

Original Research Article

Clinical and Epidemiological Profile of Snake Bite Cases in a Tertiary Care Medical College and Hospital in Eastern India

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Abstract: Snake bite is one of the important causes of morbidity and mortality in tropical countries like India. In India, the most important venomous snakes are cobra, krait, Russell's viper and saw-scaled viper. This study was undertaken in a teaching hospital of West Bengal to find out the epidemiological profile and clinical presentations of snake bite cases in a defined geographical area of rural West Bengal. Data were collected from the snake bite cases came to emergency and internal medicine department of a tertiary level Medical College and Hospital since March 2013 to February 2014. In the study, 685 snake bite cases were reviewed over a one year period. Most common presenting symptoms were swelling at the site of bite (56.05%) and hematuria (27.59%). 18.97% cases reached hospital within 4 hours and 22.48% cases within 4 to 8 hours. 8.02% cases presented with acute kidney injury, overall mortality rate was 5.48%. Snake bite is one of the common life threatening emergencies in the study area. Delay in hospitalization is associated with poor prognosis and increased mortality.

Keywords: snake bite, envenomation, neglected tropical condition, anti-snake venom, cobra, krait

INTRODUCTION

Snake bite is a life-threatening medical condition where rapid diagnosis and rapid initiation of medical measures prevent an unfortunate death. Snake bite cases are mostly reported from tropical and sub-tropical countries; farmers, plantation workers, hunters, rice pickers and other people who dwell and sleep outdoors specially in rural and poor communities are at particular risk of snake bite [1]. Incidence of snake bites vary from region to region and depend upon the factors such as natural habitat of a particular venomous snake species in a particular area and probability of human being coming in contact with venomous snakes. Due to high population density and extensive agricultural practices, most snake bite cases are reported from South East Asia region. As poor, rural populations are mainly affected by snake bite, it is a neglected public health problem of the region and also of Sub-Saharan African countries. But in 2009 WHO took initiative to include snake bite in its list of neglected tropical conditions [2]. Incidence of worldwide snake bite cases is about five million and mortality is about 1,00,000 per year; half of

the snake bite victims who lose their life are from India and the total death in India varies from 15000-50000 per year [3]. However, in worldwide and in India particularly, there is no accurate statistics of snake bite morbidity and mortality due to lack of standardized reporting system and most of the snake bite cases are not registered in the hospital. On the other hand, most of the cases in rural areas in India initially approach traditional healers and these cases are usually not reported to the health database.

Worldwide, highest number of snake bite cases has also been reported from India (81,000). Out of 60 venomous snakes, most important venomous snakes in India are cobras, common krait, Russell's viper and saw-scaled viper [4]. In spite of enormous variability in snake bite statistics in India, small surveys have reported an annual death rate of 1/10,000 in the early 20th century and 3.1/100000 in the 1950's [5]. In India, highest incidence of snake bite cases have been reported from the state of Maharashtra (70 bites per 100000, about 2000 death each year, mortality of 2.4 per 100000

per year). The other states of India with high incidence of snake bite are Tamilnadu, Uttar Pradesh and Kerala [6]. A snake bite mortality survey in India (2001-2003) has reported 45,900 deaths annually with the highest mortality rate in the state of Andhra Pradesh. Snake bite cases in West Bengal, India vary in different rural areas and in remote areas in different districts. In West Bengal there are 39,000 villages in 22 districts. In Burdwan district of West Bengal nearly 8000 people are bitten by snakes and 800 deaths occur each year. In an epidemiological survey in Burdwan district which covered 26 villages, reported 0.16% of annual incidence and 16.4 deaths per 100,000 per year due to snake bites [7].

Paschim Medinipur district, situated in south-west of West Bengal, has a population of 5,943,300. As per 2011 Indian population census, 87.78% population of Paschim Medinipur district lives in rural areas of villages. One tertiary level Medical College and Hospital is situated in the Medinipur town of West Medinipur, caters about 8.3 million population of both East and West Medinipur district as well as adjacent rural areas of Bankura district. Most people of both Medinipur and Bankura district reside in rural areas; rural farmers comprise about 89.5% of the population [8]. There is limited data about snake bite from this defined geographic region of Eastern India; no recent data is also available.

On this background, we planned to undertake the study to reveal the clinical and epidemiological profile of the snake bite cases in the only tertiary level Medical College and Hospital in the Paschim Medinipur district of West Bengal.

