

Venomous snakebites in Diwaniyah: A Clinicoepidemiological descriptive study

Mohammed M. Al-Shamsi* Aqeel R. Al-Barqawi* Asaad Habeeb Abdullah** ,
Mohammed K. Al-Jelawi***

* College of Medicine, Al-Qadisiyah university, Iraq, Diwaniyah, ** Maternity and children teaching hospital, Diwaniyah, *** Al-Diwaniyah teaching hospital

e-mail: mojar65m@yahoo.com

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الخلاصة

الخلفية: تعتبر لدغة الأفعى السامة في الديوانية من المخاطر المهمة على الصحة وترتبط بنسب عالية من الوفيات
الأهداف: استكشاف حالات لدغة الأفعى السامة في الأطفال والمراهقين لغاية السنة السادسة عشر من العمر في هذه المدينة والتركيز على المواصفات السريرية والسكانية وأسباب الوفاة
المرضى وطرق العمل: شملت هذه الدراسة الملاحظات ذات الأثر الرجعي 49 حالة للدغات الأفعى السامة التي أدخلت إلى مستشفى النسائية والأطفال التعليمي و مستشفى الديوانية التعليمي في الديوانية والفترة من 2005-2009. النتائج: كان متوسط عمر المرضى 8 سنوات، 84% من اللدغات حصلت خلال الفصل الحار (مايس – آب)، كانت معظم الحالات من مناطق ريفية وخاصة مناطق آل بدير والشنافية والحفار، بلغ معدل الوفيات في الحالات التي تم دراستها 28,6% وتعتبر هذه النسبة عالية جدا بالمقارنة مع النسب المخبر عنها في أماكن أخرى من العالم. الخاتمة: هنالك حاجة ملحة لاستكشاف أنواع الأفاعي السامة في الديوانية و المطلوب بتوفر ضد السم الخاص بهذه الأنواع.

Abstract

Background: venomous snakebite is an important health hazard in this area associated with high mortality. Objectives: exploration of snake envenomation cases in children and adolescents up to the age of 16 years in this city with a focus on clinical and demographic characters and causes of death. Patients and methods: this observational and retrospective study involves 49 cases of venomous snakebites admitted to the teaching hospitals in this city between 2005-2009. Results: the median age of patients was 8 years, 84% of the bites happened during the hot season (May – August), most cases were from rural areas (90%) particularly from Albdeer, Shannafiah and Alhaffar. The death rate among the studied patients was 28.6% which was very high in comparison with rates reported elsewhere. Conclusion: There is a need for exploration of the types of venomous snakes in this area and a demand for the availability of species specific antivenom.

Introduction

Poisonous snakebites are a serious health challenge in tropical regions due to their incidence, morbidity and mortality. The world health organization(WHO) estimates that there are approximately 125000 deaths out of 2.5 millions poisonous snakebites worldwide every year.(1)

Of the more than 3000 known species of snakes, only 200 are poisonous to human. Of the poisonous snakes, 90% are members of one of three families: the

Hydrophidae or poisonous sea snakes, the Elapidae (which includes the Cobras, mambas and coral snakes) and the Viperidae(Crotalidae) or true vipers(pit vipers). (2)

Snake venom is a mixture of polypeptides, proteolytic enzymes and toxins which are species specific. The Elapidae and the Hydrophidae venom is primarily neurotoxic and has a Curare-like effect by blocking neurotransmission at the neuromuscular

junction, death result from respiratory depression. The Crotalidae (Viperidae) venom is cytolytic; causing tissue necrosis, vascular leak and coagulopathy. Death from pit viper bites results from hemorrhagic shock, acute respiratory distress and renal failure. There are exceptions; some members of the Elapidae family cause little or no neurotoxicity but rather severe tissue necrosis (e.g., African spitting cobras). Some vipers cause significant neurotoxicity (e.g., some populations of the Mohave rattlesnake [*Crotalus scutulatus*]).(3)

Reports on clinical features and management of envenomated children are scarce, even in countries known to present a high snake bite incidence. (4) The majority of snakebites victims are initially treated by professional snakebite

healers, snake charmers and religious men, who use herbal remedies, chant divine and apply snake stone causing delay in seeking medical aid.

