

Original Research Article

A prospective study regarding cardiovascular manifestations following snake bite

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ABSTRACT

Background: Snake bite is an occupational hazard especially of agricultural workers. Through snake bite venom, a complex mixture of various enzymes, polypeptides and toxins are injected into body of the victim. Clinical features of snake bite include local effects such as pain, swelling, cellulitis, tissue necrosis and lymphadenopathy. Snake bite and its common complications like nephrotoxicity, neurotoxicity and haemorrhagic manifestations have always been stressed. The cardiovascular abnormalities following snake bite was relatively less stressed complication; hence the present study has been conducted. Aim of the study was to observe clinical, electrocardiographic and cardiac changes following snake bite.

Methods: Present prospective study has been conducted in emergency ward of medicine department of K. R. Hospital, Mysore, India during the period from July 2004 to May 2005.

Results: In the present study 80% of cases were in second and third decade of life. Male patients were outnumbered female patients. 70% of cases were from agricultural background. Distal part of the body was the most common site involved in snake bite, 82% of cases presented within 24 hours of snake bite. Cardiac manifestations were seen in 36% of cases in the form of hypotension, ECG changes and elevated cardiac enzymes.

Conclusions: Cardiovascular system involvement following snake bite was not rare, it was mandatory to record ECG and estimate cardiac enzymes as soon as possible in detecting cardiotoxic effects following snake bite.

Keywords: Atrial fibrillation, Breathlessness, Cardiac enzymes, Cardiovascular changes, Hypotension, Hypertension, Snake bite

INTRODUCTION

Snakes have object of awe and curiosity in all lands. They have been associated with mysticism and object of fear. Their mention in earliest medical writings indicates that bites by poisonous snakes must have been one of the first kinds of poisoning known to man. There are more than 3500 species of snakes, about 500 belongs to the four families of venomous snakes and only 200 species have caused morbidity and mortality in humans.¹ Commonly encountered poisonous snakes in India are

cobras, kraits and vipers.² Few patients of snake bite die out of terrible scare, apprehension and shock, even though there are no signs of envenomation.¹⁻⁴ Though prevention would be ideal, in a setting of developing country like India with occupational emphasis on agriculture and hence exposure to deadly snakes, the alternative is to stress on timely and appropriate management of snake bites. This will be possible through careful study of symptomology, pathogenesis and value of timely medical attention. Snake bite and its common complications of nephrotoxicity, neurotoxicity and

haemorrhagic manifestations have always been stressed. The cardiovascular changes in snake bite are a relatively less stressed complication. Hence the present study has been undertaken with aim of observing cardiovascular changes following snake bite. The aim of the study was to observe clinical, electrocardiographic and cardiac changes following snake bite.

METHODS

Hospital based prospective study has been conducted in emergency ward of medicine department of K. R. Hospital, Mysore, India from July 2004 May 2005. All poisonous snake bite cases (50) admitted during the study period was taken by using clinical criteria of D. A. Warrell in The Clinical Management of Poisonous Snake Bites in South East Asia region (WHO). Data analysis was done by using MS Excel sheet, chi-square goodness of fit test and fisher exact test.

RESULTS

Present study has been conducted in emergency ward of Medicine Department of K. R. Hospital, Mysore, India from July 2004 to May 2005. In the present study maximum number of snake bite cases were in the age group of 20-29 years (25) followed by 30-39 years (15) and 13-19 years (06) of age group; minimum cases were observed in 40-49 years of age group (04). Males were more exposed to snake bite as compared to females (Table 1).

Table 1: Age and gender distribution of snake bite cases.

Age (years)	Males (%)	Females (%)	Total (%)
13-19	04 (10.53)	02 (16.67)	06 (12)
20-29	21 (55.26)	04 (33.33)	25 (50)
30-39	10 (26.31)	05 (41.67)	15 (30)
40-49	03 (7.90)	01 (8.33)	04 (8)
Total	38 (100)	12 (100)	50 (100)