MATERIALS AND METHODS

The present study is a Hospital based descriptive, prospective study which was carried out in the internal medicine department of a tertiary level Medical College and Hospital in the remote district Paschim Medinipur, West Bengal, India. The study was conducted by the Pharmacology department of Midnapore Medical College. Snake bite cases that attended the emergency department and were admitted in internal medicine department of Midnapore Medical College were included in the study. Duration of the study was one year (from March 2013 to February 2014). Institutional Ethics Committee approval was obtained beforehand. Written informed consent was

obtained from a patient or legal guardian, with the provision of a witness when the guardian was illiterate. The data was collected on a predesigned, pretested and structured questionnaire by interviewing the patients and attending guardians/relatives as needed. Prescription or case note of each patient was also reviewed. Detailed demographic and epidemiologic information of the patients such as age, sex, residence, occupation, site of bite, place of bite, type of snake if identified was obtained. Information regarding relevant investigations, treatment and outcome (discharge, death, referral to a higher centre) of each patient was retrieved from the case notes.

STATISTICAL ANALYSIS

The data have been summarized by routine descriptive statistics. Demographic and clinical parameters were expressed in numbers and percentages.

RESULTS

A total of 685 cases of snake bite were evaluated. Among them 384 (56.05%) were males and 301 (43.95%) were females. The highest incidence of snake bite was observed in patients with ages between 14-50 years (68.03%). 438(63.94%) patients had poisonous snake bites and 247(36.06%) patients had non-poisonous snake bites. Maximum incidence of snake bites was in rural areas (96.05%), usually in the farms (97.22%). One bite mark was present in 87.88% cases in the lower extremity (88.03%) in most of the cases. Maximum number of cases was found between March to October (82.24%) (Table1). About 56% of snake bite cases were admitted to hospital within 8 hours; 71.97% received first aid in hospital, about 16% patients received first aid by traditional healers (Table2). The patients were presented with varied manifestations. Vomiting (36.05%) and abdominal pain (28%) was the most common gastrointestinal symptom. Bite mark was present in (51.97%) of cases and local swelling was present in 56% of cases. Hematuria (27.59%), subconjunctival haemorrhage (8.02%) and gum bleeding (8.02%) were the most common bleeding manifestations. Ptosis was present in 28% of cases. More severe manifestations of snake bite were hypotension (28.02%), oliguria (31.97%), shock (3.94%) and acute kidney injury (8.02%). ASV was given to 87.88% of patients, while 15.91% patients received dialysis. About 75% of patients discharged in a favourable condition and death rate was 5.48 % (Table3).

Table 1: Clinical profile of patients with snake bite

Criteria	Distribution	No. of patients/ Percentages
Sex	Male	384(56.05%)
	Female	301(43.95%)
Age group (in years)	14-30	177(25.84%)
	31-50	299(42.19%)
	>50	219(31.97%)
Area	Rural	658(96.05%)
	Farm	639(97.22%)
	House	19(2.78%)
	Urban	27(3.95%)
Type of snake	Poisonous	438(63.94%)
	Viper	384(87.68%)
	Krait	54(12.32%)
	Non-poisonous	247(36.06%)
Site of bite	Upper extremity	82(11.97%)
	Lower extremity	603(88.03%)
No. of bite marks	One	602(87.88%)
	Two	83(12.12%)
Seasonal variation	March - October	563(82.24%)
	November-February	122(17.76%)

Table 2: Time from snake bite to hospital admission

Criteria	No of cases
Time	No. of cases/percentages
<4 hours	130(18.97%)
4-8 hours	254(37.08%)
>8 hours	301(43.95%)
First aid	
Place/person	No. of cases/percentages
Hospital	493(71.97%)
Home	83(12.12%)
Traditional healer/Ojha	109(15.91%)

Table 3: Clinical presentations and outcome of snake bite cases

Symptoms/signs	No. of cases/percentages
Vomiting	247(36.05%)
Abdominal pain	137(28%)
Hiccough	27(3.97%)
Slurring of speech	55(8.02%)
Dysphagia	164(23.94%)
Hematuria	189(27.59%)
Gum bleeding	55(8.02%)
Bite mark	356(51.97%)
Local swelling	384(56.05%)
Subconjunctival hemorrhage	55(8.02%)
Tender lymph node	189(27.59%)
Ptosis	137(28%)
Neck muscle weakness	55(8.02%)
Respiratory paralysis	55(8.02%)
Hypotension	192(28.02%)
Shock	27(3.94%)
Oliguria	219(31.97%)
Acute kidney injury	55(8.02%)
Outcome	
Discharge	511(74.59%)
Death	37(5.41%)
Referred to higher centre	137(20%)
ASV received	602(87.88%)
Dialysis	109(15.91%)

