

A study of clinical profile and outcome of snake bite envenomation at tertiary care hospital

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Abstract

Introduction: Snake bite is one of the most common treatable emergency which presents with diverse clinical presentations depending on the type of snake venom. This study was conducted with objective to determine the clinical profile and outcome inpatients of snake bite envenomation. We have also studied the incidence of snake bite and the association of time of administration of ASV with mortality in snake bite envenomation.

Methodology: All the patients above 18 years with complaint of snake bite envenomation admitted to Medicine Department to Jhalawar Medical College, Jhalawar during January 2020 to October 2020. Their detailed history was taken, clinical examination was done and they were thoroughly investigated.

Results: A prospective study was conducted on 106 snake bite patients. Male to female ratio was 2.03. Snake bite is more common in rural background especially among agricultural workers. The most

common site of bite was lower limb (57.5%). 36 cases had no signs of envenomation. Vasculotoxicity was seen in 37 patients, neurotoxicity in 35, dual toxicities seen in 2 patients. Most common presenting complaint was pain and swelling at site of bite (44.3%). Most serious complications in vasculotoxicity group were sepsis, disseminated intravascular coagulation (DIC) and renal failure while in neurotoxicity group it was respiratory failure. Overall the association of renal failure and DIC with poor outcome was found to be statistically significant with a p value of <0.01. A statistically significant association was noted between mortality and prolonged bite to ASV administration time (p= 0.01). The overall outcome was good and only 4.72% succumbed to death.

Conclusion: In a tropical country like India, it is imperative to increase awareness among the people about the complications of snake bite and educate them about the availability of effective specialized treatment.

Keywords: Snake bite, DIC, ASV, SPSS-PC-21

Introduction

Some of the most poisonous snakes in the world, are found in India, most of which are in rural areas (1). Of 3000 species of snakes known to world, we have around 216 species, out of which 52 are known to be poisonous in India and Cobra, Krait, Russell's viper and Saw Scaled Viper are four commonest venomous snakes. There is relative paucity of credible information on snakes and on handling with emergencies of snake bite. With rapid urbanization and deforestation, the incidence of snake bite is high and forms a significant group of hospital admissions. Trust on traditional healers and myths further compound the matter. Fatality due to snake bite is due to wide species variation, shortage of anti-snake venom (ASV), poor compliance with treatment protocols, lack of public education and clear policy to deal with the problem. Also there are a number of victims who die after seeking medical attention, the reason being lack of experience in handling such cases and non-compliance with the existing guidelines. (2)

There is wide variation in presentation of clinical profile range just from simple apprehension to the very toxic neurotoxicity or vasculotoxicity. The time elapsed after the bite is of prognostic importance as with any duration of delay more and more venom gets bound to the tissues and is thus becomes less manageable for neutralization by ASV.

Materials & Methods

This Cross sectional prospective study was carried out from January 2020 to October 2020, at Department of Medicine in Jhalawar Medical College and SRG Hospital, Jhalawar tertiary care hospital serving population of Southern Rajasthan.

Inclusion Criteria

A total of 106 patients with a history of snake bite and with or without signs of envenomation were included in this study after an informed consent for participation in the study.

Exclusion Criteria

Patients with age <18 years, bites other than snake bite and with preexisting renal disease, liver dysfunction and bleeding disorder were excluded from the study.

Methodology

After obtaining consent, data was collected on pre-designed and structured questionnaire by interviewing the study subjects who were hospitalized during the study period 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. History taking also included application of tourniquet; type of snake, time interval lapsed between bite and arrival at hospital and any native treatment and also history elicitation regarding various symptomatology. Detailed clinical examination of the patient will be done. Data were analyzed and statistically evaluated using SPSS-PC-21 version.

