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Análisis clínico y epidemiológico de los accidentes por mordeduras de serpientes del género *Bothrops* en Venezuela

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RESUMEN

Se analizó el registro clínico de 60 pacientes mordidos por serpientes del género *Bothrops* que fueron vistos en el Hospital "Leopoldo Manrique" y en la consulta del Instituto de Medicina Tropical (HLM-IMT) en Caracas durante 1996-1997. El accidente más frecuente se describió en varones (45/75 %). En 32 casos (53, 3 %) la serpiente ofensiva fue clasificada y 26 fueron *Bothrops lanceolatus, 4 Bothrops venezuelensis* y 2 *Bothrops atrox*. La regiones anatómicas más frecuentemente mordidas fueron los miembros superiores (40/66,6 %): las manos (36/60 %), los antebrazos/ (2/3, 3 %), los codos/ (1/1, 6 %) y los brazos/(1/1,6 %). En miembros inferiores (20/33,3 %): las piernas (6/10 %), los pies (10/16,7 %), los tobillos/ (2/3, 3 %), y las caderas (2/3,%). Las manifestaciones clínicas más frecuentes en casos moderados y severos (33 pacientes) fueron dolor (10,0 %), oedema (98 %), equimosis (76 %), flictenas (20 %), necrosis (12 %), abscesos (6 %), sangramiento (19 %), insuficiencia cardíaca (1/1, 6 %), fallo renal (1/1, 6 %). La coagulación sanguínea se evaluó en los 60 casos (100 %) y se observaron alteraciones en 33 pacientes (55 %). No se reportó ninguna muerte.

Descriptores DeCS: BOTHROPS LANCEOLATUS; VENENOS DE SERPIENTES; MORDEDURAS DE SERPIENTE/ epidemiología; VENEZUELA.

Venomous snakes in Venezuela belong to two families: *Crotalidae* and *Elapidae*. They are responsible for more than 4 000 accidents notified during the year to the Ministry of Health having a subregister whose number is ignored. Approximately 80 % of the envenoming in our country is caused by *Bothrops* snakes.[1] Although the snakes of this genus are in the whole country, the species are irregularly distributed in the national territory. In the incidence of snake bite there is a marked seasonal variation, peaks being associated with rainy season. In South America, India, Pakistan, Bangladesh, West Africa, and Southeast Asia there is the highest incidence of snakebite.[2] The bothropic venom components produce local manifestaions in the envenomed patient characterised by a proteolytic and necrotic activity, with oedema and blisters in the bitten area. The general manifestations are haemorrhages, clotting, fibrinolysis, fibrinogenolysis and platelet aggregation.[3,4] The present study is an evaluation of the epidemiology, associated to the clinical picture of envenoming that outlines new pertinent discussions in all Latin America, from Mexico to Brazil, where the bothropic accident represent a serious public health problem.

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METHODS

The data of the present study was obtained in one year from *Bothrops* snake bitten patients, attending the Hospital "Leopoldo Manrique" and the Institute of Tropical Medicine of the Central University of Venezuela (HLM-IMT). Due to the characteristics of the HLM-IMT, with an experience of about 50 years dedicate to the attention of ophidian accidents, the medical histories are designed to obtain the maximum information from venomous animal accidents that facilitates the current and retrospective study of these casualties. The Department of Poisonous Animals (HLM-IMT) classified the snake brought by the patients.

The clinical information is accompanied with an exhaustive epidemiological data collected in a clinical history including among others: place of home and activity, sex, age, schedule of the accident, time between accident and consultation, bioecological aspects, accident aspects, treatment and patient's evolution, and the use of the tourniquet.

This information was stored in a database elaborated with dBase II-III program and later on the quantitative pursuance was carried out with the World Health Organization Epinfo 5 (1990) and Excel 5.0 (1994) for Windows programs.

The patients, according to the local and systemic dysfunction were classified in four qualitative categories: *discreet, light, moderate* and *severe* envenoming were defined.

Discreet envenoming is characterised by minor symptoms such as local pain at the bitten place and the fang marks*; light* envenoming characterised by discreet symptoms plus pain of rapid appearance and variable intensity, indurate oedema, heat and blush that it can appear in the first hours of the accident; *moderate* cases are typified by light envenoming symptoms plus a more intense symptomatology, like haemorrhages: gingivorrhages, epistaxis and haematuria and the presence or absence of altered renal function; *severe* cases are characterised by an extreme symptomatology of blisters, ecchymosis and tissue necrosis that may causes functional limitation and loss of anatomical regions from the affected area. Also, general haemorrhages that lead to heart failure, acute lung oedema, acute renal failure, deep gasping, convulsive spasms, and in some cases death.

