International Journal of Research in Medical Sciences
Dheer SK et al. Int J Res Med Sci. 2023 Apr;11(4):1192-1196
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20230860

Original Research Article

A study of clinico-epidemiological profile of patients of snake bite and their outcome in a tertiary care centre in central zone of Himachal Pradesh

Santosh Kumar Dheer, Roshan Lal*, Rajesh Kumar Bhawani

Department of Medicine, SLBSGMCH Mandi at Nerchowk, Himachal Pradesh, India

Received: 11 January 2023
Revised: 01 March 2023
Accepted: 02 March 2023

***Correspondence:**
Dr. Roshan Lal,
E-mail: 450mph@gmail.com

ABSTRACT

Background: The aim of this study was to assess clinico-epidemiological profile, prevalent treatment practices and outcome of snake bite patients in a tertiary care hospital in a hilly North central region of Himachal Pradesh.
Methods: A hospital record based retrospective descriptive study was done which included demographic data, clinical profile, prevalent traditional treatment methods of snake bite, treatment given at hospital and outcome among 144 patients.
Results: The 123 (83%) patients were young (age group of 17-50 years) and number of female patients was 89 (62%), 29 (38%) more than male patients. Most of snake bite cases recorded, presented in the months of July to September 56 (72.7%). The most frequently bitten sites were the upper limbs particularly left hand. 61 (42%) of patients presented without any features of envenomation. Hematotoxicity was the commonest presentation in 68 (82%) of patients followed by neuroparalysis in 26 (18%) of the symptomatic cases. Green snake (Green pit viper) was the commonest snake seen. Cure rate in our study was more than 80%. Major reason for delayed presentation was consultation of traditional healers.
Conclusions: In the tropics and subtropics, snake bite is a life threatening health hazard especially in poor rural people who usually waste precious time by indulging in harmful activities. This needs public as well as health care workers' awareness and prompt intervention in a health care facility.

Keywords: Snake bite, Green snake, Whole blood clotting time, Anti snake venom

INTRODUCTION

Envenomation from snakebites is a neglected but important public health problem especially in rural areas of South Asia, South-East Asia and sub-Saharan Africa, where majority of the population is poor, who lack basic amenities of life.[1,2] It has been classified by WHO as neglected tropical disease (NTD).[1] Globally snake bite burden is 1,841,000 envenomings and 94,000 deaths per annum as estimated by WHO.[1] India is reported to have the highest number of deaths due to snakebites in the world, with 119,368 envenomings and 1559 deaths per annum, with death rate of 4.1/100,000 per annum.[3,4] Himachal Pradesh has reported 1095 envenomings and 40 deaths per annum, which as per estimates maybe as high as 208 deaths per annum.[4,5]

Most of the fatalities are due to victims not reaching the hospital in time where definite treatment can be administered. In addition, community is also not well informed about the occupational risks and simple measures which can prevent the bite. It continues to adopt harmful first aid practices such as tourniquets, cutting and suction etc. Studies reveal that primary care doctors do

not treat snake bite patients mainly due to lack of confidence in administering ASV.[7] The data on the clinico-epidemiological profile of snake bite is sparse in this part of India. Therefore, we describe the epidemiological profile, clinical manifestations, and management practices of snakebites in a hilly North Indian state Himachal Pradesh.

METHODS

A retrospective descriptive study on clinico-epidemiological profile and outcome of snakebite victims admitted at SLBSGMCH Mandi, Himachal Pradesh was conducted from May 2017 to September 2018. Locally toxic, hematotoxic or neurotoxic bites were classified as poisonous bites.[7] The sample size was 144 that is the number of patients admitted with history of snake bite from May 2017 to September 2018. The bites having manifestations such as local swelling, bullae, local necrosis or gangrene were classified as locally toxic bites and those bites having whole blood clotting time (WBCT) of more than 20 minutes, haematuria, epistaxis, hypotension, ecchymosis, sub-conjunctival haemorrhage, hematemesis or melena– were classified as hematotoxic bites. The bites having ptosis, diplopia, encephalopathy convulsions, dysphagia or dysarthria were classified as neurotoxic bites.

We studied management practices amongst the poisonous cases in relation to the use of ASV, calculated the cure rates, case fatality rates, and calculated the median time of hospital stay by type of bites. We analysed the data using chi-square test for comparison.

Inclusion criteria

Age should be 18 years or more and history of snake bite should be included in the study.

Exclusion criteria

If age below 18 years, known case of chronic kidney disease, chronic liver disease, coagulopathy. Patient on anticoagulation or history of any other insect bite were excluded.

