	2	50	2	50
50–99	3	75	1	25
≥100	17	68	8	32
≥60	19	68	9	32

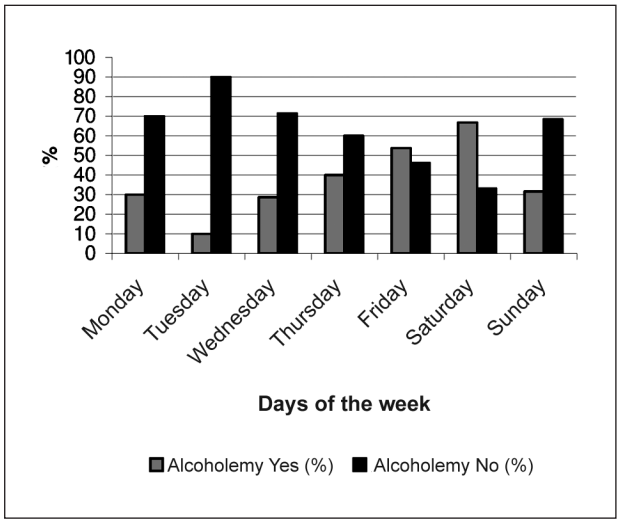

Fig 1. Relationship of patients with positive alcoholemy with the number of patients attended in each day of the week (n=84) with TBI diagnosis in the ER of the CH of UFU.

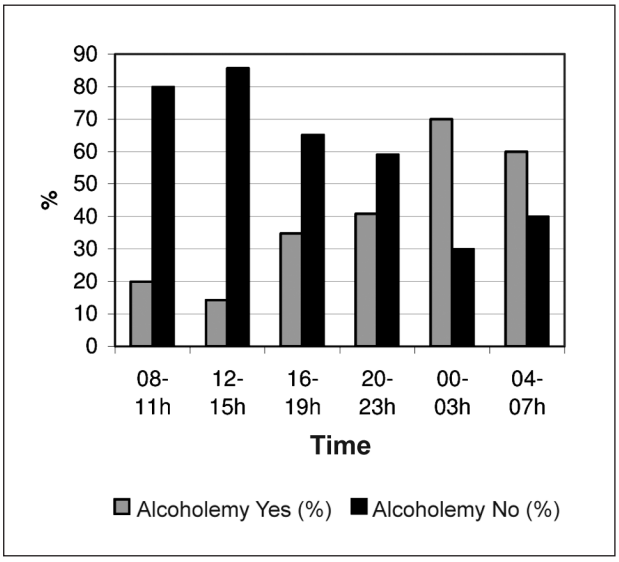

Fig 2. Circadian distribution of patients arrival with TBI, and dosage of alcoholemy (n=84) in patients attended in the ER of CH of UFU.

A significant relation between the frequency of alcoholemy levels and the trauma severity was not observed (Table 2).

The major prevalence of positive alcoholemy during the week occurred on Saturdays (66.7%), followed by Fridays (53.8%) and Thursdays (40.0%) as illustrated in Figure 1. The majority of patients with positive alcoholemy arrived at night (Fig 2).

93.9 of the patients with positive alcoholemy were men with a proportion man/woman of 15.5:1.0. (p=0.01). The relation of positivity according to age can be observed in Table 3.

Table 3. Distribution according to age range of patients with TBI in relation to positive alcoholemy; patients attended in the ER of CH of UFU.

Age range	Alcoholemy			
	Yes		No	
	N (33)	%	N (51)	%
18–19	2	50.0	2	50.0
20–29	11	47.8	12	52.2
30–39	6	26.1	17	73.9
40–49	7	38.9	11	61.1
50–59	3	60.0	2	40.0
≥60	4	36.4	7	63.6

Regarding the activities in the moment of trauma, 55% of the patients were in their leisure time, while 15% were working.

