

## A Study of Clinical profile and Outcome of Snake bite at Tertiary Care Centre in Mahbubnagar, Telangana

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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 retrospective, observational study was carried out from January 2021 to June 2021, at Department of Medicine in Government General Hospital, Government Medical College, Mahbubnagar, a tertiary care hospital serving population of Rural areas of Telangana.

**Result:** A total of 150 patients with a history of snake bite and signs of envenomation were included in this study., (67.33%) were identified. Maximum incidences were in farmers (49.3%) and in rural areas (50.67%). Commonest vasculotoxic manifestation was Gangrene (6.67%). Commonest neurotoxic manifestation was Respiratory paralysis, failure (3%) The mean dose of ASV vials required for vasculotoxic snakebites was more (vials) and for neuromuscular snakebite was less (vials).

**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.

**Key words:** snake bite, neurotoxic, vasculotoxic bite, Anti snake venom; Gangrene

### 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.<sup>1</sup> In India more than 20,00,000 snake bites are reported annually, of which 35,000 to 50,000 people die.<sup>2</sup>

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 krait.<sup>3</sup>

The overall mortality rates for victims of venomous snakebites are low in regions with rapid access to medical care and appropriate antivenoms. Snakebite is one of the most life-threatening bio-weapon system in nature which may cause local to systemic complication the form of neurotoxicity or haemato-toxicity. It is a fact that despite heavy morbidity and mortality, very little attention is paid by the clinicians to this occupational hazard.

### MATERIALS AND METHODS

The present descriptive observational study was carried out in medicine wards of Government General Hospital, Mahbubnagar, Telangana, India during January 2021 to June 2021. A total of 150 cases of snake bite were admitted in medicine wards during the study period. After obtaining informed consent, data was collected on pre-designed, pretested, and semi-structured questionnaire by interviewing the study subjects who were hospitalized during the study period. Detailed information regarding

demographic and epidemiological parameters such as age, sex, residence, occupation, site of bite and place of bite, type of snake if identified, etc., was obtained. Time interval to reach the health facility after snake bite and first aid received if any was asked to them.

Thorough clinical examination was carried out in each case. For identification of type of snake bite (Vasculotoxic, VT, Neuroparalytic, and Non-poisonous) opinion from treating physician was taken. Subsequent information was collected on the day of discharge or death of the patient from the case paper of the patient.

**Table 1: Demographic profile of snake bite cases**

Sl. No	Characteristics	No. of Snake bites	Percentage	
1.	Age (in Yrs.)	1-12	10	6.66
		13-30	53	35.33
		31-50	66	44.0
		> 50	21	14.0
		<b>Mean= 35.1; Std.Dev=±15.2</b>		
2	Gender	Male	106	97.33
		Female	44	2.67
3	Residence	Urban	74	49.33
		Rural	76	50.67
4	Occupation	Farmer	74	49.3
		Housewife	47	31.3
		Student	16	10.6
		Others	13	8.6

**Table-2 Distribution of Snake bite cases according to some physical characteristics**

Sl. No	Characteristics	Incidence	Percentage
<b>1</b>	<b>Type of Snake</b>		
	Identified	<b>101</b>	<b>67.33</b>
	Not Identified	<b>49</b>	<b>32.67</b>
<b>2</b>	<b>Time of bite</b>		
	Morning ((8.00 AM-12.00 PM)	46	<b>30.66</b>
	Afternoon (3.00 PM-5.00 PM)	52	<b>34.67</b>
	Late Evening (7.00PM-10.00PM)	52	<b>34.67</b>
<b>3</b>	<b>Site of Bite</b>		
	Upper Extremity	54	<b>36</b>
	Lower Extremity	90	<b>60</b>
	Trunk	6	<b>4</b>
<b>4</b>	<b>Time of admission after Snake bite</b>		
	<6hrs	125	83.33
	6-24hrs	22	14.67
	>24hours	3	2

