Section: General Medicine

Original Research Article

EPIDEMIOLOGY AND CLINICAL OUTCOMES OF SNAKEBITE PATIENTS IN A TERTIARY CARE SETTING

Vedant Sharma[1], Paramjeet Singh[2], Manjeet Singh[3], Arun Pandey[4]

[1]*Assistant Professor, Department of General Medicine, Soban Singh Jeena Government Institute of Medical Science and Research, Uttarakhand, India.*
[2]*Associate Professor, Department of General Medicine, Government Medical College, Haldwani, Uttarakhand, India.*
[3]*Post Graduate Resident, Department of General Medicine, GR Medical College, Madhya Pradesh, India*
[4]*Associate Professor, Department of Medicine, Doon Government Medical College, Dehradun, Uttarakhand, India.*

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Corresponding Author:
Dr. Arun Pandey,
Associate Professor, Department of Medicine, Doon Government Medical College, Dehradun, Uttarakhand, India.
Email: arun_pandey09@yahoo.co.in

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ABSTRACT

Background: In modern India, snakebite is still an underappreciated cause of accidental mortality, especially in rural areas where people are more likely to fall prey to quacks utilizing traditional healing practices than to seek treatment from modern medical professionals. Treatment outcomes would be more promising if the patient was swiftly recognized and treated based on many clinical variables, such as manner of presentation, timing of medical intervention, species recognition, and analysis of a series of consistently identified bites. The objective is to study the clinical profile of the patients of snake bites.

Materials and Methods: This cross sectional observational study was conducted on all suspected cases with signs and symptoms suggestive of venomous snake bite admitted in medicine department to analyze the epidemiology of snake bite envenomation cases in this part of state and to study the clinical profile of snake bite envenomation.

Results: The highest incidence of snake bite was seen in the age group of 21-30 years, mean age was 37.80 years. The Majority 59(59%) were males and 41(41%) were females. Labourers had an incidence 23% and agricultural farmers had 20% incidence. Incidence of snake-bite in plain area was high (66%), while only 33% patients were from hilly area. Bites were more common on distal parts of body. Higher incidence seen in lower extremities (64%). Identification of snake was difficult for most of the patients (45%).37% were vipers and 11% cobra. There was a predominance of non-toxic bites (55%) followed by neurotoxic bites (27%) and vasculotoxic bites (18%).Fang mark (85%) was most common local sign followed by the immediate pain at the bite site (84%).

Conclusions: One of the most frequent risks is snakebite, particularly in rural areas where agriculture is the primary industry. The transmission of knowledge about easily accessible, efficient treatment modalities could significantly reduce the morbidity and death linked to treatment by quacks or traditional snake bite healers, as snake bites are largely a rural employment danger.

Key-words: Snake bites, venomous, vasculotoxic, neuroparalytic, non-poisonous.

INTRODUCTION

India is home to some of the most poisonous snakes in the world, most of which are found in rural areas.[1] Snake bites cause substantial mortality and morbidity in India. A large proportion of snake bites occur when people are working barefoot in the fields, or while walking at night or early morning

through fields or along roads.[2] Superstitions, wrong practices, misconceptions,[3] handicap doctors who care primary attention.[4] Of 3000 species of snakes known to world, in India, we have around 216 species, out of which 52 are known to be poisonous.[5] Our venomous species belong to two major families: Elapidae, Viperidae.

The Registrar-General of India's "Million Death Study {2001-2003}" has provided reliable evidence of substantial mortality (exceeding 50000 per year) as it is based on Representative re-sampled, Routine Household Interview of Mortality with Medical Evaluation (RHIME).[1-4] Snake bite is a common acute medical emergency faced by rural populations in tropical and subtropical countries with heavy rainfall and humid climate.[6] It is an important occupational injury affecting farmers, plantation workers, herders, fishermen, restaurant workers and other food producers.[7] Open-style habitation and the practice of sleeping on the floor also expose people to bite from nocturnal snakes. There is a lack of public awareness, education, widespread myths and superstition regarding snake-bite which restricts patients in seeking proper treatment in anti-snake venom treatment centers. Even now a large number of patients first goes to the traditional healers which lead to significant delays in getting timely treatment.[8] Few centres are treating snake bite cases in this area because of lack of awareness both among public and also health care personnel. On these factors, a large number of patients are referred to our tertiary care hospital from many areas and at times many patients come after considerable time has elapsed after the bite and complications have set in.