Results

Table 1: Clinical profile of snake bite

Sn.	Characteristic		Percentage
1.	Age	<35years	59.4%
		>35years	40.6%
2.	Gender	Female	33%
		Male	67%
3.	Residence	Rural	83%
		Urban	17%
4.	Occupation	Farmer & Gardner	58.49%
		Manual labourer	27.36%
		Others	14.15%
5.	Time of bite	6AM- 6PM	40.57%
		6PM- 6AM	59.43%
6.	Season of bite	Summer	54.7%
		Autumn	29.2%
		Winter	5.7%
		Spring	10.4%
7.	Site of bite	Lower limb	57.5%
		Upper limb	34%
		Back	2.8%
		Others	5.6%
8.	Place of snake bite	INDOOR	6.6%
		OUTDOOR	93.4%
9.	Type of snake	Unidentified	47.17%
		Viper	18.88%
		Cobra	13.20%
		Krait	12.26%
		Non poisonous	8.49%
10.	Envenomation type	No signs of envenomation (n=36)	33.96%
		Vasculotoxicity (n=37)	34.90%
		Neurotoxicity (n=35)	33.01%
		Both neurotoxicity and vasculotoxicity (n=2)	1.88%

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

Sn.	Symptom	Number	Percentage
1.	Pain or swelling	47	44.3 %
2.	Ptosis	35	33.0 %
3.	Oozing from site	23	21.7 %
4.	Oliguria	13	12.3 %
5.	Subconjunctival haemorrhage	11	10.4 %
6.	Haematuria	9	8.5 %
7.	Anuria	7	6.6 %
8.	Malena	6	5.7 %
9.	Hematemesis	4	3.8 %
10.	Epistaxis	3	2.8 %
11.	Bleeding gums	3	2.8 %

Table 3: Neurological complications due to neurotoxicity (n=35)

Complications	No.	Percentage
Ptosis	35	100%
Ophthalmoplegia	31	88.6%
Respiratory paralysis	18	51.4%

Table 4: Coagulation parameter and outcome determinants

	No.	Percentage
Whole blood clotting time		
Negative	69	65.1%
Positive	37	34.9%
PT/INR		
Normal	67	63.2%
Increased	39	36.8%
Time between snake bite & ASV administration in snake bite cases (n=70)		
Within 1 hrs	21	30.0%
2-6 hrs	27	38.6%
7-12 hrs	12	17.1%
>12 hrs	10	14.3%
Duration of hospital stay		
Up to 3 days	62	58.5%

4-7 days	41	38.7%
>7 days	3	2.8%
Outcome of snake bite cases (n=106)		
Complete recovery	97	91.51%
Recovery with disability	4	3.77%
Death	5	4.72%

Table 5: Association of complications with outcome

Complications	Alive (n=101)		Death (n=5)		P value
	No.	Percentage	No.	Percentage	
Respiratory Paralysis					
No	75	97.4%	2	2.6%	0.12
Yes	26	89.7%	3	10.3%	
Renal failure					
No	96	98.0%	2	2.0%	<0.01
Yes	5	62.5%	3	37.5%	
Subconjunctival haemorrhage					
No	93	97.9%	2	2.1%	<0.01
Yes	8	72.7%	3	27.3%	
Sepsis					
No	93	97.9%	2	2.1%	<0.01
Yes	8	72.7%	3	27.3%	
DIC					
No	98	99.0%	1	1.0%	<0.01
Yes	3	42.9%	4	57.1%	
Cellulitis					
No	84	95.5%	4	4.5%	0.99
Yes	17	94.4%	1	5.6%	

A prospective study was conducted on 106 snake bite patients and admitted to the inpatient ward at Jhalawar Medical College & SRG Hospital, Jhalawar, Rajasthan. This study comprised of 71 (67%) men and 35 (33%) women. Most of the patients recruited to the study were young adults and males were more frequent victims of snake bites with male to female ratio of 2.03. Snake bite is more common in rural areas of Jhalawar district

and nearby districts – Baran, Kota, Rajgargh, Mandsores especially among agricultural workers and the rest 17% were from urban area with Rural: Urban ratio of 4.9:1. The most common site of bite was lower limb (57.5%), maximum bites were between 6:00 Pm to 6:00Am with maximum incidence of cases (59.43%) occurring in months of June to August and is closely related to seasonal changes which compel the reptiles to

come out of their shelter. Nearly 94% of bites were reported from outdoor areas. Out of 106 cases of snake bite, 36 cases had no signs of envenomation. Vasculotoxicity was seen in 37 patients, neurotoxicity in 35, dual toxicities seen in 2 patients while there was no patient with cardio toxicity.

