ISSN: 0976-3031

International Journal of Recent Scientific Research

Impact factor: 5.114

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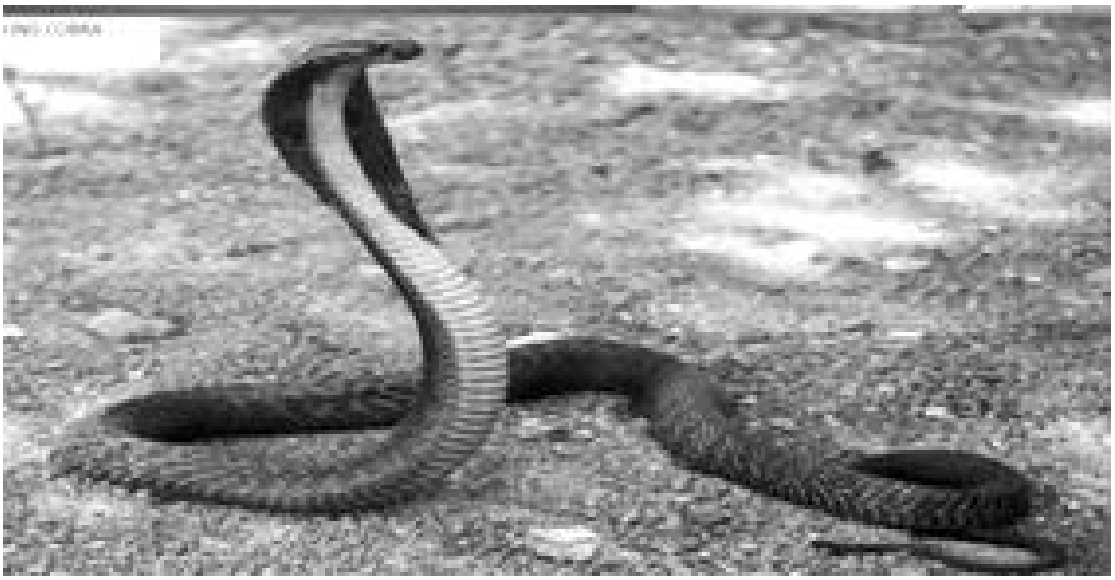

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Volume: 6 Issue: 9

THE PUBLICATION OF
INTERNATIONAL JOURNAL OF RECENT SCIENTIFIC RESEARCH
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ISSN: 0976-3031

International Journal of Recent Scientific Research
Vol. 6, Issue, 9, pp.6065-6068, September, 2015

International Journal of Recent Scientific Research

RESEARCH ARTICLE

A STUDY OF CLINICAL PROFILE OF SNAKE BITE AT A TERTIARY CARE CENTRE

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ARTICLE INFO

Article History:

Received 15th June, 2015
Received in revised form 21st July, 2015
Accepted 06th August, 2015
Published online 21st September,2015

Key words:

Snake Bite Viper Krait Cobra Antisnake Venim

ABSTRACT

Snake bite is an important occupational and rural hazard because India has always been a land of Exotic snakes. It is a fact that inspite of heavy morbidity & mortality, very little attention is paid by the clinicians to this occupational hazard. We will hereby study the prevalence of poisonous & non-poisonous snake bites in part of Western Maharashtra with reference to age, sex, occupation, part of body bitten, time of bite and seasonal variation and the types of poisonous snakes common in this locality & their clinical manifestations along with the systemic envenomation from various types of poisonous snakes and their effective management in reducing the mortality rate.

This study was carried out at Krishna Institute of Medical Sciences Hospital and Medical Research Centre, Karad over a period of 31 months amongst the patients admitted in MICU with snake bite. A total of 150 patients were included in the study. Detailed history, physical examination and laboratory investigations were done after obtaining the consent for the same. Antisnake Venim was given for poisonous snake bites. Statistical tests applied were chi square test and percentage.