This study was conducted at a tertiary care centre which is one of the agricultural belts and forest areas, to determine the clinical profile of venomous snake-bite cases.

MATERIALS AND METHODS

This cross sectional observational study was conducted on all suspected cases with signs and symptoms suggestive of venomous snake bite admitted in medicine department to analyze the epidemiology of snake bite envenomation cases in this part of state and to study the clinical profile of snake bite envenomation. All non-documented cases of snake bite, insect bite, sting and other animal bites were excluded from the study.

Method: A thorough understanding of the demographic and epidemiological characteristics, including age, sex, place of residence, employment, bite site and location, type of snake, if known, etc., was acquired. The amount of time it took them to get to the medical institution following their snake bite, and whether they were given any first assistance. In every case, a comprehensive clinical examination was performed. A treating physician's opinion was obtained in order to identify the type of snake bite (non-poisonous, neuroparalytic, VT, and Vasculotoxic). On the day of the patient's discharge or death, further data was gathered from the patient's case file.

RESULTS

In this study highest incidence of snake bite was seen in the age group of 21-30 years, mean age was 37.80 years. [Table 1] Majority 59(59%) were males and 41(41%) were females. [Table 2] Labourers had an incidence 23% and agricultural farmers had 20% incidence. [Table 3] Snake-bite in plain area was high (66%), while only 33% patients were from hilly area. Maximum number (60%) of patients reported to our hospital's emergency department/OPD within 1-4 hours of bite. Bites were more common on distal parts of body. Higher incidence seen in lower extremities (64%). [Table 4] Identification of snake was difficult for most of the patients (45%).37% were vipers and 11% cobra. [Table 5] Majority of patients (65%) were in months from May to august. Fang mark could be visualized in majority of patients 85%. [Table 6] There is predominance of non-toxic bites (55%) followed by neurotoxic bites (27%) and vasculotoxic bites (18%). [Table 7]

Majority of snake-bite occurred during night time, 48% bites were reported between 7 PM – 6 AM. Most common first aid received before reaching our tertiary care centres were tourniquets (56%). Fang mark (85%) was most common local sign followed by the immediate pain at the bite site (84%). [Table 8]

Table 1: Distribution of patients according to Age group

Age group (in years)	No. of patients	Percentage (%)
17-20	15	15%
21-30	38	38%
31-40	19	19%
41-50	10	10%
51-60	11	11%
>60	7	7%
Total	100	100.00

Table 2: Distribution of patients according to gender

Sex group (in years)	No. of patients	Percentage (%)
Males	59	59%
Females	41	41%

Total	100	100.00

Table 3: Distribution of patients according to Occupation

Occupation	No. of patients	Percentage (%)
Businessman	2	2%
Farmer	20	20%
Housewife	21	21%
Labourer	23	23%
Serviceman	3	3%
Shopkeeper	4	4%
Student	15	15%
Unemployed	8	8%
Garden Worker	4	4%
Total	100	100.00

Table 4: Distribution of patients according to Site of Bite

Site of Bite	No. of patients	Percentage (%)
Lower limb	64	64
Upper limb	33	33
Axial body	2	2
Face	1	1
Total	100	100.00

Table 5: Distribution of patients according to types of snakes

Type of snakes	No of patients	Percentage
Viper	37	37%
Cobra	11	11%
Krait	7	7%
Unidentified	45	45%

Table 6: Distribution of patients according to fang mark

Fang mark	No of cases	Percentage
Present	85	85%
Absent	15	15%

Table 7: Distribution of patients according to Type of bite

Type of bite	No. of patients	Percentage
Neurotoxic	27	27%
Vasculotoxic	18	18%
Non toxic	55	55%

Table 8: Distribution of patients according to sign of local envenomation

Signs	No. of patients	Percentage (%)
Fang mark	85	85%
Immediate pain	82	82%
Rapid swelling	25	25%
Necrosis/ulceration	7	7%
Bullae	5	5%
Paresthesia	3	3%
Petechiae	4	4%

DISCUSSIONS

In India, it is estimated that up to 50,000[9] people die annually from snake bites. Morbidity is also significant and there seems to have been little improvements in reducing the fatalities over the year in spite of now having good supplies of polyvalent Anti–snake Venom (ASV) available in all health care centers.