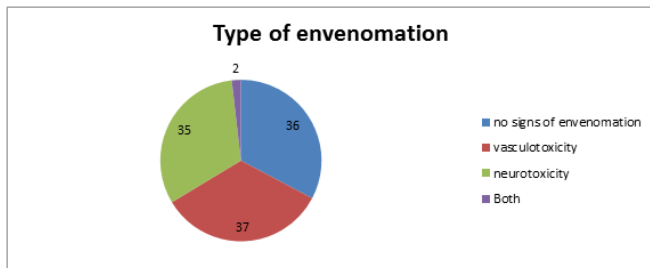


Fig.1: Type of envenomation in snake bite cases

Most common presenting complaint was pain and swelling at site of bite (44.3%). The commonest complications in vasculotoxicity group were oozing from site (62.16%), cellulitis (48.64%), oligouria (35.13%) and sepsis (29.72%).

All patients with vasculotoxicity had increased WBCT and PT/INR and WBCT is a good bedside predictor of coagulopathy.

In this study the biting species was identified in only 56 cases (50.9%) and commonest was viper (20 cases-18.88%).

Most common presenting complaint was pain and swelling at site of bite and seen in 44.3% case, ptosis seen in 33% and oozing from bite site in 21.7%.

Most common neurological complication in neurotoxic snake bite cases was ptosis, seen in 100% cases followed by ophthalmoplegia in 83.6% and respiratory paralysis in 51.4%.

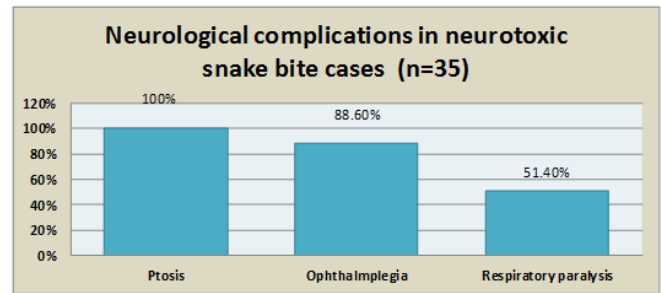


Fig. 2: Neurological complications in neurotoxic snake bite cases

Commonest vasculotoxic manifestation was local bleeding (62.16%) followed by cellulitis (48.64%)

Most serious complications in vasculotoxicity group were sepsis, DIC and renal failure while in neurotoxicity group it was respiratory failure. Overall 3.8% of our cases received blood transfusion while 7.5% underwent dialysis.

Overall the association of SCH, anuria, renal failure and DIC with poor outcome was found to be statistically significant with a p value of <0.01.

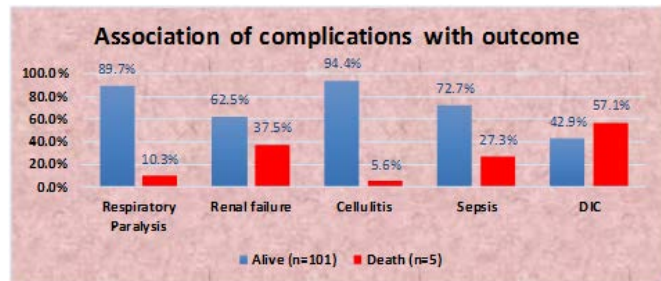


Fig. 3. Association of complications with outcome

Mean no. of total ASV given was 23.84±5.10 doses.

Majority of patients of our study received ASV >5hours later. A statistically significant association was noted between mortality and prolonged bite to ASV administration time (p= 0.01).