The exact prevalence of snakebites in Diwaniyah, Iraq(180 km south of Baghdad) is unknown and difficult to be determined for the following reasons:

1. Most of the victims are from far rural areas and only those who develop severe symptoms are admitted to the hospital

2. Most of the snakebites are treated by alternative medicine or they are due to non venomous snakes and subsequently no treatment is required.

This observational and retrospective study is aimed at exploration of snake envenomation in this city with a focus on clinical presentation, demographic characters and causes of mortality.

Patients and methods

The records of children and adolescents up to the age of 16 years who were victims of snake envenomation and were admitted to the maternity and children teaching hospital and Diwaniyah teaching hospital in Diwaniyah were reviewed. Those patients were admitted to these hospitals during 2005-2009. Patients admitted to these hospitals during the study period (February – June 2010) were also included. Information was collected about patients includes: age, sex, residence, site of bite, time and date

of bite, the place where the bite occurred, the conditions associated with bite, signs and symptoms, time interval between bite and development of symptoms, time interval between bite and hospital arrival, treatment, duration of hospitalization, the fate of the patients and causes of mortality. Patients with poor records and those older than 16 years were excluded. A number of patients records lack some of the required information.

Results

The study involves 49 patients with snake venom disease, twenty nine were males and 20 females(59%, 41% respectively). Eighteen patients were less than 5 years

(36.7%), 14 were between 5 and 10 years(28.6%), 12 were between 11- 15 years(24.5%) and 5 patients were 16 years old (10.2%). Figure 1

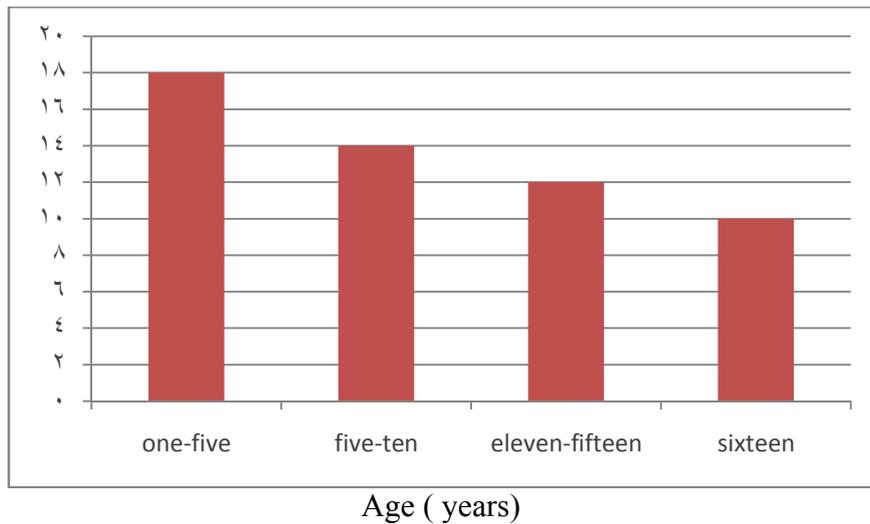


Figure 1: The age distribution of the envenomated patients

The majority of the patients were from rural areas, 44 patients, (89.8%) and 5 patients only were from urban areas(10.2%), the geographical distribution of patients is shown in figure 2.