HAEMORRHAGIC TESTS

Partial Time of Thromboplastin (PTT) and Time of Prothrombin (TP) tests were carried out at 0.6 and 24 hours in the bitten patients. Fibrinogen tests were carried out at 0.12 and 24 hours. Blood samples from patients (approximately 5 mL adults and 2 mL children) were obtained by venopuncture.

CLINICAL STUDY

In a year we studied 60 patients both sexes and any age that fulfilled the requirements: patients that had been bitten by snakes of *Bothrops genus*. Those that had received antivenin previous to their entrance to the HLM-IMT were excluded from the investigation protocol.

All patients were intravenously treated with polyvalent antivenin (anti-Crotalus/Bothrops) (Pharmacy Faculty- UCV, Venezuela).

RESULTS

We obtained samples from 60 patients with bothropic accident, 75 % of them were males and 25 % females.

The involved snake species were: in 32 cases (53,3 %) the snake was classified and 26 were *Bothrops lanceolatus, 4 Bothrops venezuelensis* and 2 *Bothrops atrox.*

The accidents prevailed on rainy season (86 %) (April-October). Male patients were mainly attacked in age groups from 15 to 24 years old (25 %) (table 1).

TABLE 1. Age groups by sex of *Bothrops* bitten patients, January-December 1996-1997

	Sex					
	Males		Females		Total	
Age ranges	No.	%	No.	%	No.	%
0-4	0	0	0		0	100
5-14	9	60	6	40	15	100
15-24	15	83,3	3	16,7	18	100
25-44	6	66,6	3	33,4	9	100
45-64	9	100	0	0	9	100
> 65	6	66,6	3	33,4	9	100
Total	45	75	15	25	60	100

Anatomic regions more frequent bitten were superior members (40/66.6 %): hands (36/60 %), forearm (2/3.3 %), elbow (1/1.6 %) and arm (1/1.6 %). On inferior members (20/33.3 %): legs (6/10 %), feet (10/16.7 %), ankle (2/3.3 %), and the hip (2:3.3 %). The use of tourniquet (this practice is very common in bothropic accident in Venezuela) was carried out in different forms and periods of time in 27 patients (45 %).

The minimum time lapsed from the bite and the entrance to the hospital was 0.2 hours and the maximum 17 hours (fig. 1). In all cases, blood clotting was evaluated. In nine patients clinically classified as discreet no coagulation alteration were found; eighteen patients clinically classified as light presented delayed of time of clotting, but not blood incoagulability. From twenty-seven patients clinically classified as moderate, ten presented delayed of clotting time and sixteen patients blood incoagulability. Three (50 %) from six severe patients, presented blood incoagulability. Fibrinogen was always altered in all moderate and severe cases (table 2).

28.3 % of the moderate cases presented abscesses and 8.4 % necrosis of the affected area by the bite. 50 % of the severe cases presented abscesses, but we did not observe necrosis in these patients.

The average of hospitalisation was: discreet cases 1 day; light 2 days; moderate 7 days and severe 7 days.

In figure 2 is shown bothropic envenoming along the day. Here is observed that snake accident in any moment of the day, however, the highest incidence (36.7 %) was between 17:00 to 20:00 hours.

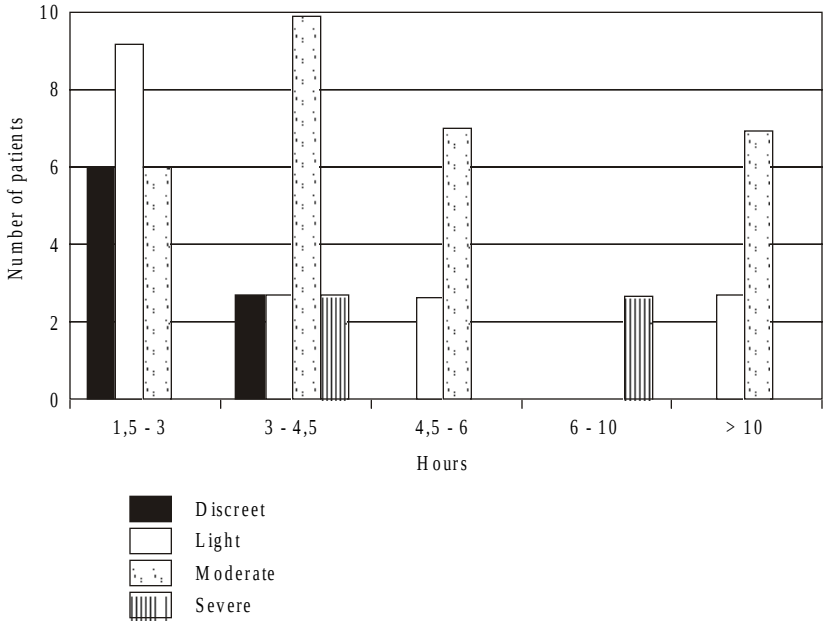

Fig.1. Intervalo of time between patients consultation and bites from *Bothrops* snakes.