DISCUSSION

In the present study, a total of 685 cases were evaluated. In a previous protocol development study from the same institute, a total of 780 and 839 numbers of cases were followed up over consecutive two years [9]. In the present study, 14-50 years age group was the most commonly bitten age group, which was 68.03%, as people of this age group commonly remain engaged with outdoor activities. Similar findings were observed in other studies [10-13]. The percentage of male to female also varies. The present study reported 56.05% vs. 43.95%, whereas others have reported 55% vs. 45%, 66% vs 34%, 68% vs. 32%, 53% vs. 47% [7, 13-15]. In this study, incidence of snake bite was found more in people of rural area (96.05%) compared to urban area (3.05%). The male to female and rural to urban difference is due to the fact that males in rural areas of this part of the subcontinent remain involved in agricultural and other activities. In the present study, 88.03% of bites occurred in the lower limb and 11.97% of bites in upper limb. In one study reported from this region, upper limb bite was 40%, whereas from other parts of the country reports 75% of all the snake bites below the knee [6, 16]. One study from Nepal reported 60% of bites in the lower limb [11]. In the present study, 18.97% of cases reached hospital within 4 hours, 37.08% of cases within 4 to 8 hours and 43.95% of cases after 8 hours. In one study in Maharashtra,

33.08% of patients reached hospital within 1 hour, 48.84% cases within 1 to 6 hours, remaining after 6 hours [17]. Lahori *et al* [18] observed that 85% of snake bite cases were admitted within 24 hours, 7.4% within 1 hour; Kulkarni and Anees [15] reported that 78% of cases admitted within 24 hours, 6.6% cases within 1 hour. In the present study, maximum number of cases (82.24%) were found between March to October, similar observation is reported by one study where 86% of cases were found between March to September[13]. Among the snake bite cases, 71.97% received first aid in hospital, 12.12% received first aid in home and 15.91% received first aid from traditional healers. In one study, 37.72% cases reached hospital without first aid [17]. In this study, non-poisonous snake bite was 46.06%, poisonous bite was 63.94%. Reported non-poisonous snake bite cases from other studies such as Punde DP *et al* 32.5% and poisonous was 67.5% of which 64.2% was viper bite and 9.8% was krait bite [19]. In this study, viper bite was 87.67% and krait bite was 12.33%. The patients presented with varying local as well as systemic signs and symptoms. Bite mark and local swelling was detected in 51.97% and 56.05% of cases. One study reported the presence of bite mark and local swelling in 76.74% and 73.90% of case respectively whereas another study reported presence of local swelling in all cases [17, 20]. In this study, vomiting and pain abdomen was present in 36.05% and

28% of patients. One study reported vomiting and pain abdomen in 20.15% and 17.57% of cases respectively [17]. Bleeding manifestations such as gum bleeding and subconjunctival hemorrhage was present in 8.02% of cases, whereas hematuria was present in 27.59% of cases. In one study, gum bleeding, subconjunctival hemorrhage and hematuria was present in 83.3%, 4.76% and 42.85% of cases, whereas in another study, hematuria was present in 33% of cases but gum bleeding and subconjunctival hemorrhage was present in 8.3 % of cases [13, 20]. Hypotension and oliguria was present in 28.02% and 31.97% of patients; 3.94% developed shock and 8.02% progressed to acute renal failure. Similar observation was reported by Joseph OF and Afolabi OA where 8.3% cases developed acute renal failure [20]. The patients who presented with hypotension, oliguria and later progressed to shock, AKI - were sent for dialysis (15.91%); some critical patients were referred (20%) to higher center. On the basis of signs and symptoms, ASV was given to 87.88% of cases. In the study of Mahajan and Mhaskar [13], 50.66% patients received ASV; whereas in two other studies, ASV was given to 90% and 91.7% of patients respectively [9, 20]. The overall mortality rate in this study was 5.48%. Mortality rate reported from four other studies in India were 5.1%, 5.2%, 5.68% and 4.7%, is very close to our study [9, 15, 17, 19]. One study from Nepal reported 3.8% mortality rate [11].

CONCLUSION

Snake bite is a neglected occupational hazard in the Indian subcontinent and other neighborhood countries also. In snake bite cases, death and other fatalities like hypotension, oliguria, shock, AKI, may be prevented by early detection of symptoms and signs and prompt institution of definitive medical management.

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