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Research Article

A study on the clinico-epidemiological profile and the outcome of snake bite cases in the tertiary care hospital

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ABSTRACT

Background: Snake bite is a common medical emergency and an occupational hazard in India. It is also a major public health issue in rural India where farming is a major source of employment. Very few studies describe epidemiology of snake bite from India. Hence, this study was planned to collect information on various aspects of snake bite in a tertiary care hospital.
Methods: A prospective observational study of 167 patients of snake bite and unknown bite carried out from September 1, 2012 to August 31, 2013.
Results: Among a total 167 cases, majority were males (54.49%), aged between 20 and 40 years (38.92%). Most of the cases were laborers (61.67%) and farmers (17.36%). Peak incidence was observed during monsoon (64.67%). Bite mark was seen in 46.70% cases, upper extremity being common site (52.09%). Most cases were of vasculotoxic bite (65.26%) and few were of neurotoxic bite (19.76%). Major complications were respiratory failure (4.79%) and acute renal failure (1.8%). Average bite to needle time was 365 min. Bleeding & clotting time was raised in 44.03% & 35.19% cases, respectively. Average dose of anti-snake venom (ASV) required was 17.1 vials. Allergic reactions to ASV observed in 8.38% cases. Mean duration of hospital stay was 4.3 days. Recovery rate was 94.01% with three cases referred to higher center. Mortality rate was 2.39%.
Conclusions: Our study highlights various aspect of snake bite cases and tries to find out ways to improve quality of life of patients, decrease mortality and morbidity and decrease economic burden on society.

Keywords: Epidemiology, Snake-bite, Anti-snake venom, Outcome

INTRODUCTION

Snake bite is a common medical emergency and an occupational hazard in rural populations of India, where farming is a major source of employment.[1] In India, there are 216 species of snakes of which most important venomous snakes are Cobra, Common Krait, Russell's viper, and E. Carinatus.[2] In India, more than 20,00,000 snake bites reported annually, of which 35,000-50,000 people die and Maharashtra contributes more than 2000 deaths each year.[3]

Most of the cases of snake bite occur in rural area mainly because of their occupation and close proximity to nature. In rural area, people seek out for local remedies instead of reaching nearest hospital. In most cases, vital time is lost before transport to hospital and only the severe snake bite cases reach the health care center. Furthermore, lack of knowledge of first aid measures, scarcity of anti-snake venom (ASV), cost of treatment, poor health services and wrong identification of snake species leads to morbidity and mortality.[4,5]

Along with these problems, scarcity of studies on snake bites leads to lack of understanding of various epidemiological factors associated with this neglected disease.[5] So as far as snake bite cases are concerned, along with creating a public awareness for management of snake bite, various epidemiological factors need to be understood to improve outcome of snake bite cases. Hence, this study is carried out to describe epidemiology, clinical features, complications, outcome and use of ASV in snake bite cases in Government medical college, Latur, Maharashtra.

METHODS

A prospective observational study was carried out on 167 patients of snake bite and unknown bite requiring ASV for duration of 1 year (September 1, 2012 to August 31,

2013). Data on the epidemiological factors, clinical features, investigations, complications, details of the treatment and outcome were recorded and analyzed.[6]

During this period, patients were followed up for the entire duration of hospital stay. Detailed proforma was prepared and information about following parameters was recorded & analyzed:

1. Patient parameters (Register No, Name, Age, Sex, Address, Occupation Date of admission, Ward, Clinical features, Prior any t/t taken, Complication developed, Duration of hospital stay).
2. Snake bite Characteristics like (Bite mark, Assessment of bite mark, Site, Tissue condition, Time, Bite to needle time, Snake identified by Forensic medicine teachers).
3. ASV (Time of administration, Frequency of administration, Dose- loading and maintenance (total) in hospital and outside hospital, Duration, Side-effects, Total dose per patient, Total cost).
4. Investigations (bleeding time, clotting time) and concomitant medications.

RESULTS

A total of 167 cases of snake bite were included in this study that came to the hospital from September 1, 2012 to August 31, 2013. Among 167 cases, highest incidence of snake bite was observed in the age group 30-39 years (23.35%) (Table 1 & Figure 1). Mean age of the male patient was 36.5 years and that of the female patient was 34.33 years. Most of the cases were males 91 (54.49%) and the male to female ratio was 1.2:1.