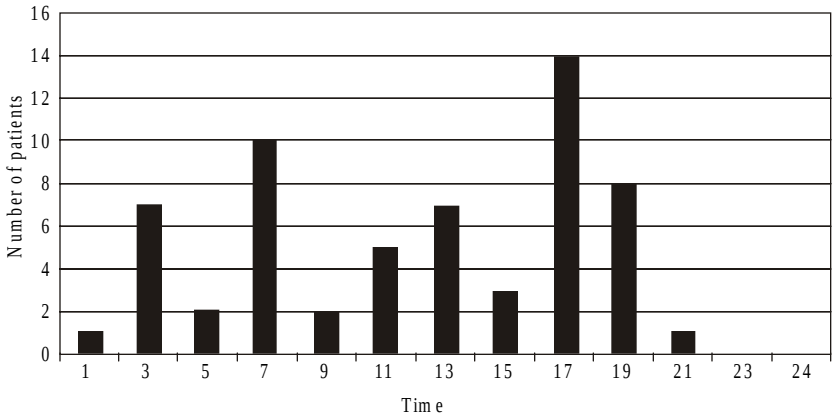

Fig. 2. Bothropic accidents throughout the day.

TABLE 2. Fibrinogen, time of prothrombin and partial time of thromboplastin tests

Fibrinogen	(0 hours)				(12 hours)				(24 hours)			
	D	L	M	S	D	L	M	S	D	L	M	S
Mean values mg/dL	300	150	90	54	300	180	130	120	300	250	280	290

Arrival time	No. of patients	Diagnostic of arrival				Time of Prothrombin Ex.1				Ex. 2				Ex. 3			
		D	L	M	S	D	L	M	S	D	L	M	S	D	L	M	S
0-3 h	24	6	9	9	0	N	P	3N 6P	0	N	P	3N 3P	0	N	N	6N 3P	0
4-7 h	27	2	6	12	6	N	P	8I 4 P	3 P 3I	N	N	6I 6 P	3 P 3I	N	N	8 P 4N	N
> 8 h	9	1	3	6	0	0	3 P	6I	0	N	N	6 P	O	O	N	6 P	0

Arrival time	No of patients	Entry diagnostic				Partial Time of Thromboplastin Ex.1				Ex.2				Ex.3			
		D	L	M	S	D	L	M	S	D	L	M	S	D	L	M	S
0-3 h	24	6	9	9	0	N	P	6 P 3I	0	N	N	6N 3 P	0	N	N	N	0
4-7H	27	2	6	12	6	N 3 P	3N I	12 3I	3 P	N	6 P	9 P 3I	6 P	N	6 P	6N 6 P	3 P 3 P
> 8 H	9	1	3	6	0	N	3 P	6I	0	N	N	6 P	0	N	N	6 P	0

Ex.1: sample 1, at 0 hours (when patients arrived to the hospital); Ex. 2: sample 2, at 6 hours from arrival; Ex. 3: sample 3, at 24 hours from arrival; D: discreet, L: light; M: moderate, S: severe; N: normal, P:prolonged, I:incoagulable.

DISCUSSION

Bothrops lanceolatus species is wide nationally distributed, being the predominant snake in the number of accidents from 1947 to 1998.[5] This species distributed in the costa mountain range and in the northern of the Orinoco river, where settles 80 % of venezuelan population. It prevails in humid environmental and near to currents of water, from 0 to 1 500 meters of altitude with 23 °C mean temperatures. The accident occurrence seems to depend so much of the man's activity mainly peasants and during rainy season when most of the accidents are described. The biggest occurrence of accidents in males, it has been referred by many authors and it is probably due to the large frequency that men carry out activities in the field.

The highest bothropic envenoming incidence between 17:00 to 20:00 hours agrees with the national and international literature,[1,6,7] since most of the *Bothrops* snakes have vespertine and nocturne habits.[3]

The high percentage of bites on feet and ankles has already been reported for national and international authors in studies based on accidents by solenoglyphs snakes.[1,3,7-10] In Venezuela is not rare, since most of the Venezuela *Bothrops* are of terrestrial habits. In general, the bites occur accidentally when a person enconters a snake that is resting or searching for food. Several authors[11] have suggested that recently born and young specimens of certain families possess in their venom a higher lethal capacity than adult specimens.

