



Incidence of Burns Caused by Epileptic Crisis in Paraguay Carolina Soledad Montiel¹, María Ignacia Troche², Gustavo H Marin^{3*}, Gladys Lugo Ortellado¹, Lourdes Samaniego¹, Lupe Marin³ and Gladys Mabel Maidana¹

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Citation: Montiel CS, Troche MI, Marin GH, Lugo Ortellado G, Samaniego L, et al. Incidence of burns caused by epileptic crisis in Paraguay (2020) Neurophysio and Rehab 3: 8-10.

Received: Jun 16, 2020

Accepted: Jul 24, 2020

Published: Jul 31, 2020

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Abstract

Objectives: The present study was initiated in order to evaluate the epileptic crisis as causes of serious burns that merit an admission to hospital. **Methodology:** This is a retrospective descriptive study based on information on admission reports and medical records of patients who met the inclusion criteria to be enrolled in the present investigation. The Institution studied was the Public Hospital Specialized in Burns, in Asuncion City, Republic of Paraguay, South America. **Results:** From 937 adult patients admitted in the National Centre of Burns in Paraguay during the study period, in only 35 of them their burns were due to epileptic seizures, which represent 3.73% of all admissions. The average age of those affected was 40 ± 16.5 years. 62.86% of the patients were female and 65.71% of those affected came from rural areas where to heat homes and to cook food braziers are used. Education and prevention campaigns to reduce burn injuries in people with seizure disorders may help to minimize the incidence of these cases.

Keywords: Seizures, Burns, Epilepsy.

Introduction

The International League Against Epilepsy (ILAE) defines this disease as a brain disorder characterized by an abnormal electrical activity, called epileptic seizures and the neurobiological, cognitive, psychological and social consequences that this condition entails [1].

Epilepsy is one of the most common neurological diseases, with more than 50 million people affected around the world and of which about 80% come from developing regions. The prevalence of epilepsy worldwide is estimated at 10/1000 people, being one of the most serious non-infectious chronic diseases in the world. It is estimated that about 5 million people suffer from the disease in Latin America and the Caribbean [1] with high incidence 30 and 50 new case per year per 100,000 inhabitants, according to WHO and PAHO office, or 11.9 to 21/1000 according to Brazilian authorities [2]. Unfortunately, In Paraguay there are no records or statistics of this type of illness.

Epilepsy is characterized by recurrent seizures, which are brief episodes of involuntary movements that can affect a part of the body (partial seizures) or its entirety (generalized seizures) and are sometimes accompanied by loss of consciousness. Pharmacological treatment for epilepsy manages to control epileptic seizures in up to 70% of patients, but in Latin America up to 60% of patients are not diagnosed or receive treatment due to lack of access [1].

This chronic disease represents 0.5% of the total global burden of diseases and has significant economic repercussions in terms of health care needs and lost productivity at work [3,4]. These patients have a higher risk of suffering physical injuries associated with epileptic seizures, since epileptic seizures invalidate the individual's consciousness for several minutes, and expose them to unwanted consequences during that period. If the patients during a crisis, are performing dangerous tasks, or are surrounded by potentially harmful elements such as fire, hot water, electricity or chemicals, seizures will put their own health at risk.

Most studies in epilepsy outcomes were focused on the psychosocial impact of epilepsy, paying little attention to other type of injuries, like burns, especially in developing countries where heating or cooking depends on fire [5]. There are few studies that describe the association between epilepsy and burns [2,4]. One study revealed that patients who suffered burns due to epileptic seizures were 1.3% of all hospital admissions due to burns [6].

Thermal burns represent one of the most complex and challenging forms of traumatic injuries, which means great costs for the health system and imposes significant physical and psychological care on the recovery of the patient and their relatives [7-10], due to the prolonged hospitalization required. The incidence severity and nature of the various types of lesions in epileptic patients are different from those that occur in people who do not have epilepsy [4].



Burns as a result of an epileptic attack represent between 1.6-10% of admissions to burn units, while 3.7-15.9% of adult epileptics have been burned due to seizures however, there is a wide range for these events according to the region of the world and the country of study [7-10]. For this reason, it is useful to carry out these types of studies that help to make visible the problem of the consequences of uncontrolled epileptic seizures in patients belonging to countries with low income level such as Paraguay, where data is still very scarce or null.

Methodology

This is a descriptive study based on a retrospective analysis of the medical records of patients who were admitted for severe burns in a specialized public hospital in the city of Asunción, capital of the Republic of Paraguay.

Unit of analysis: Adult patients admitted to the Hospital Specialized in Burns of Asunción, Paraguay, during the study period.
Study Period: 01-01-2015 to 12-31-2017.

Variables: age, sex, type of burn according to the agent that produced it (Table 1), according to the extension (Table 2); according to the degree of severity (Table 3), body surface area affected [11], presence or absence of a diagnosis of epilepsy, reason for admission, cause of the burn, complications suffered, address of the patient according to urban or rural area.

Statistics: The statistical analysis was performed with the EPI INFO statistical software, each variable was coded for the program management, with its description and its categories. This program allows expressing the results in frequency and percentage of each study variable.

Ethical aspects: In order to ensure that research is ethically acceptable, the present work was carried out according to international standards for biomedical research in human beings proposed by the Council of International Organizations of Medical Sciences (CIOMS) where the confidentiality of the data obtained from patient records, for this purpose it was submitted to the Research Ethics Committee of the Faculty of Chemical Sciences, UNA.

