

Study of Clinical Profile and Complications of Snake Bite (80 Cases) Attending at Emergency Department of Medicine –In a Tertiary Care Hospital

1st Author Dr. B. Vamshee Krishna

Assistant Professor,
Department of General Medicine
Government Medical College and Hospital,
Mahaboobnagar

2nd author Dr. G Yashwanth Reddy

Assistant Professor, Department of General Medicine
Government Medical College and Hospital,
Mahaboobnagar

3rd Author: Dr. Charan Neeradi

Assistant professor, Department of General Medicine
ESIC Medical College and Hospital,
Sanath Nagar, Hyderabad

4th author and Corresponding author:

Dr. Chennakesavulu Dara
Associate Professor, Department of General Medicine
ESIC Medical College and Hospital, Sanath Nagar, Hyderabad

5th author: Dr. Phani Krishna Telluri

Junior resident, Department of General Medicine
ESIC Medical College and Hospital, Sanath nagar, Hyderabad

6th author: Dr. Khizer

Junior resident, Department of General Medicine
ESIC Medical College and Hospital, Sanath nagar, Hyderabad

Abstract

INTRODUCTION: Snakes are fascinating and form an important component of fauna and are the objects of awe and curiosity since the dawn of civilization. Snakebite is a one of the common medical emergency encountered in day today practice in India. Snake bite is completely treatable if treated in time. Immediate steps should be taken to shift the victim to the hospital as early as possible. Educate the people to avoid traditional heals so that we can reduce the time lapse for the admission of hospital. All cases of doubtful snake bites should be admitted in hospitals to watch the toxicity for proper treatment.

MATERIALS AND METHODS: This is a prospective study conducted in the Emergency Department of Medicine at Tertiary Care Hospital among 80 Adult patients admitted with history of snakebite over a period of 1 year were studied. Inclusion criteria: All patients with history of snakebite and with at least one of the following criteria were included in the study.

Patients or attenders have seen the offending snake. Definite fang marks are noted. Features of local or systemic envenomation.

RESULTS: Limbs 75 (93.66%) are the commonest site for bite. Among the limbs lower limbs were commonest site 39 (48.75%), followed closely by upper limb bite 36 (45.0%). Four patients had unusual sites of bite, three on face and one over right scapula, all four bites occurred while patients were asleep. The incidence of venomous snakebites was 70 patients (87.5%), whereas non-poisonous constituted only 12.5%. Among poisonous bites neurotoxic manifestations 37 (52.86%) were more common than hemorrhagic manifestations 33 (47.14%).

CONCLUSION: Early hospitalization and timely ASV was the corner stone in the treatment of snakebite. Still majority of the patients do not seek medical attention immediately. Most of them visit traditional healers. Thus, there is a need for giving health education regarding the snakebites, their toxic effects, effectiveness of hospitalization, ASV therapy in bites and prevention of snakebite by appropriate measures. This will definitely reduce the incidence and complications of snakebites.

Keywords: Snake Bite, Hemorrhagic, Neurotoxic

INTRODUCTION

Snakes are fascinating and form an important component of fauna and are the objects of awe and curiosity since the dawn of civilization. Snakebite is a one of the common medical emergency encountered in day today practice in India. ^[1]

In India 236 species of snakes have been identified out of which 52 are poisonous. Approximately 2 lakh people are bitten by poisonous snakes in India annually, out of them about 20,000 die. ^[2] The annual mortality from snake bites in India is between 35000 to 50000. Annual snake bite incident is about 66-163 per 100000 population. Morbidity is about 1.4 to 68 per lakhs and mortality is 1.1 to 2.4 per lakh population and case fatality rate is 1.7 to 20%. ^[3]

There are four medically important venomous land snakes in India, the Indian Krait (*Bangarus Coeruleus*), the common Cobra (*Naja Naja*), the saw scaled viper (*Echis Carinatus*) and Russel's viper (*Viper Russelli*). ^[4] The largest family Colubridae includes 1748 species of which 100 are capable of producing mild envenoming in humans but only a few have caused fatalities. ^[5]

