

Original Research Article

A Study of Clinical Profile and Outcome of Snake Bite at Tertiary Care Centre in South Rajasthan

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Abstract

Introduction: Snakebite is a major public health problem throughout the world, more so in tropical and subtropical countries. In India, there are 216 species of snakes, of which only four are venomous snakes (Cobra, Krait, Russell's Viper and Saw Scaled Viper). Poorly informed rural populations often apply inappropriate first-aid measures and vital time is lost before the victim is transported to a treatment center, where cost of treatment can constitute an additional hurdle.

Materials & Methods: This descriptive observational study was carried out from January 2017 to December 2017, at Department of Medicine in Maharana Bhupal Government Hospital, R.N.T. Medical College, Udaipur, a tertiary care hospital serving population of Southern Rajasthan.

Result: A total of 100 patients with a history of snake bite and signs of envenomation were included in this study. 38(38%) had viper bites, 33(33%) were unidentified and 29(29%) had krait bites. Maximum incidence were in farmers (73%) and in rural areas (82%). Commonest vasculotoxic manifestation was local bleeding (71.42%). Commonest neurotoxic manifestation was ptosis (100%)The mean dose of ASV vials required for vasculotoxic snakebites was more (32.62vials) and for neuromuscular snakebite was less (10.00 vials). One patient died because of respiratory paralysis, due to delayed presentation in hospital.

Conclusion: Snake bites are common in rural areas affecting mainly agricultural workers, in rainy season and the most common site is lower limbs. Most poisonous snake bites are due to hematotoxic bites in this region. From this study, it is inferred that delay in presentation following snake bite has an overall negative effect on the outcome and there is no substitute for early and effective treatment with ASV. Population awareness programs regarding prevention, first-aid and the importance of the early transfers to be emphasized.

Introduction

Snakebite is a major public health problem throughout the world, more so in tropical and subtropical countries. In a predominantly

agricultural country like India with its rich flora-fauna, the encounter between man and snake is a frequent occurrence.

With rapid urbanization and deforestation, the incidence of snake bite is high and forms a significant group of hospital admissions. There are no accurate records available to determine the exact epidemiological or even mortality in snakebite cases as the true incidence of snakebites is difficult to assess and often is underreported. There are approximately between 1.2 million and 5.5 million snakebites worldwide each year, with 20,000-94,000 deaths.¹ In India more than 20,00,000 snake bites are reported annually, of which 35,000 to 50,000 people die.²

In India, there are 216 species of snakes, of which only four are venomous snakes (Cobra, Krait, Russell's Viper and Saw Scaled Viper). Viper bites are more common than other poisonous snakebites in human beings. Of the different varieties of vipers, the Russell's viper (*Vipera russelli*) commonly inhabits the Southern Asian countries, Indian cobra (*Naja naja*) and Common Indian krait (*Bungarus caeruleus*) are two important species of elapid snakes found in India and are responsible for most of the cases of neurotoxic snake bite. The most common poisonous snake is common krait³.

The overall mortality rates for victims of venomous snakebites are low in regions with rapid access to medical care and appropriate antivenoms. Snake-bite is one of the most life-threatening bio-weapon system in the nature which may cause local to systemic complication the form of neurotoxicity or haematotoxicity.

Materials & Methods

This descriptive observational study was carried out from January 2017 to December 2017, at Department of Medicine in Maharana Bhupal Government Hospital, R.N.T. Medical College, Udaipur, a tertiary care hospital serving population of Southern Rajasthan.

Inclusion Criteria

A total of 100 patients with a history of snake bite and signs of envenomation were included in this study after an informed consent for participation in the study.

Evidence of bite by a poisonous snake included:

- i. Fang marks,
- ii. Swelling, ecchymosis, blister formation and/or bleeding from local site,
- iii. Disturbances in coagulation mechanism with or without systemic bleeding, and
- iv. Identification of snake wherever possible.
- v. Neurotoxicity was defined as documented ptosis, external ophthalmoplegia, weakness of neck or bulbar muscles, use of neostigmine or ventilatory support (endotracheal intubation, Ambu bag or a mechanical ventilator).

Exclusion Criteria

Patients with pre existing renal disease, liver dysfunction and bleeding disorder were excluded from the study.

After obtaining consent, data was collected on pre-designed and structured questionnaire by interviewing the study subjects who were hospitalized during the study period.