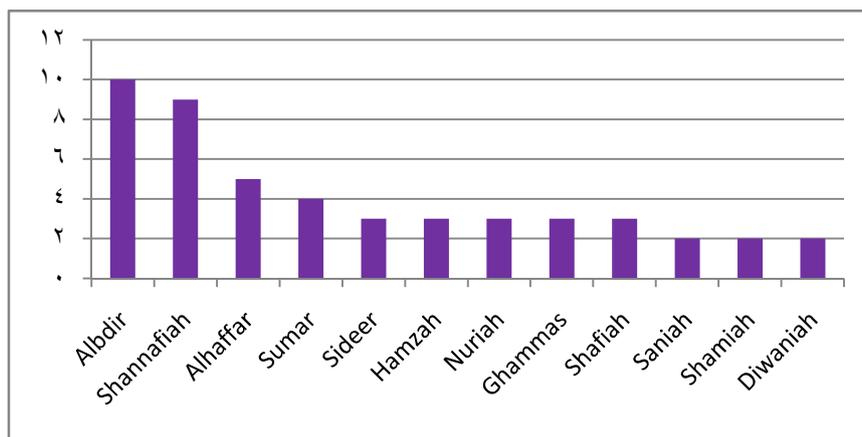


Figure2:The distribution of envenomated patients by administrative regions of Diwaniah

Twenty four cases (49%) were from three areas (Albdier, Shannafiah and Alhaffar). Feet and legs were more commonly bitten sites, 26 cases (53%), while hands and arms were bitten in 17 patients(34.7%), the buttocks were involved in 3 patients(6.1%); the chest, abdomen and back were sites of bites in 3 patients.

Of the 49 patients, 41 were bitten from April to August (83.7%) and in 26 patients the bites occurred in the field (53%) and 17 patients the bites occurred at or near home (34.7%). Regarding the

time of bites, most patients were bitten during the day (walking, playing, working), 38 cases(77.6%), the bites were at night in 11 patients(22.4%). The time interval between bites, development of symptoms and hospital admission (bite to needle time) was difficult to be determined because of the retrospective nature of the study. The signs and symptoms in our envenomated patients are summarized in table 1. Local swelling and edema were the most common occurring in 46 patients (94%) followed by pain and irritability, bleeding

tendency, pallor (anemia), disturbed level of consciousness, hypotension and

shock(92%, 77.6%, 57%, 37%, 31% respectively)

Although clinical grading of snake bites and envenomation is crucial for evaluating and managing the condition of each victim (from grade 0 to grade 4), this was difficult to be assessed in our patients because of lack of such grading in their records. Forty five patients (92%) received antivenin (Favirept, Sanofi Pasteur, France), 47 patients received antibiotics (96%), 27 received blood transfusion(55%), blood products (fresh frozen plasma, cryoprecipitate) were used in 26 patients(53%), some of the patients received transfusion more

than once. The duration of hospitalization was less than 4 days in 34 patients(69.4%), 4-7 days in 9 patients (18.4%), 7-10 days in 6 patients (12.2%). Thirty five patients (71.4%) were discharged well from the hospital after treatment and unfortunately 14 patients died(28.6%), the major cause of death was disseminated intravascular coagulation, acute renal failure was additional cause of death in 2 patients. The relation between age and frequency of death is shown in table2.

Table 1: Signs and symptoms in the envenomated patients

Signs / symptom	Number	%
Local swelling and edema	46	94
Pain and irritability	45	92
Bleeding tendency	38	77.6
Pallor (anemia)	28	57
Disturbed consciousness	18	37
Hypotension and shock	15	31

Table 2: The relation between age of patients and mortality

Age	Number of patients	Number of deaths	%
Less than 2 years	2	2	100
2-4	16	8	50
5-7	8	3	37.5
8-10	6	1	16.7
11-16	17	0	0

Specific lethality for age group peaked in patients who were less than 5 years(71.4%).

Discussion

Reports on the types of venomous snakes of central Iraq are scarce as is the specific antivenins that could be used in the treatment, however four of the six species of venomous snakes that are known to naturally occur in Iraq, are in the family Viperidae (Vipers): *Vipera lebetina*, *Echis carinatus*, *Cerastes cerastes*, *Pseudocerastes persicus*, the fifth and sixth species are members of the family Elapidae(Cobras): *Walterinnesia*

aegeyptia, Arabian Cobra(*Naja haje Arabica*)(5). This can also be suggested by the nature of the clinical signs and symptoms that our patients had and the causes of mortality(table 1,3), as the Viperidae venom is classically associated with tissue necrosis and DIC(6). The male: female ratio in our patients is almost similar to that mentioned in other studies(7,8,9). The median age of our

patients, 8 years, is comparable to the Taiwan study (9.9 years)(7).