Ethic committee approval

Exempted by ethical committee.

RESULTS

The 144 cases of snakebites were admitted at SLBSGMCH Mandi (HP) from May 2017 to September 2018. The 123 (85.4%) out of 144 patients were from rural areas and 21 (14.6%) were from urban areas, in the age group of 17-90 years with median age of 38±14.8 years. Out of symptomatic 83 (57.6%) of patients with features of envenomation, hematotoxic manifestations in 68 (82%) and neuroparalytic features were seen in 15 (18%) patients (Table 1).

Most of the victims in our study were bitten outdoors 114 (79.2%). The 86 (59.7%) patients were wearing chappals, 37 (25.7%) were wearing shoes and 21(14.6%) were barefoot at the time of bite. Of all the snakebites, 73% occurred in the months of July–September. The 89 (62%) of all cases were females, amongst whom 63 (70.8%) were 21-50 years old.

Agriculture was the occupation of most of the patients 111 (77%). The 10 (7%) patients were manual labourers. Fang marks were present in 124 (86%) out of 144 patients.

Table 1: Demographic profile of snake bite victims.

Factors	N (%)
Gender distribution	
Male	55 (38)
Female	89 (62)
Rural/Urban	
Rural	123 (85.4)
Urban	21 (14.6)
Educational status	
Up to secondary	105 (72.9)
>secondary	22 (15.3)
Illiterate	17 (11.8)
Occupation	
Farmers	111 (77)
Housewives	16 (11)
Students	8 (6)
Manual workers	9 (6)
Place of bite/ locality	
Rural areas	122/144 (85)
Urban areas	22/144 (15)
Fang marks	
Present	124 (86)
Absent	20 (14)

The 64 (44.4%) reached health facility within six hours. Median time to reach health facility was 8±4.7 hours (Table 2).

Table 2: Time delay between snake bite and hospital admission.

Time of delay	N (%)
< 1 hour	0
1-6 hours	64 (44)
>6-24 hours	69 (48)
1-5 days	9 (6)
>5 days	2 (1.4)

Of the 68 hematotoxic bites, 21 (30.9%) patients had systemic plus local toxicity and 15 (41.7%) patients had only local toxicity. Out of 15 neurotoxic patients, 13 (86.7%) were having systemic neurotoxic manifestations

and 2 (13.3%) were having neurotoxic manifestations plus local swelling (Table 3).

Table 3: Clinical features of snake bite victims.

Variables	N (%)
Local manifestations of snake bite	
Pain and tenderness	144 (100)
Swelling/cellulitis	77 (53)
Local rise of temperature	82 (57)
Blisters	42 (29)
Bleeding at site of bite	68 (47)
Local lymphadenopathy	22 (15)
Hematotoxic manifestations	68/83 (82)
Haematuria	30 (44)
Melena	10 (14.7)
Neuroparalytic manifestations	15/83 (18)
Ptosis	15/15 (100)
Bulbar paralysis	2/15 (13)
Respiratory paralysis	13/15 (86.7)
Loss of consciousness	12/15 (80)

The 71 (49.3%) of 144 bites occurred in morning, 24 (16.7%) in afternoon, 30 (20.8%) in evening and 19 (13%) bites occurred at night. The 97 (67.4%) patients were referred from peripheral health institutions and 47 (32.6%) patients came directly to this tertiary care hospital. The 20 (14%) patients reached health facility late because of poor road conditions. The 101 (70.1%) patients visited traditional snake bite healers (snake charmer), 75 (62.5%) personally and 26 (21.7%) patients contacted them telephonically. Most of the patients used traditional methods of snake bite treatment.

The 127 (88.2%) patients used tourniquets, 131 (91%) patients gave incisions at site of snake bite, 45 (58.4%) snake bite patients applied decoction (poultice i.e., Crushed leaves or shrubs), 22 (15.3%) applied burnt chillies, 30 (20.8%) mud and snake stone were applied by 11(7.6%) patients before reaching the hospital (Table 4).

Table 4: Pre-hospital care received.

Pre-hospital care	N (%)
Visit to snake charmer/shaman (jhar-phoonk)-in person)	75 (62.5)
Contacted snake charmer/shaman (jhar-phoonk)-telephonically	26 (21.7)
Incision	131 (91)
Tourniquet	127 (88.2)
Application of herbal medicine, decoction/poultice (crushed leaves)	84 (58.3)
Application of mud	30 (20.8)
Application of burnt chillies	22 (15.3)
Application of snake stone	11 (7.6)
Suction of venom from bite	5 (3.5)
No first aid	13 (9)

WBCT of more than 20 minutes was observed in 53 (64%) of the poisonous bites. Mean WBCT was 22±6.6 minutes. In 15 (22%) patients out of 68 hematotoxic bites even at the time of discharge WBCT was still prolonged. The 250 ml was the maximum and 100 ml was the minimum ASV given in neurotoxic bites, whereas in haematotoxic bite 300 ml was maximum and 50 ml was minimum ASV given to patients. Amongst 83 poisonous bites, 21 (25%) were referred to higher institutions.