A total of 150 patients were studied in our hospital. Out of 150, 76 patients were of poisonous snake bite and 74 patients were of non-poisonous snake bite. Out of these 76 poisonous snake bites, 42 were viperine snake bites, 21 were neuroparalytic snake bites and 13 were locally toxic snake bites.

Snakebite is a common life-threatening emergency in the study area. Delay in hospitalization is associated with poor prognosis and increased mortality rate due to consumptive coagulopathy, renal failure and respiratory failure. Proper measures are necessary to prevent and treat it to the earliest to prevent complications.

INTRODUCTION

Globally, atleast 421,000 envenoming and 20,000 deaths occur each year due to snakebite. These figures may be as high as 18,41,000 envenoming and 94,000 deaths.[1] The concept of the "Big 4" Snakes of medical Importance in India are- the Indian cobra (*Naja naja*), the common krait (*Bungarus caeruleus*), the Russell's viper (*Daboia russelii*) and the saw-scaled viper (*Echis carinatus*).[2] Inadequate hospital-based reporting has resulted in estimates of total annual snakebite mortality ranging widely from about 1,300 to 50,000.[3] The incidence of envenomation is high in this part of the world where snakes are abundant and human activities like field work and outdoor-sleeping increases the risk of man-snake encounters. Awareness against treatment by quacks is a key factor as complications are directly proportional to the duration of venom in the blood prior to neutralization by ASV. Delayed presentation to the hospital is the main reason for increased morbidity and mortality and despite the known reasons, very few measures are taken to prevent and treat that in time. The present study was conducted in order to assess the magnitude and to study the clinical profile of snakebite cases in Maharashtra (India) and to suggest the measures to prevent and treat them with adequate doses of ASV and also the role of atropine and neostigmine in the treatment of neuroparalytic snake bite.

MATERIALS AND METHODS

The present descriptive observational study was carried out in medicine wards of Krishna hospital, Karad, Maharashtra (India). A total of 150 cases of snake bite were admitted in medical ICU during the study period. After obtaining consent, the data was collected on pre-designed, pretested and structured questionnaire by interviewing the study subjects who were hospitalized during the study period. A 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, Neuroparalytic and Non-poisonous) opinion from treating physician was taken. Patients requiring the need of ASV were determined by the 20 minute whole blood clotting time (WBCT) on admission, which, if positive, was labelled as

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the candidate requiring ASV. The patients who required ASV were given the Indian lyophilised polyvalent ASV in the dose of 150 units (diluted in 150cc NS and transfused over 1 hour IV) after negative test dose. The dose of 100 units of ASV (diluted in 100cc NS and transfused over 1 hour IV) was repeated after 6 hours irrespective of the coagulation profile. Subsequent information was collected on the day of discharge or death of the patient from the case paper of the patient. Statistical tests applied were chi square test and percentage.

RESULTS

A total of 150 patients were studied in our hospital. Out of 150 patients, 74 patients had non-poisonous snake bites and 76 patients had poisonous snake bites. Maximum incidence of snake bite was found in farmers (81.33%) than in any other occupation. Males (66%) were bitten more than females (34%) among poisonous bites (Table 1).

Table 1 Table Showing the Clinical Profile of Patients with Snake-Bite

Criteria	Distribution	No. Of poisonous snake bites	Total no. Of snake bites
Age group (in years)	14-30	56.57% (n=43)	89%
	31-50	36.84% (n=28)	50%
	>50	6.57% (n=5)	11%
SEX	MALES	61.61 % (n=61)	66%
	FEMALES	30.61% (n=15)	34%
Site Of Snake-Bite	UPPER EXTREMITY	17.64% (n=3)	11.33%
	LOWER EXTREMITY	54.88% (n=73)	88.67%
	TRUNK	-	-
Type Of Snake-Bite	PROVOKED	0.66% (n=1)	0.66%
	UNPROVOKED	50% (n=75)	99.34%
Time Of Snake-Bite	12 PM – 4 PM	36.84% (n=7)	12.66%
	4 PM – 8 PM	53.94% (n=41)	50.66%
	8 PM – 6 AM	45.45% (n=15)	22%
	6 AM – 12 PM	59.01% (n=13)	14.66%
Seasonal Variation Of Snake-Bite	MONSOON (JUNE-SEPTEMBER)	46.15% (n=24)	34.66%
	WINTER (OCTOBER-FEBRUARY)	47.61% (n=10)	14%
	SUMMER (MARCH-MAY)	54.54% (n=42)	51.33%