A detailed information regarding demographic and epidemiological parameters such as age, sex, residence, occupation, time of bite, site of bite and place of bite, type of snake if identified by patient or bystanders by showing photographs or by identification of the dead snake brought by the victim, etc., was obtained. Time interval to reach the health facility after snake bite and first aid received if any was asked to them.

Patients reached to hospital within 6 hours of snake bite were kept in immediate treatment group while those who reached after 6 hours were kept in delayed treatment group.

Subsequent information like complications and outcome was collected on the day of discharge or death of the patient from the case paper of the patient and entered in a computer database for analysis.

Following statistical methods were applied in the present study- Contingency table analysis and Independent samples 't' test.

Result

In the present study, 100 patients of snake bite were studied. Maximum incidence of snake bite was found in farmers (73%) than in any other occupation, which shows snake bite is a major public health problem among farmers in rural areas.

Males (59%) were bitten more than females (41%). This suggests a risk of outdoor activities. Maximum incidence of snake bite was found in rural areas (82%) than urban areas (18%). Bites were commonly seen on the lower extremities (50%), as in most cases, snakes were inadvertently trodden upon.

Majority of snake bites occurred during night time (65%) than day time (35%), due to poor visibility in darkness. Higher incidence of snake bites was found in monsoon (60%) i.e. June to September. Many victims (33%) could not identify the snake.

Among the identified, 38% were due to viper. 41% of patients reached the hospital after 6 hours of snake bite. Most of them had received native treatment from traditional healers. A total of 68% patients came with tourniquet application. 32% of patients did not receive any sort of first aid.

Complications like ARF requiring dialysis, spreading cellulitis requiring debridement/fasciotomy amongst vasculotoxic snake bite and need of ventilator support among neuroparalytic snake bite was more common in delayed group. (Table 2)

Commonest vasculotoxic manifestation was local bleeding(71.42%). Commonest neurotoxic manifestation was ptosis (100%) followed by ophthalmoplegia (85.1%). 59.57% of patients with neuroparalytic bite required artificial ventilation, the need for mechanical ventilation was more in patients who presented late to the hospital.

Two patients developed anaphylactic reaction to ASV and were treated conservatively and recovered completely.

Mean hospital stay in the patients who presented early was 3.32 ± 0.78 days while in patients who presented late, mean hospital stay was 5.8 ± 2.14.

The mean dose of ASV required for vasculotoxic snakebites was more (32.62 Vials) and for neuroparalytic snakebite was less (10.00 Vials).

One patient died because of respiratory paralysis, due to delayed presentation in hospital.

Table 1: Clinical profile of snake bite

	Characteristics	Percentage	
1	AGE	LESS THAN 30 YEARS	53%
		MORE THAN 30 YEARS	47%
2	GENDER	MALE	59%
		FEMALE	41%
3	RESIDENCE	RURAL	82%
		URBAN	18%
4	OCCUPATION	FARMER	73%
		HOUSEWIFE	17%
		STUDENT	10%
5	SNAKE DISTRIBUTION	VIPER	38%
		UNIDENTIFIED	33%
		KRAIT	29%
6	TIME	DAY	35%
		NIGHT	65%
7	SITE OF BITE	HAND	44%
		FOOT	50%
		OTHER BODY PARTS	06%
8	TYPE OF FIRST AID	NONE	32%
		TORNIQUET	68%
9	Presentation time	Immediate (less than 6 hrs)	59%
		Delayed(more than 6 hrs)	41%

Table: 2 Presenting complaints and symptoms in patients of snake bite.

Parameter	Immediate		Delayed	
	NO	Yes	NO	Yes
Local bleeding	41	18(30.5%)	24	17(41.46%)
Local Edema	26	33(55.93%)	23	18(43.90%)
Blisters	59	0(0%)	32	9(21.95%)
Cellulitis	57	2(3.38%)	24	17(41.46%)
Necrosis	59	0(0%)	33	8(19.51%)
Fasciotomy	59	0(0%)	36	5(12.19%)
Vomiting	23	36(61.01%)	12	29(70.73%)
Drowsiness	51	8(13.55%)	24	17(41.46%)
Ophthalmoplegia	32	17(34.69%)	18	23(56.09%)
Ptosis	35	24(40.67%)	18	23(56.09%)
Mechanical Ventilation Required	46	13(22.03%)	26	15(36.58%)
Bleeding Time	10	49(83.05%)	14	27(65.85%)
Clotting Time	31	28(47.45%)	18	23(56.09%)
Prothrombin Time	46	13(32.20%)	27	14(34.41%)
Gum Bleeding	47	2(4.08%)	36	5(12.19%)
Oliguria	59	0(0%)	32	9(21.95%)
Hematuria	58	1(1.69%)	23	8(25.80%)
Acute Renal Failure	59	0(0%)	30	11(26.82%)
Dialysis	59	0(0%)	40	1(2.43%)

Discussion

In the present study, 100 cases of snakebite were studied in the medical wards of Maharana Bhupal Government Hospital, R.N.T. Medical College, Udaipur from 1st January 2017 to 31st December 2017.