Table 1: Analysis of age & sex in snake bite cases.

Age group	Male No. (%)	Female No. (%)	Total No. (%)
<10	1	4	5
10-19	18	8	26
20-29	16	10	26
30-39	16 (9.58)	23 (13.77)	39
40-49	14	22	36
>50	26	9	35
Total	91 (54.49)	76 (45.50)	167

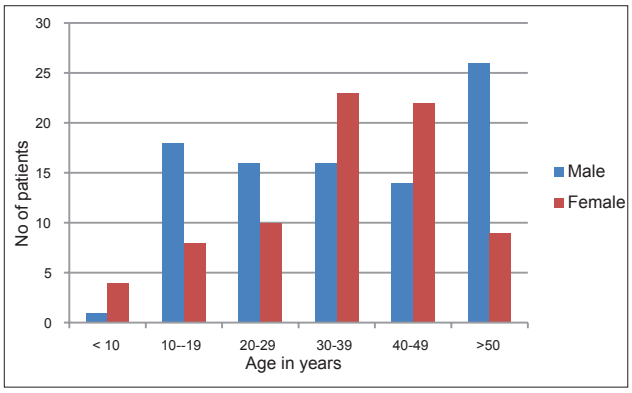

Figure 1: Age and sex distribution of snake bite cases.

Majority of cases (78.45%) were from rural area with a rural to urban ratio of 3.63. Most of cases were laborers (61.67%) and farmers (17.36%). Peak incidence of cases occurred during months of June to September (64.67%) (Table 2).

The most common type of snake bite cases were vasculotoxic (65.26%) followed by neurotoxic (19.76%) (Figure 2). The most common presenting symptoms were pain and swelling in 42.51% followed by ptosis, altered vision and breathlessness in 13.76% (Figure 3). Definitive bite marks were seen in 46.70%. Upper extremity is being the most common bite site in 52.09%. Maximum number of cases (65.26%) came within 1-6 hrs (Figure 4). Mean dose of ASV was more for neuroparalytic snake bite (19 vials) (Figure 5). Allergic reaction to ASV was noted in 8.38%. Average

Table 2: Analysis of epidemiological factors in snake bite cases.

Factors	No. of patients (%)
1. Place	
Rural area	131 (78.45)
Urban area	36 (21.55)
2. Occupation	
Laborers	103 (61.67)
Farmers	29 (17.36)
Others	35 (20.87)
3. Season	
Rainy	108 (64.67)
Winter	42 (25.14)
Summer	17 (10.17)

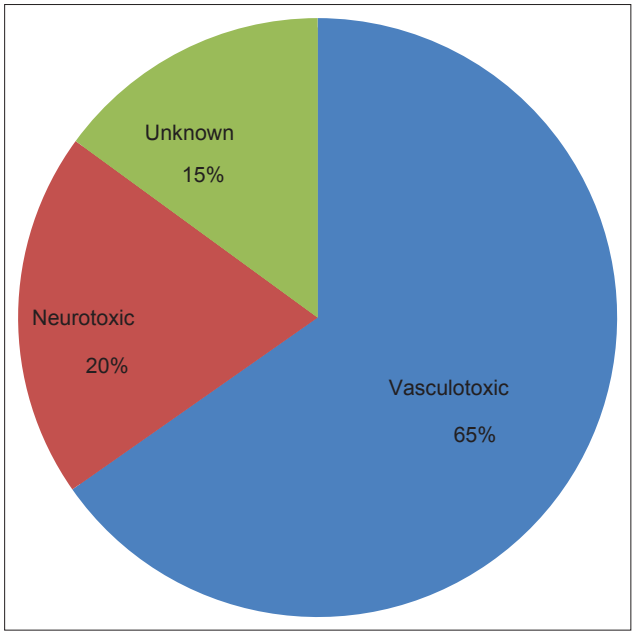

Figure 2: Type of snake bite cases.