In our study highest incidence of snake bite was seen in the age group of 21-30 years and the mean age was 37.80 years. Kularatne et al,[10] studied 210 patients with neurotoxic snake bite and majority of patients in their study were in age group of 10-30 years (52%). Sanjib et al,[11] studied 143 patients, mean age being 32 years in their study. In our study the majority 59(59%) were males and 41(41%) were females, The Male to Female ratio in our study was 1.43:1. Rojnuckarin et al,[12] had majority of male patients (59%) while Sharma et al,[13] had a male to female ratio of 4.25:1. The majority of study population were labourers (23%) and agricultural farmers(20%).The incidence of Snake-bite in plain area was high (66%), while only 33% patients were from hilly area.

The maximum number (60%) of patients reported to our hospital's emergency department/OPD within 1-4 hours of bite. In present study 26% study subjects had reached hospital after a delay of 4 hours which had contributed to a substantial increase in the morbidity and the mortality which was similar to the

study by Bhelkar SM et al.[14] Fang mark could be visualized in majority of patients (85%).

In our study, bites were more common on distal parts of body. The higher incidence seen in lower extremities (64%). Sharma et al,[13] reported 38% bites on lower limbs; upper limb bites in 47% and 14% axial bites. Kalantri et al,[15] noted that 66% bites were on lower limb, rest being on upper limbs; no axial bites were reported in their study. Sanjib et al,[11] noted 79% bites on lower limbs, 20% on upper limbs and 1% over trunk.

In our study Identification of snake was difficult for most of the patients (45%). Snakes were identified when they were brought to the tertiary care centre; however no pictorials were shown for identification of snake as this was similar done by Bawaskar et al.[16] In majority of cases, the type of snake species could not be identified.

Most snakebite cases (65%) were in months from May to August, which coincided with the rainy season in this region. During the rainy season, rainwater floods their burrows and snakes then try to take shelter near human dwellings, which increases the chances of snakes feeling threatened or startled or when provoked by human beings, and biting them in defence. The distribution of snake bite cases in different quarters of the year was uneven, and was not statistically significant and similar to other studies.[17]

In our study, there was a predominance of non-toxic bites (55%) followed by neurotoxic bites (27%) and then vasculotoxic bites (18%). Similar to our study, Sanjib et al,[11] had 72% neurotoxic bites in their study. Their study was conducted in Nepal, 27% of the bites being non–poisonous in their study. Sharma et al,[13] had majority of neurotoxic snake bites (60.6%), their study area was north India. Bawaskar et al,[16] found 68.45% snakebites to be vasculotoxic in their study, done in Mahad region in western Maharashtra. Majority of snake-bite occurred during night time, 48% bites were reported between 7 PM – 6 AM. Most common first aid received before reaching our tertiary care centre were tourniquets (56%). They are not proven to be useful [18]

In this study, the nonpoisonous snake bite cases formed 55%. Highest nonpoisonous snake bite cases were observed by Bhardwaj and Sokhey,[19] in1998 (90.5%), followed by Bawaskar and Bawaskar,[20] in 2002 (49.5%), and Saini et al,[21] in 1984 (41.5%). This variation in nonpoisonous snake bite cases may be due tovariation in the geographic distribution of poisonous and nonpoisonous snakes in various parts of the country.[22]

In our study Fang mark (85%) was most common local sign followed by the immediate pain at the bite site (84%). In their study, Kularatne et al,[10] studied only neurotoxic snake bites; among them ptosis was seen in 70%, dyspnea was present in 68%, dysphasia in 64% and diplopia in 54% of cases (n=190). In the study by Sharma et al,[13] local or systemic bleeding (60%) and ptosis (75%) were the presenting complaints in vasculotoxic and neurotoxic bites. In study by Bhelkar SM et al,[14] haematotoxic snake bites, bleeding from the site of the bite was the main manifestation, followed by cellulitis, hematuria and ecchymosis.

CONCLUSION

Snakebite still remains an important cause of accidental death in modern India, and its public health importance has been systematically underestimated. In our society, mostly in uneducated societies, there is sheer ignorance regarding snake bite and peoples have more faith in local customs and in traditional healers. Morbidity and mortality can be reduced by educating the society about first aid measures, timely treatment in ASV equipped hospitals and without any delay in seeking prompt medical aid or reaching a hospital and community health centres (CHCs).

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