Out of 21 referrals, 13 (62%) were referred due to severe neurotoxic complications, 6 (28.5%) due to complications of hematotoxicity (ARF) and 2 (9.5%) patients were referred on request, who had recurrent hypersensitivity to ASV.

Table 5: Complications observed following hospitalisation.

Complications	N (%)
Acute renal failure (Hematotoxic bite)	6/68 (8.8)
Respiratory failure (Neurotoxic)	13/15 (86.7)
Hypersensitivity reaction after ASV	13/83 (15.7)
Recurrent hypersensitivity reaction after ASV	2/83 (2.4)
Gangrene at bite site (Hematotoxic bite)	2/68 (5.8)

Of the 97 cases referred from peripheral health institutions, 71 (73.2%) were bitten by poisonous snakes. Amongst these envenomations, only 9 (13%) were given ASV at the peripheral institute before referral. Prophylactic regimen consisting of dexamethasone or hydrocortisone and pheniramine maleate (Avil) in injectable forms, was used in 49/83 (59%) of the cases prior to administration of ASV. Of all the poisonous bites, 83 (100%) were given ASV at SLBSGMC hospital and 13 patients developed severe hypersensitivity reactions. Repeat doses of ASV were given to 32 (38.6%) of the cases. The 123 (85.4%) out of 144 patients improved. No death was reported in this study. The maximum duration of hospital stay was 12 days and minimum stay was of 1 day. The median duration of hospital stay was 18 hours.

DISCUSSION

The N144 patients (55 males and 89 females) admitted in medical wards with history of snake bite were included in the study. Majority of them were farmers (77%) from rural background (85.4%). These findings suggest that young females with rural background are more exposed to snakes as they are involved in outdoor activities in the fields and forest. A study published by Mahur et al reported data of 100 patients out of them 73% were farmers, 59% were males and 83% incidences occurred in rural areas like our observation.[11,13] Another study by Kaushik et al published in 2018 from Himachal reported in profile of snake bite patients median age as 38.46 years

with 61 % females, 88% rural patients and 71.79% were agriculturists, almost like our data.[14]

Our data suggested that most common site of bite was upper extremity (61%) while in study by Kaushik et al it was 44.88% in feet and 43.59% in hands, while Mahur et al reported foot in 50% and hand in 44% cases.[11,14] In this region people work in fields and jungles to collect grass, leaves or crop without using protective gloves hence chances of snake bite on hands are high. Also, people are mostly right-handed and use sickle (daraati) with right hand and use left hand to hold grass and leaves, so more chances of snake bite on the left hand. 107 patients were either barefoot or were wearing chappals at the time of bite suggesting increased risk of snake bite with poor protection as snake getting toddled while walking either bare foot or wearing chappals instead of shoes.

Most bites occurred during daytime (79.2%) and in the months of monsoon. In a study by Kaushik et al peak incidence (60.25%) of snake bites was in same months.[14] Rise in snake bite cases in rainy season occurs as the habitat of snakes gets flooded.

In present study 44.2% patients reached hospital within 1-6 hours, 48% patients reached after 6-24 hours of bite, rest all reached after 24hours in the hospital. Most common reason for delayed presentation in hospital was consultation with traditional healers (83%) followed by poor transport facility (14%). In our study reasons for delayed presentation were visit to snake charmers in person (62.5%), telephonic treatment by snake charmers (20.7%). Practices like tourniquet application (88%), application of herbal medicine, decoction (58.3%), application of mud (20.8%), burnt chillies 15.3%, application of snake stone (7.6%), suction from bite site (3.5%) were present in this study. A study from Bangladesh by Rahman et al reported that 86% victims went to snake charmers for treatment after snake bite later only 10% visited doctors while only 3% visited doctor as a first contact.[17] Reason reported was unawareness of efficacy of ASV, lack of transport facility, lack of ASV at hospitals, similar reasons we found in our study. People have many prevalent myths regarding snake bite treatment. A study by Kulkarni et al found that out of total 633 patients of snake bite only 6.6% were admitted with in 1 hour while 22% patients reached after 24 hours.[16] Himachal being a rural predominance, traditional methods of healing are still popular hence patients waste their precious time in consulting traditional healers. In a study by Kaushik et al 66.67% patients reached hospital within 6 hours after the snake bite.[14] They attributed difficult terrain and hilly area as major cause of delay.

