Clinical Profile of Snake Envenomation with Complications and Outcome in a Tertiary Health Care Centre, Kalburgi

Shoukat A. R.¹, Muddasir Ahmed Indikar²

¹Department of General Medicine, M. R. Medical College, Kalburgi, Karnataka, India. ²Department of General Medicine, M. R. Medical College, Kalburgi, Karnataka, India.

ABSTRACT

BACKGROUND

Bites by snakes represent an important health problem in the tropical world including India. The true incidence of snakebites is difficult to assess and often is under reported. Though the exact number of snake bites is unknown, an estimated 5.4 million people are bitten each year with up to 2.7 million envenoming. Around 81,000 to 1,38,000 people die each year because of snake bites, and around three times as many amputations and other permanent disabilities are caused by snakebites annually. We wanted to determine frequency of various modes of presentation, complications and management of snakebite.

METHODS

All patients presenting to emergency department of Basaveshwara Teaching and General Hospital with history of snakebite and features of envenomation were included in the study. All these patients were given Anti-Snake Venom. Symptomatic treatment of complications was done. Semi-structured questionnaire was filled during hospital stay to analyse various characteristics of snakebite and people's attitude towards this problem.

RESULTS

75 cases of snakebite admitted to Basaveshwara Teaching & General Hospital, Gulbarga between January 2018 to November 2019 were studied. Males [50 (62.5%)] were affected more than females [25 (31.5%)] in the ratio of 2:1. Most common age group is 20-40 years [45 (60%)]. Snakebite is a common health hazard in rural areas [55 (73.34%)]. Agricultural labourers (68.6%) are the major sufferers with majority of bites occurring outdoor 60 (80%). 71 (94.66%) bites occurred over limbs, out of which 38 (50.66%) were in lower limbs. Most bites occur between 12 Noon to 12 Midnight 60 patients (81.2%). Out of 75 patients, 60 (80%) were poisonous snakebites, 20 (20%) were non-poisonous snakebites. Among 60 (80%) poisonous bites, 32 (53.34%) had neurotoxic manifestations and 28 (46.66%) had hemotoxic manifestations.

CONCLUSIONS

Snakebite is common in rural setup, in agricultural labourers. Most common victims are males in the age group between 20-40 years. Poisonous bites were more common than non-poisonous snake bites in this study. In neurotoxic envenomation ptosis was the commonest and earliest symptom while in hemotoxic envenomation, most common symptoms were bleeding from bite site and hematuria. The commonest complications were acute renal failure and respiratory paralysis. Shock, infection and gangrene were also noted in some patients. Maximum mortality was observed in patients who were admitted after 24 hours. Early hospitalization and timely ASV administration were the corner stones in the treatment of snakebite.

KEY WORDS

Snake Bite, Elapidae, Viperidae, Hemotoxic, Neurotoxic, Anti-Snake Venom

Corresponding Author: Muddasir Ahmed Indikar, Amina Manzil, Darbar Galli, JM Road, Vijaypur, Karnataka, India. E-mail: drmuddasir12@gmail.com

DOI: 10.14260/jemds/2020/135

Financial or Other Competing Interests: None.

How to Cite This Article:

Shoukat AR, Indikar MA. Clinical profile of snake envenomation with complications and outcome in a tertiary health care centre, Kalburgi. J. Evolution Med. Dent. Sci. 2020;9(09):608-612, DOI: 10.14260/jemds/2020/135

Submission 20-12-2019, Peer Review 04-02-2020, Acceptance 11-02-2020, Published 02-03-2020.



BACKGROUND

Snakebite is a one of the common medical emergencies encountered in day to-day practice in India. Bites by snakes represent an important health problem in the tropical world including India. The true incidence of snakebites is difficult to assess and often is underreported. Though the exact number of snake bites is unknown, an estimated 5.4 million people are bitten each year with up to 2.7 million envenoming. Around 81 000 to 138 000 people die each year because of snake bites, and around three times as many amputations and other permanent disabilities are caused by snakebites annually.¹ There are four medically important venomous land snakes in India, the Indian Krait (Bungarus caeruleus), the common Cobra (Naja naja), the saw scaled viper (Echis carinatus) and Russel's viper (Viper russelli).² The distribution of the snakes differs depending on the 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 Awareness and educating the farmers and labourers.² In tropical countries where snake bite is a serious problem there is very little reliable data because of inadequate documentation. 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. 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.