In this study, 53% of patients bitten were between the age group of 11-30 years of age observation

correlated closely with studies conducted by Hati et al⁴, age group accounted for 69% of their cases and Ried et al¹⁵ study where 50% cases were between 20 and 50 years of age.

As males are more involved in outdoor activities 59% patients were male victims. Male predominance in cases of snake bite was also observed in study done by Reid et al⁵, who reported 72% males.

Study conducted by Warrell et al⁶ showed the higher incidence of snake bite in farmers closely related with our study. Rural: Urban ratio was 4.5:1 in our study which was similar to study by Sharma et al.,(2005)⁸ who found a rural: Urban ratio 4.7:1. Incidences of site of bite most common being lower limbs (50%) in this study were similar to study conducted by Saini et al⁷.

In this study 65% snake bite incidents took place in night time whereas observation was made by Sharma et al.,(2005)⁸ (60.6%) and Virmani and Dutt⁹, reported 88%.

Naik et al.¹⁰,(1997) reported that 60.6% cases occurred between June to November. In the present study maximum numbers of patients were admitted during rainy season. 60% bites occurred between June to September.

In a study of 633 cases conducted by Kulkarni et al.,(1994)¹¹ the biting species was identified in only 388 cases (61.2%). The commonest was viper (242 cases-38.2%). Punde et al.,(2005)¹² found that out of the 427 patients envenomed by poisonous snakes, 274 (64.2%) were bitten by saw-scaled viper. These findings were somewhat comparable to our study(56.7%).

Kulkarni et al.,(1994)¹¹ found that out of the 633 cases, 42 (6.6%) were admitted within 1 hour of bite and 22% of the patients came to hospital after 24 hours. In a study conducted by Steinmann et al.,(2000)¹³ contrary to this study, almost 87% of the patients were brought to the hospital within an hour. In this study 59% patients reached the hospital within 6 hours of bite, 41% patients reached after 6 hours of bite.

Tourniquet application was the most commonly used first-aid measure, it was applied in 68% of

patients. In a study conducted by George Watt et al¹⁴, tourniquet was applied in 94% of patients.

In this study, all the viper bites (100%) presented with local edema whereas study done by Gaurav et al¹⁶ 95.23% of viper bites presented with local edema.

In the study done by Gaurav et al¹⁶, the most common vasculotoxic manifestation was local bleeding (83.33%) followed by cellulitis (57.14%), in our study the commonest vasculotoxic manifestation was also local bleeding (71.42%).

In this study, 100% patients developed ptosis among 47 cases of neuroparalytic bite and Ophthalmoplegia was seen in 40(85.1%) patients. Seneviratne et al¹⁷ observed ptosis in 85.7% patients and ophthalmoplegia in 75% of patients of neurotoxic bite.

In a study done by Patil et al,¹⁸ late admission >6 hours after envenomation was associated with ARF requiring dialysis. In our study Viper bite victims who reached hospital after 6 hours of bite, 11(73.33%) developed ARF and one patient required dialysis, as compared to only 4(26.66%) patients in immediate treatment group developed ARF.

Prothrombin time was prolonged in 24(63.15%) patients of viper bite. Similar incidence has been reported by Saini et al⁷.

In the present study, mean duration of hospital stay for those who reached early was 3.32 ± 0.78 days and 5.80 ± 2.14 days for those who reached the hospital late. Omogbai et al.,(2000)¹⁹ studied 433 patients of snake bite with a mean duration of stay in hospital of 5.7 ± 5.1 days.

In the present study, overall mortality was 1(1%), death was due to respiratory paralysis because of late presentation in the hospital (10 hours after envenomation). In the study done by Patil et al¹⁸ and Punde DP et al¹², mortality was 1.94% and 4.7% respectively.

Conclusion

From this study, it is inferred that delay in presentation following snake bite developed local

and systemic complications and need for surgical intervention, renal failure, mechanical ventilation was more in those who reached the hospital late. There is no substitute for early and effective treatment with ASV. Population awareness programs regarding prevention, first-aid and the importance of the early transfers to be emphasized.

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