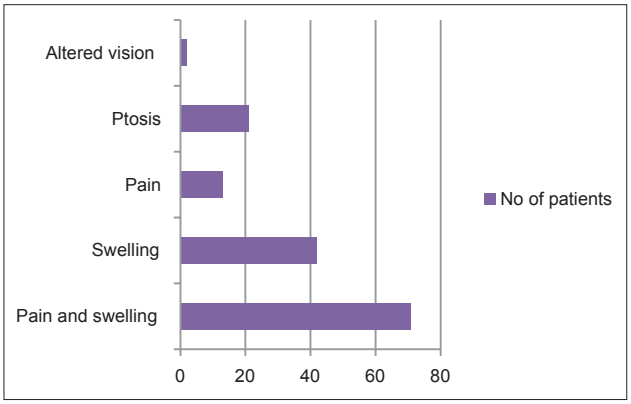

Figure 3: Clinical profile of envenomous snake bite cases.

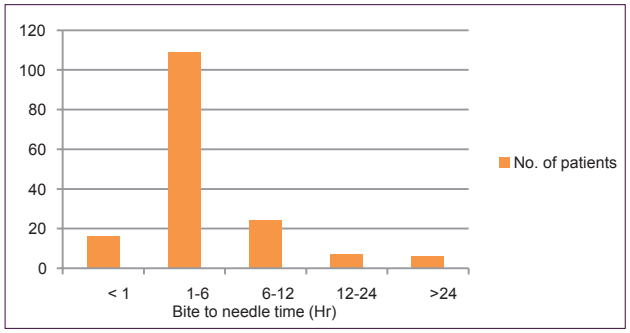

Figure 4: Bite to needle time.

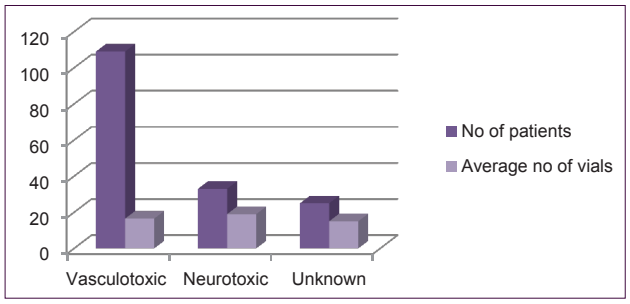

Figure 5: Average no. of vials for snake bite cases.

bleeding time and clotting time was 4.62 and 12.22 min, respectively (Table 3).

In our study, cellulitis was the most common complication developed (25.74%). Recovery rate was 94.01% (Table 4).

DISCUSSION

Snake bite is an important and preventable health hazard. But lack of understanding of epidemiological factors and proper treatment leads to increase in mortality and morbidity. Hence, we planned this study to focus on various clinicoepidemological factors related to snake bite with the hope of improvement in mortality and morbidity of snake bite cases.

In our study, we included a total of 167 snake bite cases over 1 year duration. We followed each individual case

Table 3: Analysis of patient factors in snake bite cases.

Type of snake bite	No. of patients (%)	Average no. of vials	Cost	Average hospital stay (days)
Vasculotoxic	109 (62.67)	16.5	13,200	5.5
Neurotoxic	33 (19.76)	19	15,200	4.11
Unknown	25 (14.97)	15	12,000	3.6
1. Bite mark (%)				
Not present				89 (53.29)
Present				78 (46.70)
2. Site (%)				
Upper limb				87 (52.09)
Lower limb				75 (44.90)
Unknown				5 (2.99)
3. Bite to needle time (hr) (%)				
<1				16 (9.58)
1-6				109 (65.26)
6-12				24 (14.37)
12-24				7 (4.19)
>24				6 (3.59)
Not known				5 (2.99)
4. Clinical features (%)				
Pain and swelling				71 (42.51)
Swelling				42 (25.14)
Pain				13 (7.78)
Ptosis				21 (12.57)
Altered vision				2 (1.19)
5. Reactions to anti-snake venom (%)				
Itching and rash				11 (8.38)
Shock and bronchospasm				3 (1.79)
Bleeding time				44.03%
Clotting time				35.19%

Table 4: Analysis of outcome of snake bite cases.