There was no difference between employment and alcoholemy as 41.9% of the patients with alcoholemy and 58.1% of the patients without alcoholemy were employed (p=0.34).

In traffic accidents it is observed that 8 (43.1%) motorcyclists, 3 (60.0%) automobile passengers, 5 (29.4%) pedestrians and 2 (33.3%) bicyclers had positive alcoholemy (qui-square test; p=0.63). It was observed that among the patients with positive alcoholemy (n=33), 24.2% died during internship with no significant difference when compared with the patients with negative alcoholemy (n=51) (p=0.93); RR=0.9; IC 95%=0.40–2.08.

DISCUSSION

A positive alcoholemy was obtained (>10 mg/dL) in 39.3% of the patients; this frequency was slightly inferior to the ones found in the international literature, which vary from 42 to 56%[2,4,6,15,16,22]. In Brazil there are no specific studies on alcoholemy and TBI. There are studies on alcoholemy in victims of external causes, with prevalence of 28.9%–80.7%[19], and the discrepancies can be attributed to differences between geographical and seasonal regions (southeast and northeast). Data have been collected in Recife, during Carnival, with a probable high consumption of alcohol[19].

It was observed that the majority of patients were in their leisure time and the major occurrence of TBI was after work hours; this was a significant information as compared with work hours, and it is also according to literature[2], although the majority of authors don't investigate this variable[15-16]. A significant relation with employment was not observed, what corroborates the literature[16,23].

The major frequency of positive alcoholemy at night and on weekends, mainly on Saturdays (66.7%) is according to the findings of Nery Filho apud Gazal-Carvalho et al.[19] and Maull et al.[20].

Regarding gender a significant positive alcoholemy was observed in men (45.8%) when compared with women (12.5%). Literature data vary from 49–68% of positive alcoholemy for the male sex[2,4,11].

The most frequent age range was that of young adults what is in accordance with the majority of the authors[4,6,11,15,17,19,24,25], although others have found a predominance between ages 40–49 years old[2]. However, a higher percentage between 50–59 years old was proportionally observed, probably related with the small number of patients evaluated in this age range in our study.

Alcoholemy varied according to an external cause, being more frequent in physical aggressions (50%) followed by transportation accidents (38%) and falls (18%), what was similar to the findings of other authors[2,4], although some find more prevalence in transportation accidents[11]. In a study with fatal victims of falls a positive alcoholemy was observed in 48% of the cases[26]. Brazilian authors observed frequency of positive alcoholemy in traffic accidents higher than the ones found in this work for general traumas[19], what can be explained by the methodology and object of study.

The proportion of positive alcoholemy was higher in severe traumas, although not significant, what is coincident with the findings of Kraus[3]. However, there is controversy on what regards the association of positive alcoholemy and injury severity[19], once the severity evaluated by GCS is influenced by alcohol[16,22], and can be transitory and apparent.

Some reports show that the frequency of fatal accidents increases according to alcoholemy risk[26], and on the other hand there is a report of association between TBI and death in alcoholemy patients. It is important to say that an accident associated to alcohol is not necessarily caused by them. Our findings refer to patients that did not die before hospital assistance. Also, our objective was not to study the alcohol-mortality relationship.

The high frequency of positive alcoholemy and its association with intentional and violent trauma[25] emphasize their importance as a severe public health problem in this city. These data should call attention of public authorities, health caretakers, and population for the necessity of programs and measures that aim the control of this problem.

In conclusion, we believe that this is the first Brazilian study that investigates the use of alcohol in patients with TBI. Data found on severe and moderate TBI corroborate the international literature. It was identified that occur-

rences are more frequent in young adults. Those occurrences are related to transportation accidents, on weekends, and at night. Unfortunately the use of alcohol in Brazil is similar to the countries studied. These data are preliminary, however sufficient to have measures taken, which can reduce the negative impact of alcohol intake, besides encourage and evidence the necessity of other studies that can analyze a bigger sample, and investigate other variables.

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