

A CLINICO EPIDEMIOLOGICAL STUDY OF SNAKE BITE

Muhammad Aftab Akbar¹, Misbahul Islam Khan², Mah-e-Munir Awan³ & Ijaz Hussain Malik¹

¹Department of Medicine & ²PMRC Research Centre, Nishtar Medical College, Multan.

³Railway Hospital, Multan.

ABSTRACT

Background: Poisonous snakebite is threat-full situation to life. Snakes are found all over the world. The people with poor living condition and to work at field are more vulnerable to come across the snake bites as compared to with modern living condition. It is also a significant occupational hazard commonly faced by rural adult individuals. A prospective study was conducted at Medical Department, Nishtar Hospital, Multan, to know the clinical and epidemiological aspects of snake poisoning.

Materials and Methods: The study period extended from November 2001 to July 2002. All victims of snakebite were examined and investigated to know the various patterns of toxicity. Toxic bites were recognized on the basis of clinical parameters of toxicity and appropriate laboratory reports. The main stay of treatment was polyvalent anti-venom.

Results: Most of the victims (78%) were found to be sufferer of toxic bites affected mostly on lower limbs (62%) and during night time (52%) of Summer season. Haemotoxic snakes were the most common type of snakes (52%) causing envenomations. 90% patients recovered completely. Death rate was found 6% and 4% resulted into disable person.

Conclusion: Snake poisoning is a potentially reversible condition with very good prognosis after appropriate management.

Key words: Snake bite, Venom, Toxicity.

INTRODUCTION

Venomous snakes are native throughout the world¹. Snake envenomation is an acute public health problem in many areas of Pakistan, especially south Punjab and Sindh. Due to the cultural traditions and socio-economic factors, all cases are not seen by physician. In Sindh, record of secondary health care centers have shown it to be among the five commonest causes of admission to hospitals. Based on the use of anti-venom, it is estimated that at least 40,000 episodes of snakebite occur each year². Snake venom is a complex mixture of various enzymes, basic polypeptides, glycopeptides and some low molecular weight proteins. Snake venom affects almost every organ system of the body either directly or indirectly, through the release of various auto-pharmacological substances e.g. kinins and complement components³. The most deleterious effects are seen in the cardiovascular, hematologic, respiratory and nervous system.^{4,5} This study was done to know the epidemiological characteristics of snakebite in and around Multan, and to highlight various patterns of toxicology in sufferers of snake envenomation.

MATERIALS AND METHODS

Multan and about seven various districts around it, having total population of more than 10

million, are catchment areas to tertiary care Nishtar Hospital, Multan. All victims of snakebite brought to this hospital, irrespective of age, sex and previous medical therapy were included in this study. Bite was regarded as toxic when:

- I. Clinical parameters of toxicity (local swelling, blistering, local or systemic bleeding, shock, cranial nerve palsies, respiratory insufficiency, generalized weakness, seizure, unconsciousness) were present with appropriate laboratory derangements; polymorphonuclear leucocytosis, raised activated partial thromboplastin time (APTT) or prothrombin time (PT), decreased platelet count or increased fibrinogen degradation products (FDPs).⁶
- II. Laboratory abnormalities like increased APTT without overt clinical manifestations.

Every asymptomatic victim was retained for a minimum period of 24 hours to be monitored clinically, half hourly and laboratory wise an hourly and was discharged if found non-toxic at the end of this period. Other investigations included were: ECG for ST-T changes of myocarditis, fundoscopy for retinal hemorrhage, Computed tomography (CT) brain for intracranial haemorrhage when suspected clinically. Urine for myoglobin and serum creatinine kinase where indicated.

Table-1: Mean age, sex and site of bite of patients studied.

Total Cases	Mean age (yr)	Victims of Rural areas	Site		Sex		Time of Bite	
			Upper Limb	Lower Limb	Male	Female	Day	Night
100	27.8 + 10.97	90	38	62	78	22	48	52

Table-2: Vasculo toxic cases.

Total	Thrombocytopenia	Afibrinogenemia	Intracranial-Hemorrhage	Retinal Hemorrhage	Myocarditis	Renal Failure	Disability	Death
52	20	52	4	4	6	—	2	2

Table-3: Neurotoxic cases.

Total	Ventilatory Support	Disability	Death
22	6	2	4

The mainstay of treatment was the polyvalent antivenom, supported with FFP/blood transfusion and artificial ventilation, in appropriate setting. Pre medication was done with chlorpheniramine (25 mg IV) and hydrocortisone (100 mg IV). Patients were discharged only when clinical and laboratory abnormalities settled.

Disability was defined by the development of permanent organ dysfunction (hemiplegia due to intracerebral hemorrhage or permanent loss of higher mental functions due to hypoxic brain damage resulting from respiratory insufficiency).

RESULTS

One hundred victims were studied with maximum number recorded in July (34%). The age range was 4-56 years (mean 27.8 + 10.97 years). 2% were below 10 and 4% above 50 years. 76% victims were field/farm workers, 6% grocer, 10% casual worker group (housewives, students, children, businessmen). Bite was accidental in all cases. 90% sufferers were from rural areas of various districts (Multan 28%, Khanewal 24%, Muzaffargarh 32%, Sahiwal 2%, Vehari 4%, Lodhran 2%, Dera Ghazi Khan 6% and Rajanpur 2%). 78% sufferers were males and 22% females. 62% had bite on lower extremities (55% below knees and only 7% on thighs). 38% had bite on upper limbs (35% on hands). One victim was struck on scrotum while micturating on a burrow. No case of bite on chest or face was recorded. 48% had bite during day and 52% at night. Majority had a toxic bite (78%). Table-1

Vasculotoxicity (52%) was the major type of poisoning followed by neurotoxicity (22%) and local toxicity (4%).

