ISSN:0975-3583,0976-2833 VOL13,ISSUE08,2022

CLINICAL PROFILE OF SNAKE BITE- A 10 YEAR STUDY FROM NORTH KARNATAKA, BAGALKOT DISTRICT.

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ABSTRACT

Introduction

Snake bite is a neglected public health problem in many tropical countries. "About 5.4 million snake bites occur each year, resulting in 1.8 to 2.7 million cases of envenoming (poisoning from snake bites), there are between 81,410 and 1,37,880 deaths and around three times as many amputations and other permanent disabilities each year" (1). India is among the countries most dramatically affected by snakebite and accounts for almost half the total number of annual deaths in the world. The World Health Organization (WHO) has set the target of reducing by half the number of deaths due to snakebite envenoming by 2030 (1).

Methods

All adult patients with history or signs/symptoms of definite snake bite were included and clinical profile studied under various parameters between Jan 2011 to Dec 2020 in Department of General Medicine, S.Nijalingappa Medical College and HSK Hospital & Research Center.

Results

Total of 477 snake bite patients with definite history of snake bite were noted during this study. 268 patients (56.2%) were in the age group between 21-40 years. 195 patients (40.9%) were Hematotoxic snakebite, 128 patients (26.8%) were Neurotoxic snakebite. More than 50% of the patients required 10-20 ASV administration. 70 patients (14.7%) required ventilator support, 35 patients (7.3%) developed AKI, 19 patients (4%) required Hemodialysis and 15 patients (3.1%) required surgical intervention. Out of 477, 330 patients (69.2%) recovered, 135 patients (28.3%) were discharged against medical advice, 10 patients (2.1%) death and 2 patients 90.4%) referred to other center.

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Keywords

Snakebite, ASV, Hemodialysis

INTRODUCTION

Snake bite is a neglected public health problem in many tropical countries. "About 5.4 million snake bites occur each year, resulting in 1.8 to 2.7 million cases of envenoming (poisoning from snake bites), there are between 81,410 and 1,37,880 deaths and around three times as many amputations and other permanent disabilities each year" (1). India is among the countries most dramatically affected by snakebite and accounts for almost half the total number of annual deaths in the world. As it is estimated that India had 12 Lakh snake bite deaths (representing an average of 58,000 per year) from 2000 to 2019 (20years) with nearly half of the victims aged 30-69 and over a quarter being children under 15 (2). Venomous snake bite has listed in NTD-"Neglected Tropical Diseases", by WHO in 2009, NTD mainly includes the population of people in poverty. The Australian continent and the United States too has many more species of venomous snakes but in contrast to india the number of deaths due to venomous snakebite is less than 10 per year (3).

Russell's viper, kraits and cobras are among the most important biting snake species in India, yet other often unidentified species also represent a threat [25].

The early access to hospital care is of crucial importance in snakebite patients outcome. Early detection of clinical signs and symptoms and rapid administration of adequate initial dose of ASV on arrival, endotracheal intubation and timely intervention with either manual ventilation by amboo bag or mechanical ventilation in neuroparalysis and early detection of renal failure and its rapid treatment helps to reduce the morbidity and mortality in rural settings (4). Delay in hospitalization in associated with poor prognosis and increased mortality rate due to consumptive coagulopathy, renal failure, and respiratory failure, unusual complications like pulmonary edema, intracerebral hemorrhage, Disseminated intravascular coagulation (DIC) were observed (5). India is a country known to western population as a country of snake charmersand snake over centuries. Despite generation after generation some families in our country who play with snakes(snake charmers), we fail to protect the community from snake bite which requires atleast education of the common people, how to

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protect themselves from snake bite as well as what to do after the bite has occurred (6). According to data most of the snakebite deaths occur outside hospitals in India (7).

The World Health Organization (WHO) has set the target of reducing by half the number of deaths due to snakebite envenoming by 2030 (1). India's efforts to prevent and control this disease will largely influence this global target, since our study population area comes under back waters of Krishna project, have floods every year, where snake bites are more common (8). In comparison of our previous study we are here by studying various clinical manifestations and management including judicious usage of ASV and its clinical outcome.