Most common complaint in this observational study was pain and tenderness at the site of bite (100%) followed by local rise of temperature (57%), swelling (43%), blisters (19.5%). Pain and bleeding from bite site occurred in all bitten patients, followed by haematuria in 44% and blisters in 19.4% cases as hematotoxic manifestations, while ptosis (100%), followed by respiratory paralysis in 13 out of 15patients and bulbar palsy in two patients as feature of neurotoxicity. Six (8.8%) patients developed renal failure, 13 patients required ventilatory support, 2 patients had gangrene at bite site and 13 patients had hypersensitivity during ASV infusion. A negligible proportion of envenomings were given ASV in peripheral institutions. This could be due to issues of nonavailability or lack of confidence to administer ASV amongst medical officers. In a study by Gaurav et al most common hematotoxic manifestation was bleeding (83.33%) followed by cellulitis (57.14%).[13] In study by Kaushik et al presenting complaints were pain and swelling 74.36%), 7.69% had ptosis (n=6).[13] In same study 51% patients had raised WBCT, 14.1% patients had AKI 8.9 % patients needed haemodialysis. Renal failure was in close concordance with our study.

Limitations

Sample size was small. Prolonged whole blood clotting time even on discharge needed further workup. Patients below the age of 18 years could not be included in study.

CONCLUSION

Snake bite is an important medical emergency with significant mortality and morbidity. Our study showed that young females, farmers, labourers and rural people are more exposed to snakes. Hematotoxic snakes are more common in this part of India. There is need of mass education of people about snake bite management as most people waste precious time in either useless/harmful activities responsible for increased morbidity and mortality.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. World Health Organization. First WHO Report on Neglected Tropical Diseases, Geneva. 2010.
2. Harrison RA, Hargreaves A, Wagstaff SC, Faragher B, Lalloo DG. Snake envenoming: a disease of poverty. PLoSNegl Trop Dis. 2009;3:e569
3. Mohapatra B. Warrell D. A.Suraweera W. Snakebite mortality in India: a nationally representative mortality survey. PLoS Negl Trop Dis. 2011;5:e1018.
4. Central Bureau of Health Intelligence. National Health Profile (NHP) of India-2011, New Delhi. 2011.
5. Warrell DA. Treatment of bites by adders and exotic venomous snakes. BMJ. 2005;331:1244-7.
6. Bhardwaj A, Sokhey J. Snake bites in the hills of north India. Natl Med J India. 1998;11.

7. Warrell DA. WHO/SEARO Guidelines for the clinical management of snake bites in the Southeast Asian region. Southeast Asian J Trop Med Public Health. 1999;30.
8. Ministry of Health and Family Welfare. National Snakebite Management Protocol, New Delhi. 2009.
9. Department of Health and Family Welfare WB. A Module on the "Management of Snake Bite Cases" for Medical Officers, Kolkata. 2012.
10. Whitaker R, Whitaker S. Venom, antivenom production and the medically important snakes of India. Curr Sci. 2012;103:635-43.
11. Mahur H, Ahada RS, Singh DP, Singh Y, Jain A. A study of clinical profile and outcome of snake bite at tertiary care centre in south Rajasthan. J Med Sci Clin Res. 2019;07(5).
12. Gauravbhalla G, Mhaskar D, Agarwal A. A study of Clinical Profile of snake bite at a tertiary care centre. Toxicol Int. 2014;203-8.
13. Kaushik M, Banyal V, Sondhi S, Thakur MK, Kaushik A. Clinical profile of snake bite patients in tertiary care hospital in Himachal Pradesh: a prospective study. Int J Res Med Sci. 2018;6:2444-8.
14. Kulkarni Kulkarni ML, Anees S. Snake venom poisoning, experience with 633 patients. Indian Paediatr. 1994;31:1239-43.
15. Rahman R, Faiz MA, Selim S, Rahman B, Basher A, Jones A et al. Annual Incidence of Snake Bite in Rural Bangladesh. PLoS Negl Trop Dis. 2010;4(10):e860.

Cite this article as: Dheer SK, Lal R, Bhawani RK. A study of clinico-epidemiological profile of patients of snake bite and their outcome in a tertiary care centre in central zone of Himachal Pradesh. Int J Res Med Sci 2023;11:1192-6.