The frequency of tourniquet use in the patients (45 %) is very high, although permanently its use is dissuaded.[12] However, we think that the use has diminished in the last years, due probably to the series of workshops that experts in ophidian accidents have carried out at national level.

The frequency in these accidents of infections and necrosis is high, however not mortal cases in our casuistry reflect the small severity of the bothropic envenoming; these snakes cause the

death of their victims with little frequency.[6,8] Although the death is the feared consequence, the necrosis with spontaneous or surgical amputation occurs with more frequency.[8]

Coagulation changes are classic in the bothropic accidents and our results confirm once again, the alterations of these processes in the patients bitten by Venezuelan *Bothrops*, similar to the rest of Latin America and the Caribbean.

In conclusion, a study is presented on human cases produced by *Bothrops* snake bites with special reference to Venezuela. Here the critical characteristics of this envenoming are exposed. The low index of complications and the absence of deaths in this sample is probably due to that the team that intervened in these cases, is considered the best trained of the country.

SUMMARY

Clinical register of 60 patients bitten by *Bothrops* snake who assisted at Leopoldo Manrique Hospital and the Institute of Tropical Medicine (HLM-IMT) in Caracas during 1996-1997 were analysed. The accident was more frequent in males (45/75 %). In 32 cases (53.3 %) the snake was classified and 26 were *Bothrops lanceolatus, 4 Bothrops venezuelensis* and 2 *Bothrops atrox*. Anatomic regions more frequent bitten were superior members (40/66.6 %): hands (36/60 %), forearm (2/3.3 %), elbow (1/1.6 %) and arm (1/1.6 %). On inferior members (20/33.3 %): legs (6/10 %), feet (10/16.7 %), ankle (2/3.3 %), and the hip (2:3.3 %). The most frequent clinical manifestations in moderate and severe cases (33 patient) were pain (100 %), oedema (98 %), echimosis (76 %), blisters (20 %), necrosis (12 %), abscess (6 %) bleeding (19 %), heart failure (1/1.6 %), renal failure (1/1.6 %). The blood clotting was evaluated in 60 (100 %) cases and it was altered in 33 (55 %) patients. No deaths were recorded.

Subject headings: BOTHROPS LANCEOLATUS; SNAKE VENOMS; SNAKE BITES/epidemiology; VENEZUELA.

REFERENCIAS BIBLIOGRÁFICAS

1. Rodríguez-Acosta A, Mondolfi A, Orihuela A, Aguilar M. ¿Qué hacer frente a un accidente ofídico? Caracas: Venediciones,1995:23-9.
2. Warrell D. Venomous bite and stings in the tropical world. Med J Austr 1993;159:773-9.
3. Rosenfeld G. Symptomatology,pathology and treatment of snake bites in South America. En: Bücherl W, Buckey E, Delofeu V, eds. Venomous animals and their venoms. New York: Academic 1971:229-70.
4. Gutiérrez JM, Romero M, Núñez J, Chávez F, Borkow G, Ovadia M. Skeletal muscle necrosis and regeneration after injection of BaH1, a hemorrhagic metalloproteinase isolated from the venom of the snake *Bothrops asper* (Terciopelo). Exp Mol Pathol 1995; 62:28-41.
5. Venezuela. Ministerio de Sanidad y Asistencia Social. Anuario Epidemiológico 1/52, Caracas: 1947-1998.
6. Pifano F, Rodríguez-Acosta A. Accidentes producidos por serpientes ponzoñosas venezolanas. En: Facultad de Medicina, Cátedra de Medicina Tropical, Universidad Central de Venezuela,eds. Caracas, Venezuela:1989:1-31.
7. Ribeiro LA. Epidemiology of ophidic accidents. Mem Inst Butantan 1990;52(Sup):15-6.
8. Ribeiro LA, Jorge MT. Acidente por serpentes do género *Bothrops* : Serie de 3 139 casos. Rev Soc Bras Med Trop 1997; 30:475-80.
9. Barroso RD. Ofidismo no Brasil: consideracoes em torno de 2 238 acidentes ofidicos tratados com soro. Bol Inst Vital Brazil 1944;26:35-47.
10. Barravieria B, Pereira PCM. Acidentes por serpentes do género *Bothrops, Lachesis e Micrurus*. Arq Bras Med 1991;65:345-55.
11. Machado-Allison A, Rodríguez-Acosta A. Animales venenosos y ponzoñosos de Venezuela. Caracas: Ediciones del Consejo de Desarrollo Científico y Humanístico de la Universidad Central de Venezuela,1997:1-90.
12. Kouyoumdjian JA, Polizeli C. Accidente ofídico causado por *Bothrops moojeni:* relato de 37 casos. Rev Inst Med Trop Sâo Paulo 1988;30:424-32.

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