The snakebites were significantly more frequent in rural areas (90%), a similar observation was made by Arfaoui et al in Morocco(8) where a diverse fauna of snakes living there.

Bites were more frequent during the hot period (May- September), 84%, this was also noted in Taiwan(82%) and Morocco(69%)(7,8), this can be easily explained by hibernation of snakes in the winter. Although snake activity is generally nocturnal, most bites in our study happened during the day time(78%), this finding was also noted in similar studies (7,8), while night prevalence was reported in other studies(10,11). The site of the bites in our study was also similar to the Taiwan study(7) , where feet and legs were involved in 53% in both studies, hands and arms were involved in 35%, 40% respectively. Twenty six patients were bitten while they were in the field(53%), and in 17 patients the bites occur at or near home (35%), this is in contrast to the Taiwan study(7) where the figures are 13.5% for the field site and 68% for home or yard, this could be explained by the difference in the snake species and the outdoor agricultural activities in our patients. The bite to needle time, which was difficult to be determined in our study because of its nature, is an important factor that affects both morbidity and mortality(7,9,12).

Regarding the signs and symptoms of snake bites in our patients, we found that they are different from a similar study (7), where the pain, swelling and ecchymosis occur in 23.6%, 43.6%, 23.6% of their patients , while they occur in 92%, 94%, 77.6% of our patients respectively. This is due to the difference of snake species between the two countries. Although 92% of our patients received antivenin treatment, the mortality rate in our patients(28.6%) is higher than that reported elsewhere(0%-5.7% in the Taiwan and morocco studies

respectively(7,8), this is possibly due to the following:

1. Delayed presentation in our patients as most of them are from far rural areas and only those who develop severe symptoms are referred to the hospital

2. Late administration of the antivenin. Correct antivenom administration remains the mainstay of therapy, with a suggested elapsed time from the moment of the bite to the antivenom administration of six to eight hours(13), Chieh-Fan C et al found that the mortality rate was 0% in 12 patients who received prompt treatment, compared to three deaths out of 19 cases in which the treatment was delayed(14). High mortality and functional impairment of the extremities after bites were found in some studies due to delayed hospital visits (15,16).

3. Lack of the species specific antivenin, the antivenin that is used in our hospitals (Favirept, Sanofi Pasteur, France) is an equine antivenin immunoglobulin active against 6 snake species(Bitis, Echis, Naja haje, Naja nigricollis, Cerastes, Macrovipera) and so it is possibly useful in the treatment of only 2 types of snake species that are possibly living in this area(Cerastes, Naja haje). There is no benefit to administering an AV for an unrelated species, and doing so certainly involves unacceptable risk (e.g., anaphylaxis) and expense.(17)

4. There is lack of identification of snake species in this area because of the absence of a data base on the types of snakes in this area and their photograph. In other parts of the world (7,14 , 18), the identification of snake species had an important clinical significance concerning the decision and type of the antivenom that should be administered, the identification is based on the specimen the family brought to the hospital or on recognition using snake photograph , this was missing in our patients, The rate of identifications of

snake species varies between different studies ranging 56%, 75%, 83%) respectively (7, 14, 18).

5. The high specific lethality for age in those less than 5 years could be

Conclusion

Based on the present findings, venomous snakebites in Diwaniah is an important health problem with high mortality rate. There is a need for exploration of the types of venomous snakes in this area and a demand for the availability of species specific

antivenom. This type of antivenom should be available in health centers and emergency services in the peripheral areas where the venomous snakes are more likely to be found(Albdeer, Shannafiah, Alhaffar), rather than being concentrated in reference hospitals.

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