Types from Burns	Thermal	Heat	Flammable gases
			Hot liquids
			Direct fire
	Electric	Cold	Electric current
			Gas
	Chemistry	Acid	Radiant energy
			Ultraviolet radiation
	Radioactive	Ionizing radiation	

Table 1: Classification of burns according to the agent that produces it.

Benaim	Converse-Smith	ABA
Type A	First degree	Epidermic
Type AB-A	Superficial second degree	Dermic (superficial partial thickness)
Type AB-B	Deep second degree	Dermic (deep partial thickness)
Type B	Third degree	Full thickness

Table 2: Correlation of the Burns classifications according to Benaim, Converse-Smith and American Burns Association (ABA).

Minor	15% BSA or less than 1st or 2nd grade in adults.
Moderate	16-25% BSA or less than 2nd grade in adults.
Major	> 25% 15% BSA or less than 2nd grade in adults.

Table 3: BA classification of burns according to the percentage of Burned Body Surface Area (BSA).

Results

A total of 937 adult patients entered the Burns boarding room unit during the study period, 35 patients suffered burns due to epileptic seizures, which represent 3.73% of all admissions. 62.86% of the patients belong to the female sex. The age range is between 18 to 74 years, with an average of 40 ± 16.5 years. 65.71% of the patients came from rural areas (Table 4).

	Frequency	Percentage
Gender		
Male	13/35	37.14%
Female	22/35	62.86%
Age		
18-34 years old	12/35	34.29%
35-59 years old	18/35	51.43%
60 or more years old	5/35	14.29%
Home Area		
Urban; Asunción or Central Area	12/35	34.29%
Rural	23/35	65.71%

Table 4: Characteristics of the patients included in the study.

Direct fire burns correspond to the highest percentage of income (57.14%), the rest corresponds to hot liquid burns. Regarding the degree of burn, 40% of the patients suffered second superficial degree burns, the extension is expressed as a percentage of burned body surface, minor burns were more common, with a frequency of 94.28% (Table 5).

Origin of the burn	Frequency	Percentage
Direct fire	20/35	57.14%
Hot liquid	15/35	42.87%
Degree of the burn		
First degree	0/35	0%
Superficial 2nd degree	14/35	40.00%
Deep 2nd degree	13/35	37.14%
3rd degree	8/35	22.85%
Body Surface Burned		
2-15% (Minor)	33/35	94.28%
16-18% (Moderate)	2/35	5.71%

Table 5: Classification of burns according to their characteristics.

Patients received a total of 35 medicines, the most prescribed drug corresponded to group N for the treatment of epilepsy (Drugs acting on the Nervous System) according to ATC chart (Table 6). Phenytoin was the most prescribed and administered medication, with a frequency of 71.43% of the total patients. Patients without continuity in their treatment had twice incidence of burns that those with epileptic therapeutical adherence.

Central Nervous System. Grupe N			
Drug	ATC	n/N	% (N= 35)
Phenytoin	N03AB05	25/35	71.43%
Propofol	N01AX10	16/35	45.71%
Diazepam	N01AX03	15/35	42.86%
Clonazepam	N03AE01	15/35	42.86%
Carbamazepine	N03AF01	12/35	34.29%
Fentanil	N01AH01	11/35	31.43%

Table 6: Classification of the most frequent drugs administered.



Discussion

Burns are one of the most common causes of injuries in people with seizure disorders; however, the importance of this relation is often underestimated. Some of the risk factors associated with injuries and accidents in patients with epilepsy are the number of antiepileptic drugs consumed, history of generalized seizures and the frequency of seizures [12-14].

In this study, 3.73% of admissions in the shock room, corresponded to adult patients with burns derived from an epileptic crisis, an aspect that reflects a similar data published by other authors [13], but has a significant difference with others [14].

Patients with seizure disorders most often burn while engaged in necessary household chores or self-care activities. Our work shows that those epileptic patients who were burned were mostly women (62.86%). This is very likely to be related to the activity at the time of the burn, since most of the burns occurred at home, coinciding with Faurie's [15], and Boschini's data [3]. 65.71% of admissions corresponded to patients belonging from rural areas; this could be due to the fact that in these areas there is less access to electricity or other ways of heat or cook; also due to the limited information on the risk factors of seizures that lead to suffer injuries such as burns. The greatest tendency of burns was by direct fire, which corresponds to 57.14%, certainly a higher level than data from Laura P. Boschini et al with 28% of injuries [3].

The most frequent burn among the patients was classified as moderate (according to the classification according to the Burned Body Surface), 94.28% of the patients suffered burns between 2-15% in length, similar to data from other authors [16,17].

Regarding the degree of burn, the superficial second-degree was the most frequent in patients studied, although it was found very little difference compared to second deep degree burns. No patients with first degree burns were found since they affect only the outer layer of the skin and do not require hospitalization. Burns tend to be deep, and this is due to the inability of epileptic patients to withdraw from the heat source during a seizure.

Patients without adherence to epileptic treatment increased the risk of be submitted to a burn event. Hence, it is extremely important that in epileptic patients, continuity of treatment is guaranteed in order to prevent epileptic seizures that put patients at risk. It is also essential to prevent burns in epileptic patients, controlled that the environment and their habits do not expose them to potential risks to certain.

Conclusion

In the present study it was demonstrated that epilepsy was the cause of burns due to a seizure crisis in 3.73% of all hospitalizations in the National Centre for Burns in Asunción, Paraguay. The age range was 35 to 59 years. Flame injury was the most common cause of burn. The majority of burns were classified in severity as mild and superficial second-degree burns.

A monitoring program that guarantees access and continuity to the antiepileptic treatments, as well as a management of the environment in order to avoid possible risks might reduce the incidence of burns in this type of patients.

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