Sl. No	Characteristics	Incidence	Percentage
1	<b>Nature of envenomation</b>		
	NT	36	24
	VT	9	6
	LT	31	20.67
	NV	64	42.66
	Both	10	6.67
2	<b>Quantity of ASV Dose</b>		
	0-10	54	86.67
	15-25	14	9.33
	>25	6	4
	Mean=9.25; Std Dev=±9.79		
3	<b>Type of complication</b>		
	Cardiorespiratory failure	1	0.66
	Gangrene	10	6.67
	Necrotizing Fasciitis	1	0.67
	Respiratory Paralysis	1	0.67
	Respiratory failure	2	1.33
	None	135	90
4	<b>Ventilatory support</b>		
	Yes	3	2
	No	147	98
5	<b>Clinical outcome of Snake bite cases</b>		
	Recovery	150	100
	Referral	0	0
	Death	0	0

**Table-3 Distribution of Snake bite cases according to some clinical characteristics**

NT-Neurotoxic; VT- Vasculotoxic; LT-Locally toxic; NV-Non-venomous; Both-Neuro and Vasculotoxic

## RESULTS

A total of 150 snake bite cases were studied in our hospital during the study period. Snakes were identified from history given by the patients and by information from the attendants of patients who had either seen or killed the snake. For 49 cases, we were unable to identify the species, hence classified as 'unknown' poisonous snakes. Among 150, 106 (97.33%) cases were male, and 44 (2.67%) cases were female. Male: Female ratio was 3:1. This suggests a risk of outdoor activities. Age of the patients was in the range of 1- 65 years. Majority of the cases were in the age 30 to 50 years (44%) followed by 13-30 years (35.33%). Maximum incidence of snake bite was found in rural areas (50.67%) than urban areas (49.33%). Poisonous snake bites were more prevalent in rural than urban areas. Farmers were the most affected by snake bites in this study period (49.3%). [Table-1]

Consistent with these results, the distribution of bites throughout a typical day shows peaks in the afternoon (3pm-5pm) and late evening (7-10 pm), times when people would either be at work or travelling to and from work (34.67%) respectively. Most bites occurred on the lower extremities; over 60% occurred on parts of the leg and 36% on parts of the arm consistent with the most accessible parts of the body. Majority of cases (83.33%) were brought to study hospital with-in 6hrs after snake bite [Table- 2]

Non-venomous snake bites were more common (42.66%) followed by Neurotoxic (24%) and locally toxic (20.67%). Among those for whom ASV was administered, 86.67% received up to 10 vials, with Mean of 9.25 and Std. Dev of ±9.79 of the ASV vials used among these 150 cases. Complications like spreading Necrotizing fasciitis (0.67%) requiring debridement/fasciotomy,

Gangrene (6.67%), cardiorespiratory failure (0.67%) Respiratory failure (1.33%) amongst vasculotoxic snake bite. 2% of patients with neuroparalytic snake bite required artificial ventilation/ ventilator support, the need for mechanical ventilation was more in patients who presented late to the hospital. 100% of the snake bite cases presented during study period have recovered back to normal health. [Table-3]

## Discussion

The present study was carried out on 150 cases of snake bite including poisonous and non-poisonous bites were studied in the medical wards of GGH, Mahbubnagar from 1<sup>st</sup> of January 2021 to 30<sup>th</sup> June 2021. The number of cases with snake identified were 101 while not identified for 49 cases. 44% of patients bitten were in the age group of 31-50 yrs. followed by 13-30 yrs. (35.33%). It has been recognized time and again in most of the studies that majority of the snake bite victims were young adult males in second to fourth decades of life. this age group observation is correlated closely with studies conducted by Reid et al<sup>4</sup> study where 50% cases were between 20 and 50 years of age.<sup>5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25</sup> Most cases of envenomation were males because of their lifestyles involving farming and field work. Snake bite is the greatest threat to agricultural workers. In this study, the predominance of male gender and farmers put them at increased risk because of their involvement in out-door activities.<sup>5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25</sup>