The distribution of the snakes differs depending on the herpato fauna existing in any particular region and climatic conditions like temperature and rainfall. The pattern of bites also depends on occupation, recreational habits, clothing and season. Most of the snake bites occur in fields, usually during rainy season. Snake bites can be prevented to a certain extent by educating people working in fields to use protective gears like gumboots and gloves. There are many causes attributed to high snake bite mortality, lack of adequate training and knowledge of doctors in rational use of ASV is very important. ^[6]

Snake bite is completely treatable if treated in time. Immediate steps should be taken to shift the victim to the hospital as early as possible. Educate the people to avoid traditional heals so that we can reduce the time lapse for the admission of hospital. All cases of doubtful snake bites should be admitted in hospitals to watch the toxicity for proper treatment.^[7]

Currently intensive work is being done on the pharmacological, pathological, toxicological and immunological aspects of snake venoms to give a better break to the snake bite victim, which has resulted in production of polyvalent and monovalent antsnake venoms though the latter is not yet freely available in India.^[8]

The incidence of snake bite in vijayawada and its surroundings is high. Hence, this study is undertaken to study the snake bite, clinical presentation with special emphasis on complications and outcome.

Aims: To study the clinical presentation of snake bites in Surrounding regions of Vijayawada, A.P. To study the complications and outcome of snake bite.

MATERIALS AND METHODS

This is a prospective study conducted in the Emergency Department of Medicine at Tertiary Care Hospital among 80 Adult patients admitted with history of snakebite over a period of 1 year were studied.

Inclusion criteria: All patients with history of snakebite and with at least one of the following criteria were included in the study. Patients or attenders have seen the offending snake. Definite fang marks are noted. Features of local or systemic envenomation.

Exclusion criteria: Patients with history of suspected snakebite, where in: Patient or attenders have not seen the snake. No fang marks and no features of envenomation. In all the patients presenting with snakebites and fulfilling inclusion criteria, detailed history was taken and examination done as per enclosed proforma. It was determined whether the bites were venomous or non-venomous.

The snakebite was identified from modified criteria of Sarangi et al 40 by:

1. Fang marks: Lesions resulting from snake bites are, as a rule, two lacerated punctures, about 1.25 cms deep in the case of non-poisonous and about 2.5 cm deep in the case of poisonous snake bites. An inverted 'U' shaped or multiple teeth marks indicate non-poisonous snakebite.

2. Identification of snakes living or dead.

3. Description given by the patient / attender about the snake length, thickness, colour, head etc.

4. The development of signs and symptoms of local or systemic envenomation. The bites were classified as venomous and non-venomous based on clinical features. In venomous bites an attempt was made to determine whether they were bitten by elapidae or viperidae based on the description or examination (when brought) of the offending snake. Also whenever the patient had or developed unequivocal neuroparalysis or haemotoxic manifestation, they were assigned to elapidae or viperidae respectively.

The venomous snakebites were graded clinically as:

Mild envenomation: Viperidae: A definite local swelling confined to the area of bite with pain and tenderness at the site of bite. Elapidae: A definite fang mark with area of numbness, pain and tenderness at the site of bite and presence of ptosis and/or ophthalmoplegia only.

Moderate envenomation: Viperidae: Progression of swelling beyond the area of bite to involve the proximal parts with severe pain and tenderness, with bleeding from the wound.

Elapidae: Progression of local swelling beyond the area of bite to involve the proximal parts with severe pain and tenderness and/ or presence of ptosis, ophthalmoplegia, palatal and pharyngeal paralysis.

Severe envenomation: Viperidae: Progression of swelling to involve the trunk from the site of bite at the distal parts, local necrosis, severe systemic bleeding. Elapidae: Respiratory inadequacy or paralysis. The blood was drawn for investigations, bed side tests for bleeding and clotting time was performed and CBC, blood urea, serum creatinine, urine routine, were obtained in all cases. Prothrombin time, LFT, ECG were obtained when indicated.