SUBJECTS AND METHODS

All adult patients with history or signs/symptoms of definite snake bite were included and clinical profile studied under various parameters between Jan 2011 to Dec 2020 in Department of General Medicine, S.Nijalingappa Medical College and HSK Hospital & Research Center. IEC(Institutional Ethics committee) clearance taken. Hanagal Sri Kumareshwar Hospital Research Centre is a tertiary care hospital serving poor people of rural population in back ward and back water areas (Upper Krishna project) of North Karnataka attached to S.Nijalingappa Medical College, Bagalkot.

RESULT

Demography

Total of 477 snake bite patients with definite history of snake bite were noted during this study. 248 male patients (59.5%) and 193 female patients (40.5%). 268 patients (56.2%) were in the age group between 21-40 years, 128 patients (26.8%) greater than 40 years and 81 patients (17%) were between 15-20 years, mean age was 34.62.

Table-1, Time of presentation

Time of presentation	No of Cases	Percent
12AM – 6AM	92	19.3%
6AM – 12PM	95	19.9%
12PM – 6PM	136	28.5%
6PM – 12AM	154	32.3%
Total	477	100.0%

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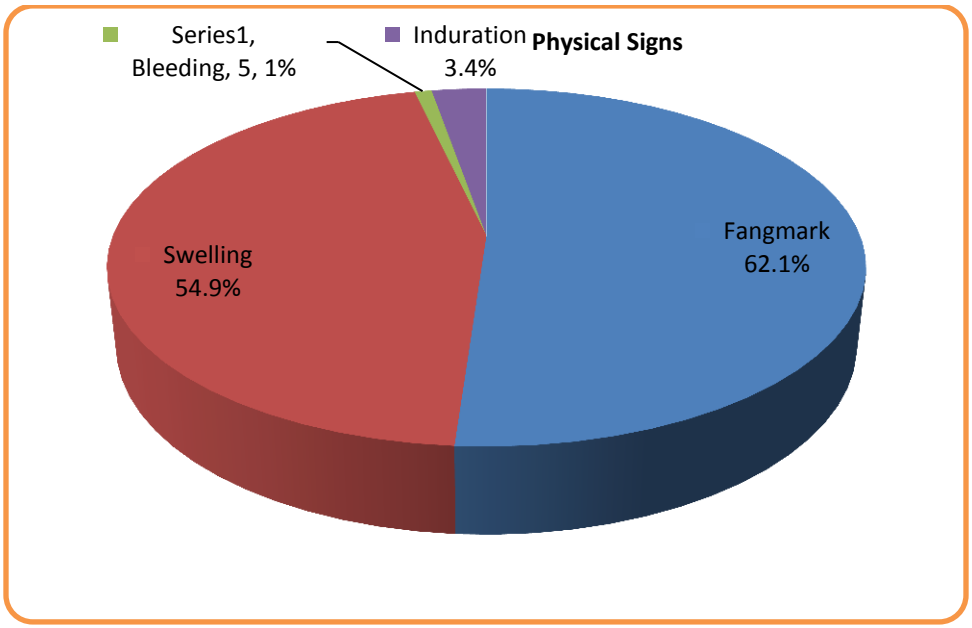
About 154 patients (32.3%) came to hospital during the late 6pm-12am hours, 136 patients (28.5%) were presented during 12pm-6pm hours. 95 patients(19.9%) and 92 patients (19.3%) were presented during 6am-12pm and 12am to 6am hours, this coincided with time of bite during evening and night times.

Graph-1, Physical signs



296 patients (62.1%) had fangmark, 262 patients (54.9%) had swelling over the bitten site, 16 patients (3.4%) had induration and 5 patients (1%) had bleeding at the bitten site.

Table-2, Type of venom

Type of venom	No of Cases	Percent
Neurotoxic	128	26.8%
Hemotoxic	195	40.9%
Neurotoxic + Hemotoxic	28	5.9%
Non-venomous	126	26.4%
Total	477	100.0%

195 patients (40.9%) were Hematotoxic snakebite, 128 patients (26.8%) were Neurotoxic snakebite, 28 patients (5.9%) were both Neurotoxic+Hematotoxic snakebite and 126 patients (26.4%) were non-venomous snakebite.

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Table-3, ASV requirement

Anti venom administration	No of Cases	Percent
NIL	137	28.7%
< 10	43	9.0%
10-20	245	51.4%
> 20	52	10.9%
Total	477	100.0%

More than 50% of the patients required 10-20 ASV administration.