	No. of patients (%)
1. Complications	
Cellulitis	43 (25.74)
Acute renal failure	3 (1.8)
Respiratory failure	8 (4.79)
2. Outcome	
Recovery	157 (94.01)
Referred to higher center	3 (1.79)
Mortality	4 (2.39)

from its admission until hospital discharge while recording the various parameters related to snake bite.

In the present study, highest incidence of snake bite was found in the age group 30-39 years because this age group

is commonly involved in farming, thereby increasing the risk of occupational hazard. Age group of 30-50 years with a peak incidence of the patients in their third decade has been observed in the earlier studies in India and SEAR.[7-11] Most of the cases were male because it is an active group involved in earning for the family. In India, men are involved in various outdoor activities, especially working in a farm which makes them more susceptible for snake bites. Our finding concurred with recent South Asian review report.[7] Incidence of snake bite was found more in people residing in rural area compared to urban area and this difference was due to exposure to agricultural work which is comparable with previous studies.[12] Most of the human snakebites occur during the monsoon season. This can be attributed to the high seasonal rainfall, abundant natural vegetation and high density of rodents, reptiles and amphibians making it an ideal habitat for snakes to live and also to the intensive human agricultural activities further leading to increased more snake bites. Our findings are in agreement to previous studies.[13]

Highest topological distribution of snake bite cases in this region was vasculotoxic snake bite followed by neurotoxic snake bite and least were unknown bite. Definitive bite marks were seen in 46.70%. A patient of snakebite without bite mark also showed signs of envenomation. This focuses the importance of keeping the patient under observation irrespective of the presence or absence of bite mark. Upper extremity is most commonly involved which is in contrast with a previous study.[14] Bites on the upper limbs occur because of accidental contact with snakes while trying to hold the grass during harvesting.

Among the vasculotoxic snake bites, pain and swelling was the main manifestations which are in contrast with a study where it was found that bleeding was main manifestation.[15] This difference in the hemorrhagic manifestations in the different studies is due to the subtle differences among the venoms of the viperine subspecies in different regions. In neuroparalytic cases, ptosis was main manifestation followed by altered vision and breathlessness which is comparable with Srilankan studies.[16,17] Most common complications was cellulitis and acute renal failure in vasculotoxic cases and respiratory failure in neuroparalytic cases. Cellulitis may be related to the large number of patients who received first aid measures in primary health centers. Average bite to needle time was 365 min. Bleeding time was raised in 44.03% cases and clotting time was raised in 35.19% cases. 21.55% patient received blood transfusion and fresh frozen plasma.

ASV is only effective and specific treatment which is available for snakebites envenomation. This therapy is not always available for snakebite cases because of its high cost, lack of availability and difficulty in correctly identifying the snake.[18] Mean dose of ASV for neuroparalytic snake bite was more compared to vasculotoxic snake bite. This is due to severe envenomation by neuroparalytic snake bite. Average economic burden in neuroparalytic snake bite was higher than vasculotoxic snake bite. Allergic reaction to ASV was noted in 8.38% which include itching, rash, shock; bronchospasm within a few hours. The reactions were probably due to previous sensitization.

Mean duration of the hospital stay was more due to continuous ventilatory support in neuroparalytic snake bite, which also adds to economic burden of these snake bite cases.

We found that 25.16% of the cases had reached hospital after a delay of 6 hrs. This delay in their arrival was due to poor transportation facility, use of local remedies and lack of awareness of the hazards of snakebite.[19] Four patients developed respiratory failure and died most probably due to delay to reach hospital, giving mortality rate of 2.39 %. Hence, prompt hospital admission and administration of ASV to snake bite victim is vital. 3-10% variation in mortality rates from snakebites was reported in various studies.[20]

CONCLUSION

Our study highlights various aspect of snake bite cases and tries to find out the ways to improve quality of life of patients, decrease mortality and morbidity and decrease economic burden on society. Appropriate prior first aid measures like immobilization; prompt transport of victims to the hospital along with early administration of ASV remains the mainstay to reduce the mortality. Lack of transport facilities and use of local remedies are common reasons for causing delay in seeking treatment. There is an urgent need to educate the rural community about seeking early treatment of snakebites, avoiding quack measures and hazards of snake bites.

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