All the patients in whom it was decided to give ASV were premedicated with chlorpheniramine maleate. Intracutaneous testing was carried out. All patients who showed any reaction were given further dose of chlorpheniramine, hydrocortisone and started on ASV infusion. Initial dosage was 2-5 vials for mild, 5-9 vials for moderate and 10-15 vials for severe envenomation for first 8-10 hours. Further dosage was based on clinical judgement and preference of treating physician.

Neostigmine was administered to all patients with neuroparalysis till reversal of Neurotoxic manifestations. Blood transfusion, respiratory assistance and dialysis was carried out as and when indicated.

RESULTS

The snakebites were observed in all age groups. The youngest patient was 10 years old and oldest was 94 years. The majority of patients (77%) were below 40 Years of age

Table-1: Age wise distribution of snakebites

Age(Years)	No. of Cases	Percentage
10 to 19	6	7.50%
20 to 29	12	15.00%
30 to 39	20	25.00%
40 to 49	24	30.00%
50 to 59	13	16.25%
60 and above	5	6.25%
Grand Total	80	100.00%

Table-2: Sex-wise distribution of snakebite cases

Sex	No. of Cases	Percentage
FEMALE	26	32.50%
MALE	54	67.50%
Total	80	100.00%

Table-3: Distribution of cases according to Sites of Bite

Sight of a bite	No. of cases	Percentage
Lower limb	39	48.75%
Others	5	6.25%
Upper limb	36	45.00%
Grand Total	80	100.00%

Limbs 75 (93.66%) are the commonest site for bite. Among the limbs lower limbs were commonest site 39 (48.75%), followed closely by upper limb bite 36 (45.0%). Four patients had unusual sites of bite, three on face and one over right scapula, all four bites occurred while patients were asleep.

Table-4: Distribution of cases according to Types of Snake Bites

Type of Snake Bites	No. of Cases	Percentage
Non- poisonous	10	12.5
Poisonous	70	87.5
Elapidae	33	41.25
Viperidae	30	37.5
Unidentified	7	8.75

Among all snakebites, majority of cases were due to poisonous snakebites 70 patients (87.5%). Among them 33 patients (41.25%) had been bitten with Elapidae snakes while

Viperidae snakes had bitten 37.5% (30 patients). In 8.75% of patients the biting snake could not be identified.

Table-5: Types of Envenomation

Type of Envenomation	No. of cases	Percentage
Hemorrhagic	33	47.14%
Neurotoxic	37	52.86%
Cardiotoxic		0.00%
Grand Total	70	100.00%

The incidence of venomous snakebites was 70 patients (87.5%), whereas non poisonous constituted only 12.5%. Among poisonous bites neurotoxic manifestations 37 (52.86%) were more common than hemorrhagic manifestations 33 (47.14%).

Table-6: Presentation of Neurotoxic Venom Poisoning (n=37)

Manifestation	No. of Cases	Percentage
Ptosis	37	100
Ophthalmoplegia	28	75.67568
Palatal and pharyngeal palsy	25	67.56757
Respiratory palsy	14	37.83784
Limb paralysis	2	5.405405
Convulsions	0	0
Coma	1	2.702703

All the 37 patients developed ptosis (100%). It was the earliest feature in these cases followed by ophthalmoplegia 28 in patients (75%), palatal and pharyngeal palsy 25 (67.56%) cases. Most cases showed the sequential progression from ptosis to respiratory inadequacy. Only one patient developed coma. None of the patients had convulsions.

Table-7: Presentation of Hemorrhagic Snake Envenomation (n=33)

Manifestation	No. of Cases	Percentage
Bleeding from bite site	24	72.72727
Gum bleeding	8	24.24242
Ecchymosis and hematoma	9	27.27273
Hematuria	12	36.36364
Hematemesis	3	9.090909
Hemamoptysis	1	3.030303
Intracranial bleed	-	-

Bleeding from the bite site 24 (72.72%) was the commonest manifestation followed by hematuria 12 (36.36%), gum bleeding 8 (24.24%) and ecchymosis 9 (27.27%).