Although the identification of snake species is crucial for optimal clinical management,<sup>26</sup> unfortunately, in many cases, it may not be possible or the identification and or description can be misleading.<sup>5,8,27,28,29,30</sup> We also noticed that lack of information was due to the fact that the patients were anxious and frightened, thus clouding their ability to identify the species,<sup>8</sup> ignorance, or poor visibility in darkness making their identification difficult and inability to spot the snake due to tall grass and crops.<sup>7</sup> Majority of the patients could reach the hospital and got primary treatment within 12 hours of snake bite incidence. In the scientific literature, the mean time taken by the patients to receive hospital care ranged from 0.5 to 10 h.<sup>5,10,16,24,25,31,32</sup> Early reporting to the hospital may reflect the proximity of health care facilities and better connectivity by roads in our area. In the present study, the day was divided into three groups. Maximum number of cases were detected in the interval between 3pm-10pm. The documented figure was 104 among 150 patients. Next on the list was the time interval between 8.00 PM to 12noon where number of patients bitten was 46. These figures show close resemblance with the observation of Virmani and Dutt.[33] They have noted 12% cases during daytime. As in this study, majority of the snake bites involved the lower extremities, and it can be explained by the fact that most of the time, the snakes are trodden upon by the victims.<sup>5,11,12,13,31,32,34,35,36,37</sup> Also, many other outfield activities including fishing, plantation, wood collection, or tending crops or gardens where fairly many people walk bare-footed, particularly in rural areas, there is increased risk of snake bite.

It was recognized that most of the snake bite cases were due to non-venomous snakes, but the venomous bites were the cause of significant morbidity, like this study.<sup>8</sup>

Hemotoxic envenomation observed in 9 (6%) cases and neurotoxic nature of envenomation were observed in 36 (24%) cases and whereas 10 (6.67%) cases had both hemotoxic and neurotoxic manifestations, which was slightly different from Murugan A et al.<sup>38</sup> study where hemotoxic envenomation was predominant, probably due to geographic variation of species distribution. The rationale for the use of ASV is well defined; doses required in different types of envenomation situation vary greatly and are subject to the severity and the snake species associated. Average no ASV administered was 7.25 ( $\pm 0.79$ ), and in cases of Cases of Moderate envenomation average no of ASV vials administered was 12.68 ( $\pm 5.09$ ), in total average ASV administered for all 150 cases observed was 9.25 ( $\pm 9.79$ ), like Murugan et al study.<sup>38</sup>

Clinical manifestations like Necrotizing fasciitis, Gangrene, Respiratory Paralysis and Cardiorespiratory failure were observed in 10% of observed cases, like study by Mahur et al.<sup>39</sup> In our study, the Severity increased as the time delay from the occurrence of bite to ASV administration i.e., 'Bite to ASV time' increased. Severity also found to be in direct proportional with bite to ASV time, the duration of hospital stay, the mean effective neutralizing dose of ASV, the time taken for normalization of coagulation abnormalities as well as the mortality. Hence, an early and adequate institution of ASV is Beneficial in preventing complications.<sup>40</sup> In the present study, among 36 patients of neuroparalytic bite (24%), only 3 needed ventilatory support, which is similar observations from Bhalla et al study.<sup>41</sup>

Thus, there is an emergent need to spread awareness among the community for avoidance of any delay and native treatment in snakebite.

## Conclusion

Increase in snake bite cases is mainly seen during the monsoon season when there is rainfall and increase in harvesting activities. As in this study, majority of the snake bites involved the lower extremities, Also, many other outfield activities including fishing, plantation, wood collection, or tending crops or gardens where fairly many people walk bare-footed, particularly in rural areas, there is increased risk of snake bite. These facts emphasize that not only there should be focus on strengthening surveillance to allow a more accurate perception of the magnitude of the problem and aggressive management of snake bite victims, but also there is a need to develop preventive strategies. Majority of snake bites resulted from neurotoxic snakebites and presented with mild envenomation. The presence of neurological symptoms and signs with absence of local reaction, favors a diagnosis of krait envenomation. Avoidance of consultation with native treatment providers as well as prompt medical interventions can reduce both the morbidity and mortality in snakebite patients. Awareness and knowledge regarding prevention, particularly among farmers and field workers, should be disseminated, and they should be advised not to disturb snakes, not to walk bare footed, and use protective boots, to use a torch while walking on footpaths at night, sleeping on a cot (rather than on the floor) and under bed nets.

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