Table-4, Complications

Associated complications post bite	No of Cases	Percent
AKI	35	7.3%
Hemodylasis	19	4%
VENTILATOR	70	14.7%
SURGERY	15	3.1%

70 patients (14.7%) required ventilator support, 35 patients (7.3%) developed AKI, 19 patients (4%) required Hemodialysis and 15 patients (3.1%) required surgical intervention. Most of the patients with complications were in the age group 21-40years.

Table-5, Associated complications and type of venom

Associated complications post bite	Neurotoxic	Hematotoxic	Neurotoxic + Hematotoxic	Non-venomous
AKI	0	30	5	0
Hemodylasis	0	16	3	0
VENTILATOR	52	8	10	0
Surgery	3	11	1	0

Out of 35 patients developing AKI 30 patients were Hemotoxic snakebite and 5 patients were Neurotoxic+Hematotoxic, In 19 patients requiring hemodialysis 16 were hematotoxic and 3 patients were Neurotoxic+hematotoxic, 70 patients required ventilator support out of these 52 were Neurotoxic snake bite, 8 were hematotoxic and 10 were neurotoxic+hematotoxic, 15 patients required surgical intervention (Fasciotomy) out of these 11 patients were hematotoxic, 3 patients were neurotoxic and 1 patient was both neurotoxic+hematotoxic.

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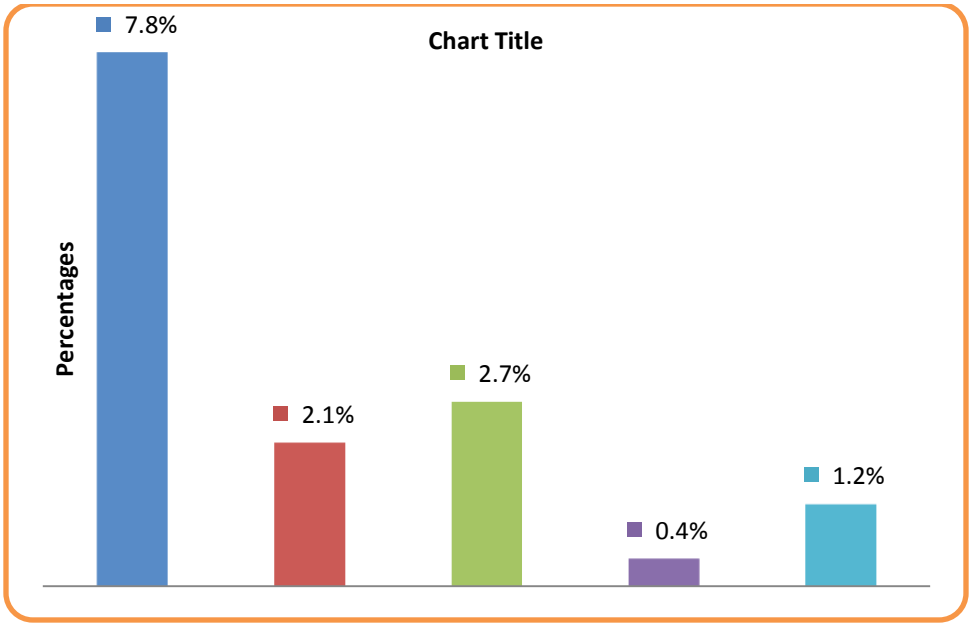
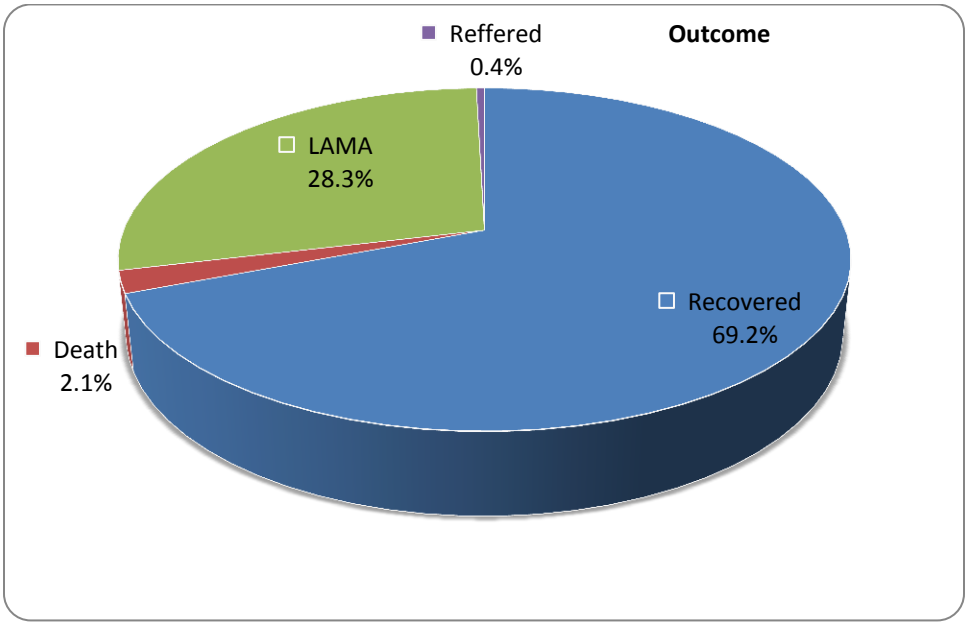
Graph-2, Blood products transfused