At present very few clinical studies are available on snake envenomation especially on haematological problems of snake envenomation.3 Many of the toxins in snake venom interact with clotting mechanism and fibrinolytic system and causes coagulopathy. The occurrence of local and systemic snake bite related symptoms is linked to toxins in snake venom. Snake bite can result in local and systemic complications. Major systemic complications include acute renal failure, neurologic abnormalities requiring ventilator support and disseminated intravascular coagulation.4,5 Disseminated intravascular coagulation can result in serious life threatening systemic complications like haemorrhage, infarction and even death if the treatment is delayed.6 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 anti-snake venoms though the latter is not yet freely available in India. The incidence of snake bite in Gulbarga and its surroundings is high. Hence, this study is undertaken to study the snake bite, clinical presentation with special emphasis on complications and outcome.

We wanted to assess the clinical presentation, complications and outcome of snake bites in North-Eastern region of Karnataka.

METHODS

This is an observational study conducted among 75 Adult patients admitted with history of snakebite in Basaveshwara Teaching and General Hospital, Gulbarga between January 2018 to December 2019 were studied. The sample size was taken based on the convenience of the study.

Inclusion Criteria

All patients with history of snakebite and with at least one of the following criteria were included in the study.

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

In all the patients presenting with snakebites and fulfilling inclusion criteria, detailed history was taken, and examination done as per proforma. It was determined whether the bites were venomous or non-venomous. 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 pre medicated 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 judgment 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. All the cases were administered injection tetanus toxoid and appropriate antibiotics and anti-inflammatory drugs were required. Patients developing severe cellulitis were referred to surgeons for necessary treatment like multiple incisions and skin grafting. The patients initially monitored continuously and later once daily and at time of discharge. Notes were made regarding appearance and disappearance of signs, symptoms and complications and treatment received. The study was approved by Ethical Committee and informed consent was obtained.

Statistical analysis

The results were analyzed by using The Statistical Package for Social Science {SPSS} Version 20 will be used for Data Analysis. Mean, median, and SD are used to describe quantitative data. Qualitative data are summarized using frequency and percentage.

RESULTS

During the study period from January 2018 to December 2019.75 patients were included in the study as per the inclusion criteria. Following are the observations made in those 75 patients.

Age Wise Distribution of Snake Bite Cases				
Age (Years)	No. of cases	Percentage		
13 - 19	15	20.00		
20-29	30	40.00		
30-39	15	20.00		
40-49	10	13.33		
> 50 years	5	6.67		
Total	75	100.00		
Sex-Wise Distribution of Snake Bite Cases				
Sex	No. of cases	Percentage		
Males	50	66.66		
Females	25	33.34		
Total	75	100.00		
Table 1. Age and Sex Wise Distribution of Cases				

The snakebites were observed in all age groups. The youngest patient was 15 years old and oldest was 69 years. The majority of patients (80%) were below 40 years of age. The snakebite is more common in males. The male to female ratio is approximately 2:1.

Distribution of Cases According to Areas					
Place	No. of cases	Percentage			
Urban	20	26.66			
Rural	55	73.34			
Total	75	100.00			
Distribution of Cases According to Activities					
Place	No. of cases	Percentage			
Outdoor	60	80.00			
Indoor	15	20.00			
Total	75	100.00			
Distributio	Distribution of Cases According to Sites of Bite				
Sites of the Bite	No. of Cases	Percentage			
Lower limb	38	50.66			
Upper limb	33	44.00			
Other parts	4	5.34			
Total	75	100.00			
Table 2. Distribution of Cases According to Areas, Activities and Sits of Bites					

Snakebite is mainly seen in rural agricultural labours as 55 (73.34%) of our cases were from rural places, while the rest 20 (26.66%) were from urban places. The bites occurred predominantly during outdoor activities Limbs 71 (94.66%) are the commonest site for bite. Among the limbs lower limbs were commonest site 38 (50.66%), followed closely by upper limb bite 33 (44.0%).Four patients had unusual sites of bite, three on face and one over right scapula, all four bites occurred while patients were asleep.