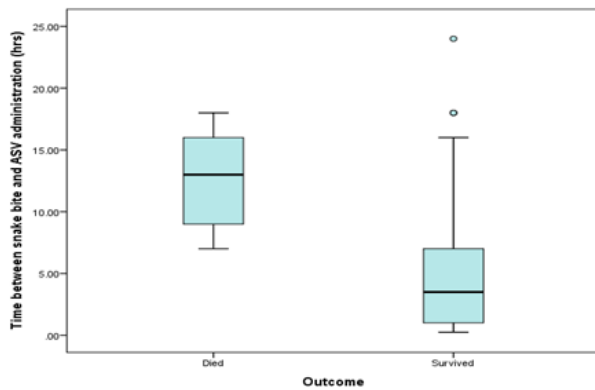


Fig: 4. Boxplot showing association of time between snake bite and ASV administration with outcome.

Mean duration of hospital stay was 3.98 ± 1.65 days. For 58.5% of patient's hospital stay duration was up to 3 days while only for 2.8% hospital stay was more than 7 days.

The overall outcome was good. 91.51% of our patients had complete recovery and 3.77% had recovery with some disability while only 4.72% succumbed to death.

Discussion

In present study the overall incidence of snake bite is 682.7 per 100000 admissions in general medicine wards.

The majority of cases (59.4 %) were found in the age group of 18-35 yrs (Table-1). This is in accordance with the study conducted by A.K Hati et al at Calcutta School of Tropical Medicine. (3)

In present study incidence of snake bite was 67% in male and 33% in females same as observed by Banerjee and Sawai et al(4). 83% of these patients were from rural areas.

In our study Rural: Urban ratio was 4.9:1 which is similar to as observed by Sharma et. al.(5)

Nearly 94% of bites were reported from outdoor areas with maximum incidence in June to August months and 59.43% occurred during night time same as observed in study by Sharma et. al.(6) The bite site incidence was

57.5% in the lower extremity suggesting that the lower extremity was most frequently involved. This observation is also similar to that made at PGI MER Hospital, Chandigarh and Halesha B R et al (6) In this study the biting species was identified in only 56 cases (50.9%) and commonest was viper (20 cases- 18.88%) same as observed by Kulkarni et al & Punde et.al.(7) Out of 106 cases of snake bite, 36 cases had no signs of envenomation, 37 cases had vasculotoxicity, 35 cases had neurotoxicity while 2 cases had both vasculotoxicity and neurotoxicity. Most common presenting complaint was pain and swelling at site of bite and seen in 44.3% case, ptosis seen in 33% and oozing from bite site in 21.7%. Out of 35 patients with neurotoxicity ptosis was seen in 100% patients, Ophthalmoplegia in 88.6% patients and 51.4% developed respiratory paralysis. Seneviratne et. Al (8) observed ptosis in 85.7% patients and ophthalmoplegia in 75% of patients of neurotoxic bite. Haematotoxicity was observed in 37 patients and the commonest vasculotoxic manifestation was local bleeding (62.16%) followed by cellulitis (48.64%) same as observed by Mahur et al. (9) The association between subconjunctival haemorrhage, Renal failure, Sepsis, DIC & Cellulitis and the poor outcome is highly significant ($p < 0.01$) while that of cellulitis and Respiratory failure is statistically non-significant. All 37 patients of our study with vasculotoxicity had increased WBCT and PT INR. Majority of patients received ASV >5 hours later which is comparable to observations made by Athappan G et al. (10) Mean duration of hospital stay was 3.98 ± 1.65 days. The overall outcome was good, 97 patients out of 106 recovered completely without any disabilities, 4 patients developed complications in the form of wide raw area and underwent some invasive procedures like SSG in the subsequent follow-ups and discharged with

some disabilities. 5 patients died in the hospital because of multiple complications.

Conclusion

Our study infers that delay in presentation following snake bite significantly increases risk of local and systemic complications compelling increased need of surgical intervention, dialysis and mechanical ventilation in such cases. There is no substitute for early and effective treatment with ASV. In a tropical country like India, it is imperative to increase awareness among the people about the complications of snake bite and educate them about the availability of effective specialized treatment.

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