Though two patients developed hypotension, it was not attributable to cardiotoxicity and none of the patient in this study had cardiotoxic envenomation. All had normal ECG

Table-8: Complications wise distribution of cases (n=75)

Complication	No. of Cases	Percentage
Acute Renal failure	16	20
Respiratory paralysis	11	13.75
Shock	4	5
Limb loss	0	0
Infection	1	1.25
Gangrene	1	1.25
TOTAL	33	41.25

Most common complications was acute renal failure was noted in 16 (20%) of patients. All of them were viper bites. Among them 4 (26.66%) patients required hemodialysis, while remaining patients recovered totally on conservative treatment. Though respiratory inadequacy was noted in 11 patients (13.75%), only 4 (5.2%) had respiratory paralysis requiring assisted ventilation. Three patients were put on ventilation, while one was managed with ambu-bag ventilation. Though shock was observed in four (4%) cases, it was mainly attributable to blood loss rather than cardiotoxicity.

Table-9: Showing results of investigations (n=80)

Investigation	Results	Percentage
Hemoglobin (g %)	Reduced in 27 patients	33.4
Bleeding and Clotting time	Prolonged in 15 patients	18.75
Prothrombin time	Prolonged in 14 patients	17.5
Microscopic hematuria	Present in 13 patients	16.25
Blood urea and serum creatinine	Raised in 20 patients	25
Platelet count	Diminished in 6 patients	7.5
Total leukocyte count	Raised in 48 patients	60
ESR	Raised in 45 patients	56.25

Investigation carried out in the cases showed that hemoglobin percent was reduced in viper (hematotoxic) bites, while it was normal in Elapidae bite. Neutrophilic leukocytosis was noted in 45 cases of moderate to severe Elapidae, while it was normal in most viperidae and non-venomous bites. Platelet count was noted to be lower in viperidae bite (hematotoxic) while it was normal in elapidae bites. Clotting time, bleeding time and prothrombin time were prolonged in 15 cases of viperidae bites. Blood urea and serum creatinine were higher in viperidae bite as a result of renal failure. Hematuria was noted on urine microscopy in 13 patients of viperidae bite. No other cases showed hematuria. ECG did not show any significant abnormalities

Table-10: Analysis of Anti-snake Venom Treatment.

	No of cases	Per
No. of patients who received ASV	62	77.5
No. of patients who not received ASV	18	22.5
Total	80	100

Table-11: Mortality

No. of patients died	7 out of 80	8.75%
Mortality and sex		
Male	5 out of 54	8.928%
Female	2 out of 26	7.692%
Mortality and site of bite		
Lower limb	4 out of 39	10.25%
Upper limb	3 out of 36	8.33%
Mortality and species		
Viperidae bite	4 out of 30	13.33%
Elapidae bite	3 out of 33	9.09%
Cause of death		
Acute renal failure	3 out of 16	18.75
Respiratory paralysis	4 out of 11	36.33
Time lapse between bite and admission		
< 24 hours	6 out of 56	10.71%
> 24 hours	1 out of 24	4.1%

Out of 80 cases of snakebite 7 (8.75%) patients died. Among 54 male patients, 5 (8.92%) died and out of 26 female patients, 2 (7.692%) died. When the site of bite was in lower limb, mortality was 4 out of 39 (10.25%), and when it was in the upper limb mortality was 3 out of 36 (8.33%). Mortality in viperidae bite was 4 out of 30 (13.33%) and in elapidae bite 3 out of 33(9.09%). Acute renal failure was the cause of death in 3 out of 16 patients (18.75%) and respiratory failure was the cause of death in 4 out of 11 patients (36.33%). When the time lapse between the bite and admission was <24 hours, mortality was 6 out of 56 (10.71%) and when it was >24 hours, mortality was 1 out of 24 cases (4.1%).