37 patients (7.8%) required FFP transfusion, 13 patients (2.7%) required whole blood, 10 patients (2.1%) required PCV transfusion, 8 patients (1.6%) required platelet transfusion.

Graph-3, Outcome



Out of 477, 330 patients (69.2%) recovered, 135 patients (28.3%) were discharged against medical advice, 10 patients (2.1%) death and 2 patients 90.4%) referred to other center.

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Table-6, Outcome and type of venom

OUTCOME	Neurotoxic	Hematotoxic	Neurotoxic + Hematotoxic	Non-venomous	Total
Recovered	100	130	20	80	330
Death	7	2	1	0	10
LAMA	21	61	7	46	135
Reffered	0	2	0	0	2
Total	128	195	28	126	477

Out of 128 neurotoxic 100 recovered, In 195 hematotoxic 130 recovered, out of 28 neurotoxic+hematotoxic 20 recovered and out of 126 non-venomous snakebite 80 recovered and 46 discharged against medical advice.

DISCUSSION

India has been one of the leading countries with increased mortality associated with snake bites.[19] Some studies have estimated the death toll ranging from 46,000 to 50,000 per year.[7,21]

The study was conducted in Hanagal Sri Kumareshwar Hospital Research Centre is a tertiary care hospital serving poor people of rural population in back ward and back water areas (Upper Krishna project) of North Karnataka attached to S.Nijalingappa Medical College. Most of the local rural population are farmers and depend on the back ward and back water area (Upper Krishna project) for irrigation of field and the area is habituated with snakes.

The most common population affected were in the age group of 20 to 40, with males being affected more than females. In our study table-7 shows, out of 477 patients 59.5% were male patients and 40.5% were female patients indicating male preponderance, which is almost similar with same study(2010) Pramiladevi et al[8], Yaqoob et al[13], Suchitra et al[15] and Sharma et al[17]. 56.2% were in the age group of 20-40years, which is similar to the same study(2010) and, Saurabh et al[13] and Suchitra et al[15].

Table-7, Comparision of demographics with other studies

	Present study	Same study(2010) [8]	Yaqoob et al [13]	Asif Raza et al [14]	Suchitra et al [15]	JasjitS et al [16]	Sharma et al [17]
Males	59.5%	56.1%	57.40%	80%	58%	100%	60%
Females	40.5%	43.8%	42.59%	20%	42%	0%	40%

ISSN:0975-3583,0976-2833 VOL13,ISSUE08,2022

20-40 years	56.2%	59.3%	NA	90%	53%	NA	NA

In our study most of the patients with snakebite were reported in the monsoon season, suggesting rain to be the most appropriate time for snakes to be out in open fields. Various other studies also reported similar seasonal incidences.[7,22,23,24]

However, The majority of the snake bites in our study were during 6 pm to 12 am hours.

Table-8 shows, Predominant snakebite site was over the Lower limbs in our study (49.3%), which has similar comparison with other studies [8,13,16,18].

Table-8, Comparision of the site of bite

	Present study	Same study(2010) [8]	Yaqoob et al [13]	JasjitS et al [16]	Hansdak et al [18]
Lowerlimbs	49.3%	50.30%	63.88%	81%	60%
Upeerlimbs	48.2%	27.30%	31.48%	9.80%	NA
Others	2.5%	0.70%	4.62%	NA	NA
No Marks	0.6%	21.50%	NA	NA	NA

Table-3, We did not give ASV 137(28.7%) as there were no signs of progression or systemic envenomation in these patients and few patients were not able to arrange ASV. Most of the patients 245(51.4%) received 100ml to 200ml of ASV which is similar in other studies [14,16,20].