Types of Snake Bites				
Type of Snake Bites	No. of Cases	Percentage		
Non- poisonous	15	20.00		
Poisonous	60	80.00		
Elapidae	30	40.00		
Viperidae	24	32.00		
Unidentified	6	8.00		
Types of Envenomation				
Type of Envenomation	No. of Cases (n=60)	Percentage		
Haemorrhagic	28	46.66		
Neurotoxic	32	53.34		
Cardiotoxic				
Total	60	100.00		
Table 3. Distribution of Cases According to Types of Snake Bites and Envenomation				

Among all snakebites, majority of cases were due to poisonous snakebites 60 patients (80%). Among them 30 patients (40%) had been bitten with *Elapidae* snakes while *Viperidae* snakes had bitten 32% (24 patients). In 8% of patients the biting snake could not be identified. The incidence of venomous snakebites was 60 (80%), whereas non-poisonous constituted only 20%. Among poisonous bites neurotoxic manifestations 32 (53.34%) were more common than haemorrhagic manifestations 28 (46.66%).

Symptoms Wise Distribution of Cases			
Symptoms	No. of Cases	Percentage	
Fright and anxiety	60	80.00	
Vomiting	20	26.66	
Pain abdomen	6	8.00	
Local pain	34	45.33	
Numbness	08	10.66	
Local swelling	26	34.66	
Bleeding from wound	11	14.66	
Hematuria	10	13.33	
Ecchymosis	06	8.00	
Complicat	ions Wise Distribution of	Cases	
Complication	No. of Patients	Percentage	
Acute renal failure	15	20.00	
Respiratory paralysis	10	13.33	
Shock	3	4.00	
Limb loss	0	0.00	
Infection	1	1.33	
Gangrene	1	1.33	
Total	30	40.00	

Fright was a prominent symptom seen in 60 (80%) of patients. It was found both in poisonous and non-poisonous bites usually developed within minutes of bite. Most common complication was acute renal failure was noted in 15 (20%) of patients. All of them were viper bites.

Manifestation	No. of Cases	Percentage		
Ptosis	32	100.00		
Ophthalmoplegia	24	75.00		
Palatal and pharyngeal palsy	22	68.75		
Respiratory palsy	12	37.50		
Limb paralysis	2	6.25		
Convulsions	0	0.00		
Coma	1	3.125		
Table 5. Presentation of Neurotoxic Venom Poisoning				

All the 32 patients developed ptosis (100%). followed by ophthalmoplegia 24 in patients (75%)

DISCUSSION

Snakebite is one of the major medical emergency and hazard to life and health of people in the predominantly agricultural country like ours.

Age Incidence

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 al⁷ (70.28%) and Nigam et al⁸ 83.3%. 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. This is because, people belonging to this age group are prone for snake bite because of occupational activities.

Sex Incidence

The incidence of snakebite is more common among males shown in our study as well as others. It is obviously due to the increased risk of exposure to the snake bite occupationally.

Population Incidence

Snakebite is mainly the disease of the rural population. In the present study 55 (73.34%) patients were from rural

population and 90 (26.66%) from urban population. The findings are consistent with finding of Bhat⁹ and Kulkarni.¹⁰

Outdoor / Indoor

An incidence of 60 (80%) of snakebite was reported during outdoor activities in the present study. A similar high incidence was also reported by Banerjee.¹¹

Site of Bite

In our study, maximum number of bites occurred on lower extremities 38 (50.66%). 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 al¹² (97.90%) and Hati et al.¹³

Types of Envenomation

The neurotoxicity 32 (53.34%) was found more frequently than haemorrhagic type 28 (46.66%). In contrast Nigam et al, Sarangi et al,¹⁴ Bawaskal et al and Emam SJ et al reported a high incidence of haemorrhagic manifestations. 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.

Haematotoxic Manifestations

In the present study, bleeding from bite site was most common (71.42%), followed by hematuria (35.71%), gum bleeding (25%) and ecchymosis (25%). Sarangi¹⁵ et al reported bleeding from bite site in only (44.4%), followed by hematemesis (39%), ecchymosis (27.7%) and gum bleeding (27.7%). 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%).¹⁶

Complications

Most common complications were acute renal failure was noted in 15 (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 10 patients (13.3%), 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 three (4%) cases, it was mainly attributable to blood loss rather than cardiotoxicity.

CONCLUSIONS

Snake bite though preventable in principle, remains to be one of the common medical emergencies being more frequent in rural agricultural and farm workers. Most common age group is 20-40 years. Adult males are more prone to the bites. Poisonous bites are more common than non-poisonous bites in hospitalized patients. In neurotoxic envenomation, ptosis was the commonest and earliest symptom while in hemotoxic envenomation, most common symptoms were bleeding from bite site and hematuria. More *Elapidae* bites are seen in this area than viper bites. The commonest complications were acute renal failure and respiratory paralysis. Shock, infection and gangrene were also noted in some patients. Maximum mortality was observed in patients who were admitted after 24 hours. 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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