DISCUSSION

In our study snakebite was observed in all age groups. The maximum number patients were in the age group 10-39 years, they constituted 80% patients, which is comparable to that of Sawai et al (70.28%) and Nigam et al 83.3%.^[9,10]

Biyajenee Mohapatra et al also concluded that snakebite and deaths peaked at ages 15-29 years. Maximum number of cases were seen in 10 to 39 years age group.^[11] This is because, people belonging to this age group are prone for snake bite because of occupational activities.

In our study, maximum number of bites occurred on lower extremities 39 (48.75%). The lower and upper extremities constituted more than 71 (94.66%), bite sites suggesting the site of the bite was predominantly determined by accidental or inadvertent contact of the snake during the activities. The incidence in our study is similar as observed by Sawai et al (97.90%) and Hati et al.^[9,12]

The neurotoxicity 33 (52.86%) was found more frequently than hemorrhagic type 37 (47.14%). In contrast Emam SJ et al reported a high incidence of hemorrhagic manifestations.^[13] No cardiotoxicity was noted in our study. It is due to the fact that relative prevalence of toxic varieties of snakes could vary in different region of country depending on prevalence and distribution of snakes.

In the present study, bleeding from bite site was most common (72.72%), followed by hematuria (36.36%), gum bleeding (25%) and echymosis (27.27%).

Sarangi et al reported bleeding from bite site in only (44.4%), followed by hematemesis (39%), echymosis (27.7%) and gum bleeding (27.7%).^[14] Contrary to above studies, Saini reported hematuria was most common presentation (83.3%) followed by bleeding from bite site (50%), bleeding gum (41.6%), and Hematemesis (33.3%).^[15]

In our study ptosis (100%) was commonest manifestation of neurotoxic bites and was found in all cases. Frequency of ptosis was 80% in study by Sarangi et al 40 & 85% in Nigam et al study. It was also noted to be earliest manifestation.^[14, 10]

Palatal and pharyngeal palsy was present in 67.56% in our study, while Nigam et al and Sarangi et al found it in 71.4% and 60% cases respectively.^[14, 10]

Ophthalmoplegia was present in 75.67% in present study but Nigam et al found it in only 43%.^[10]

Six patients did not receive ASV because of late presentation, while 56 patients were given ASV. In general, the mean dosage requirement was 16.00 vials and it ranged between 2 to 48 vials.

In hemotoxic bites, the dosage requirement ranged from 2- 40 vials (with mean requirement of 14.8 vials), which was comparable to the study by Saini et al, where in the dose required was 5-40 vials (mean 15.01 vials).^[15]

In neurotoxic bites, the average requirement ranged from 4-48 vials with Mean requirement being 20.00 vials.

Duration for which ASV was administered ranged from 4 hours to 3 days with a mean duration of 35.1 hour, which is comparable to the study reported by Saini et al. [16]

Nigam et al reported 14 deaths all of whom were admitted within 24 hours. Sarangi et al reported three elapidae bite death, though they were admitted within 3 hours of bite. [10]

In present study, one patient died though the patient admitted within 3 hours, due to sudden respiratory arrest. Four patients who died were admitted after a delay of 24 hours to 15 days of bite.

All the patients, who died were in the age group of 20-40 years, out of the 7 who died, 5 (8.92%) were males and 2 (7.69%) were females. Thus, out of 54 males 3 (6.00%) died and out of 26 females, 2 (8.00%) died. All who died had single bite.

Out of them 4 (10.25%) had bite in lower extremity and 3 (8.33%) had bite on the upper extremity. Total number of patients bitten on the lower extremity was 39 (50.66%), out of whom 4 (7.33%) died. Total number of bites on the upper extremity were 33 (33.44%), out of whom 3 (8.00%) died.

CONCLUSION

Early hospitalization and timely ASV was the corner stone in the treatment of snakebite. Still majority of the patients do not seek medical attention immediately. Most of them visit traditional healers. Thus, there is a need for giving health education regarding the snakebites, their toxic effects, effectiveness of hospitalization, ASV therapy in bites and prevention of snakebite by appropriate measures. This will definitely reduce the incidence and complications of snakebites.

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