Time from bite to ASV administration has been observed to be an important factor in preventing complications and predicting the outcome in various studies [24].

In our study some of the snake bite patients developed complications, of which 35 patients(7.3%) developed Acute kidney injury(AKI) and 19 patients(4%) required hemodialysis, the AKI incidence is lower when compared to the study conducted by Bhalla G et al[5] in a tertiary care center Maharashtra where Incidence of AKI is 20 cases(30%), of which 7 patients(10.5%) required hemodialysis, the study population of this study[5] is low on comparison with our study.

15 patients(3.1%) required surgical intervention as post snakebite complication, In the study by Bhalla G et al[5], 9 patients (13.5%) required surgical intervention, as the hematotoxic snakebite patients develop compartment syndrome and gangrene surgical intervention will help to prevent further complications.

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70 patients(14.7%) required ventilator support post snakebite which is slight lower in number when compared to Bhalla et al[5], where 15 patients(22.5%) required ventilator support.

Higher number of patients with delayed presentation and treatment required fasciotomy, dialysis, ventilator support which is in accordance with Silva *et al* [26].

Out of 477 patients, 330(69.2%) of the patients recovered completely, where 10 patients(2.1%) dead because of snakebite complications and delayed arrival to hospital, 135 (28.3%) patients were discharged against medical advise because of denay in willingness of the patient attenders for further management and some could not arrange ASV because of low socioeconomic status.

The judicious use of ASV in snakebite patients with envenomation is very effective in complete recovery and avoiding complication which develops post snake bite.

Currently lack of definitive guideline regarding the optimum dosage has prompted physicians to use ASV empirically in higher doses. Judicious use of ASV should be encouraged in physicians especially in the field to avoid any adverse effects due to its overdose and scarcity of these drugs.

TABLE-9, COMPARISION WITH OUR OWN 5-YEAR STUDY *Pramiladevi et al[8]* CONDUCTED IN THE SAME PLACE BETWEEN JAN 2006-DEC 2010.

	Same study(2010) [8]	***Present study***
No. of years	5years (Jan 2006-Dec 2010)	10years (Jan 2011-Dec 2020)
Study population	139	477
Most common age group	20-40years (65.4%)	20-40years (56.1%)
Most common time of presentation	Late evening and night	Late evening and night
Common Toxicity	Neurotoxic (30%)	Hematotoxic (40.9%)
ASV usage	79.1% of the study population	71.3% of the study population
Blood components	Not used	Used
Recovery	68.3%	69.2%
Mortality	5%	2.1%

With the judicious use of ASV, Blood products usage whenever needed, and the supportive ventilator, Hemodialysis and surgical intervention and also most importantly with the reduction in the time of seeking medical help and reaching hospital early after snakebite through regular CME and camps in rural areas to explain the need for early medical help, we are able to reduce the mortality and improve the complete recovery after snakebite.

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CONCLUSION

In conclusion, snake-bite is a common life threatening emergency in the study area. In this study we had more number of hematotoxic snake bites than neurotoxic, neurotoxic bites were more in number in our Same study(2010) *[8]*. outcome was good in neurotoxic snake bite compared to hematotoxic bites requiring greater ASV with more complications. Overall mortality was in the acceptable range of 2.1% which is improved on comparison with our previous study [8] 5%, mortality was mainly because of late presentation with severe envenomation which could have been prevented. More importantly in this study we tried to rationalize the ASV usage in different categories of snake bite patients for better results, the use of blood products, life saving measurements like ventilator and hemodialysis support was effectively studied than our previous study(2010) [8]. Knowledge of the varied clinical manifestations of snake-bite is important for effective management, ready availability and appropriate use of anti snake venom, close monitoring of patients, institution of ventilator support, transfusion of blood products and early referral to specialized units when required, helps in reducing the mortality. We did explain this to our peripheral doctors through regular CME and for rural people through camps conveying that fatalities from snake bites are surely preventable and the primary aim should be to reduce the incidence by taking proper precautionary measures like wearing protective thick, knee high footwear and avoiding sleeping on the floor, quick transportation for medical attention, discouraging indigenous medicines and myths. Because of these regular public education and early effective management from our institute it was possible for us to improve the mortality rate from 5% of our previous study(2010) [8] to 2.1% in present study.

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