*Fisher exact test;; p value = 0.493 not significant

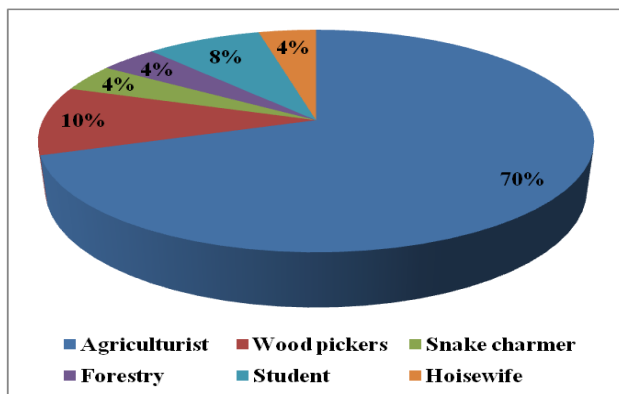


Figure 1: Occupation wise distribution of snake bite cases.

Maximum proportion of snake bite cases were found in agriculturist group (70%) followed by wood pickers (10%) and other groups (Figure 1). In the present study most of snake bite cases (14) were admitted in the hospital between 2 to 4 hours of the bite and maximum duration between snake bite and hospital admission was > 48 hours, which was seen in 2 patients (Figure 2).

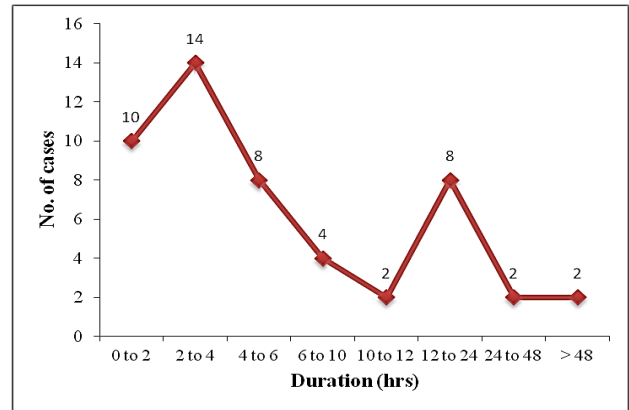


Figure 2: Interval between snake bite and hospital admission.

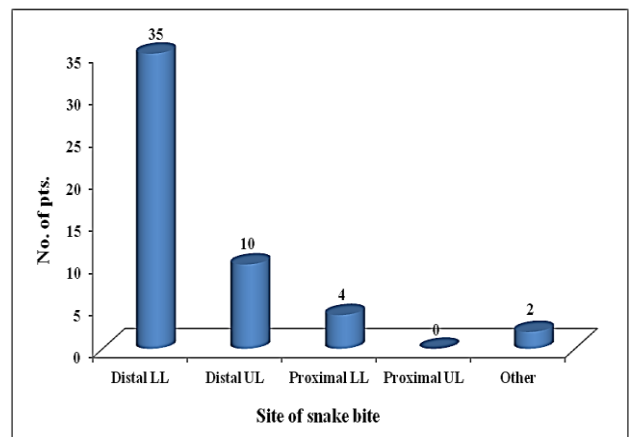


Figure 3: Distribution of cases as per site of snake bite.

Maximum number of patients 45 (90%) had snake bite on distal part of the body; 39 (78%) patients had bite on lower limb and 10 (20%) had bite on upper limb (Figure 3). We observed that all cases (50) had severe pain at the site of bite while 45 (90%) had local swelling, 35 (70%) had bleeding and 25 (50%) discoloration; 20 (40%) had parasthesia and 10 (20%) had blebs/ blisters (Table 2). Tachycardia was noticed in 20 (40%) cases while bradycardia was present only in 5 (10%) cases; five (10%) patients presented with palpitations and 4 (8%) patients had breathlessness (Table 3). Among all cases commonest ECG changes noticed was sinus tachycardia (19) followed by ST segment depression in 12 patients, sinus bradycardia in 5, ventricular ectopics in 4, T wave inversions in 2 and tall T waves in 2 patients (Table 4).

Table 2: Local symptoms wise distribution of cases.

Local symptoms*	No. of cases	Percentage
Severe pain	50	100
Swelling	45	90
Bleeding	35	70
Discoloration	25	50
Parasthesia	20	40
Blebs/ blisters	10	20

* Multiple responses

Table 3: Cardiovascular manifestations in snake bite cases.