In vasculotoxic bites, and bleeding from all system of the body 52%, retinal hemorrhage 4%, intracerebral hemorrhage 2%, intracerebellar hemorrhage 2%, bleeding from GIT 18%, skin 10% respiratory tract 12%, urinary tract 18%, ears 2% and nose 14%. Maximum APTT was 360 seconds (control = 25 sec). 22% had APTT < 50 sec, while 30% had APTT > 50 sec. All vasculotoxic patients 52%, had afibrinogenemia, while 20% had thrombocytopenia (platelet count < 150,000) also. Myocarditis occurred in 6%, all sufferers of vasculotoxic bites (Table-2).

Six victims of neurotoxic bite required ventilatory support (29% of this group) all recovered completely. Disability rate was neurotoxic and vasculotoxic 2% each. Overall death rates was 6% 7, (neurotoxic cases had 9.6% and vasculotoxic 3.8%) (Table-3).

DISCUSSION

Adult farmers of our country are the chief victims of snakebite,⁸ because of their active involvement in the fieldwork. Although, not to that much extent, women are also exposed to this hazard because of less frequent outdoor activities, they have to perform. Most of the farm workers do not have proper footwear for protection against this problem. This situation occurs mostly at nights of hot humid summers when the reptiles move out of their burrows in search of food. These are also the breeding days for vipers and kraits². Moreover, certain habits of the villagers i.e. sitting and sleeping on ground further predispose to snakebite.² Results are comparable to those reported in literature.⁹ Although the hospital data may not reflect the total number of bites in an area, but it is obvious that most of the patients brought to hospital are sufferers of toxic bite (78%)^{7,9} and the major pattern of toxicity is hemotoxicity (52%) followed by neurotoxicity (22%).¹⁰ Absence of myotoxicity shows that terrestrial snakes in this area probably do not have much myotoxic effects. Significant disturbance in renal function are uncommon with both types of poison-

ing, it is quite common for victims to present at an advance stage of toxicity as evidenced by

- i. APTT > 100 sec in 24 % and APTT > 300 sec in 60% vasculotoxic cases.
- ii. Occurrence of bleeding from all systems of body in 18% cases.
- iii. Myocarditis in 6% cases.
- iv. Requirements for assisted ventilation in 29% neurotoxic cases.

The possible reasons may be:

- The use of traditional healing methods, which do not have any definite role in combating this situation.
- Lack of transport facilities due to night time bite.
- Late onset of symptoms of toxicity.
- Ignorance about the potential hazards of snakebite.

Disability (due to intracranial haemorrhage 2% and hypoxic brain damage 2%) and death (due to shock, respiratory failure)¹¹ antivenom and other supportive measure like artificial ventilation are available 90% patients recover completely. The death rate of 6% is comparable to the studies done previously in India, but is high from those done in Zimbabwe^{7,12}

CONCLUSION

1. Snake poisoning is a potentially reversible condition with very good prognosis.
2. Antivenom is the definite way of treating these patients.
3. The farm workers of our rural areas need to be educated about the potential hazards and protective measures for snakebite.

REFERENCES

1. Reid HA, Stings and bite. In: Bahr Manson EC, Apted FIC (Eds). Manson's tropical diseases. 18th ed. London . Baillier tindal. 1982; 544-61.
2. Hanstia MF, Malik GQ, Memon S. Snakebite. In: Illiyas M, Khan IA, Malik GQ, Mubashar M, Thaver IH, Inam SNB, Baig LA, Hanstia MF (Eds) Community medicine and Public Health. 5th ed. Karachi Time publishers. 2000: 1011-29.
3. Gutierrez JM, Rucavado a. Snake venom metalloproteinases. Their role in the pathogenesis of local tissue damage. Biochemic 2000;82(9-10): 841-50.
4. Russel FE. Snake venom poisoning in the United States. Ann Rev Med 1980; 31: 247-59.
5. Bush SP, Siedenburg E. Neurotoxicity associated with suspected southern pacific rattlesnake (*crotalus viridis helleri*) envenomation. Wilderness Environ Med 1999; 10: 247-9.
6. Zafar J, Aziz S, Hamid B, Qayyum a, Alam MT, Qazi RA. Snakebite experience at Pakistan Institute of Medical Sciences, Islamabad. J Pak Med Assoc 1998; 48: 308-10.
7. Kulkarni ML, Anees S. Snake venom poisoning experience with 623 cases. India Peditar 1994; 31: 1239-43.
8. Bhardwaj A, Sokkey J. snakebites in the hills of north India. Natl Med J India 1998;11:264-265.
9. Suleman MM, Shahab S, Rab MA. Snakebite in the Thar desert. JPMA 1998; 48: 306-8.
10. Rana M.A study of snakebite cases. Pak Med Assoc 1994; 44: 289.
11. Sanmugantan PS. Myasthenic syndrom of snake envenomation: a clinical and neurophysiological study. Postgard Med J 1998; 74: 596-9.
12. Nhachi CF, Kasilo OM. Snakebite in rural Zimbabwe; a prospective study. J Appl Toxicol 1994; 191-93.

Correspondence Address:

Dr. Misbahul Islam Khan,
Principal Research Officer
PMRC Research Centre
Nishtar Medical College, Multan