Cardiac manifestations	No. of cases	Percentage
Tachycardia	20	40
Bradycardia	05	10
Palpitations	05	10
Breathlessness	04	08
Chest pain	00	00

Table 4: Electrocardiographic manifestations of snake bite cases.

ECG changes	No. of cases	Percentage
Sinus tachycardia	19	38
Sinus bradycardia	05	10
Atrial fibrillation	01	02
Sinus arrhythmia	00	00
Ventricular ectopics	04	08
Sino-atrial block	01	02
First degree AV block	01	02
Second degree AV block	00	00
Complete heart block	00	00
ST segment depression > 1mm	12	24
ST segment elevation > 1mm	00	00
Tall T waves	02	04
T wave inversions	02	04

* χ^2 value= 107.0638; d.f. = 4; p value = <0.01; highly Significant**Table 5: distribution of snake bite cases according to changes in cardiac enzymes.**

Enzyme	No. of cases	Percentage
Normal CK (MB), SGOT	26	52
Elevated CK(MB), SGOT	18	36
Elevated CK(MB)	04	08
Elevated SGOT	02	04

* χ^2 value = 31.6; d.f. = 3; p < 0.01 highly significant.

In the present study elevated CK-MB and SGOT enzymes was seen in 18 (36%) cases, elevated CK-MB enzyme alone was seen in 4 (8%) and elevated SGOT alone was noticed in 2 (4%) patients; while in 26 (52%)

cases CK-MB and SGOT enzymes level were normal (Table 5).

DISCUSSION

In the present study 50 poisonous snake bite cases were studied for cardiovascular changes following snake bite. In the present study age of the patients ranged from 13 years to 45 years, 50% of patients were in third decade of life. This observation is comparable to Banerjee et al study.⁵ 80% of patients belonged to third and fourth decade of life which is similar to Mishra et al study.⁶

We observed that males were victims of snakebite more often than females which was similar to other studies like Banerjee et al, Reid et al and Hati et al study.^{5,7,8} In the present study, 92% of patients reached hospital within 24 hours of snake bite; while in Mishra et al study 76.7% of the patients reached hospital within 24 hours of snake bite.⁶ Difference in those findings of two studies might be due to better modes of transportation and patients reaching K. R. Hospital had short distance to travel in the present study. We observed that 45 (90%) patients had snake bite on distal part of the limbs while snake bite at other sites ranged from 2 to 9%; this might be because of the fact that snake bite was accidental and more likely to occur when victims were working.

Pain and local swelling at the site of bite were most common symptoms in the present and Bhat et al and Warrel et al study.^{9,10} Bleeding at the site of snake bite was observed in 70% of cases which was similar to Mishra et al study.⁶ Other symptoms like parasthesia, blisters/blebs formation were seen in 20% of cases which was comparable to findings in Warrel et al study.¹⁰ In the present study 10% of patients complained of palpitations and 8% patients complained of breathlessness which was comparable to Mishra et al study; none of the patients in present and Mishra et al study complained of chest pain.⁶ In the present study electrocardiographic changes other than altered heart rate was seen in 40% of cases; Mishra et al study observed an incidence of 30%.⁶ We observed atrial fibrillation in 2% of cases which was similar to study done by Gupta et al.¹¹

In the present study 2% of cases had first degree AV block while Lalloo et al and Mishra et al study noticed first degree AV block in 2.9% and 3.33% of snake bite cases respectively.^{6,12} From all studies it was evident that development of conduction disturbances is rare. Ventricular premature complexes seen in 8% of cases in the present study, none in case of Mishra et al and 1.4% in Lalloo et al study.^{6,12} Cardiac enzyme estimations in the present study were similar to related studies. Mishra et al and Lalloo et al study estimated only SGOT levels in the serum while Mohapatra et al study estimate only CKMB levels in the serum.^{6,12,13} It was found that even with the significantly elevated CKMB, the patients were asymptomatic. The enzyme estimation can detect silent cardiac enzymes.

CONCLUSION

In the present study even in the absence of cardiac symptoms ECG and cardiac enzyme changes detected myocardial damage. Serum enzyme estimation was more valuable test for detection of cardiac involvement rather than clinical assessment. Hence it was mandatory to record ECG and estimate cardiac enzymes as soon as possible in detecting cardiotoxic effects following snake bite.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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