Maximum incidence of snake bites was found in rural areas (85%). Poisonous snake bites were more prevalent in rural than urban areas. Bites were commonly seen on the lower extremities 88.6%. Maximum bites were in the night (72.66%) amongst which 73.68% were poisonous bites at night and 27% were poisonous bites at day time. Higher incidence of snake bites was found in summer (51.33%) i.e. March to May. In 8 cases, the snakes were seen/ identified. 57.33% patients reported to medical help within 6 hours, amongst which 24.41% were vasculotoxic and 18.60% were neuroparalytic (Table 2).

Table 2 Table Showing Time from Snake Bite to Hospital-Admission

Time	No. Of non-poisonous snake bites	No. Of poisonous snake bites			
		Vasculotoxic	Neuroparalytic	Locally toxic	Death
< 6 hours	48	21	16	1	-
6 – 12 hours	26	15	4	5	2
>24 hours	0	6	1	7	1

67 patients came with tourniquet application, out of which 45 had poisonous bite and 9 of these patients had received ASV. 51 cases did not receive any sort of medical help before admission. 5 cases had received non-medical treatment. Time of onset of systemic manifestation was earlier in neuroparalytic snake bites than vasculotoxic snake bite. Vasculotoxic snake bites (55.26%) were more common than neuroparalytic bites (27.63%).Commonest vasculotoxic manifestation was local bleed (83.33 %) and next on the list was cellulitis (57.14%) (Table3). Haematuria (42.85%) was the commonest manifestation in those patients who developed acute renal failure. Ptosis (100%) was the commonest & earliest manifestation of neuroparalytic snake bite. Out of vasculotoxic snake bites, 20 were of acute renal failure, of which 7 required haemodialysis. 4 DIC patients received blood transfusion. 13 patients' of ARF received diuretics and recovered completely. 13 cases were locally toxic, out of them 4 patients developed cellulitis. 19 patients with neuroparalytic bite required artificial ventilation. 7 patients died because they came late to seek medical treatment and by that time complications were beyond control and were associated with systemic infection. 2 patients developed anaphylactic reaction to ASV and were treated conservatively and recovered completely. In the present study, 7 patients died of poisonous snake bites out of which 3 (3.94%) were neuroparalytic bite patients & 4 were vasculotoxic bite patients. Among neuroparalytic bites, mortality rate (14.28%) was higher than in vasculotoxic bite (9.52%). All 3 patients died because of delay in receiving respiratory assistance. Among 4 deaths of vasculotoxic bites, 3 patients died of acute renal failure and one patient died of DIC and intracerebral haemorrhage.

Table 3 Table showing the incidence of different signs and symptoms in both vasculotoxic and neuroparalytic snake-bite

	Signs/symptoms	No. Of cases	Percentage
Vasculotoxic snake-bite	Local gum bleed	35	83.33%
	Bleed	3	7.14%
	Haemoptysis	2	4.76%
	Epistaxis	1	2.3%
	Haematemesis	2	4.76%
	Malaena	2	4.76%
	Haematuria	18	42.85%
	Oliguria	20	47.61%
	Ecchymosis	2	4.76%
	Intracerebral bleed	1	2.3%
	Subconjunctival haemorrhage	2	4.76%
	Cellulitis	24	57.14%
	Acute kidney injury	20	47.61%
Neuroparalytic snake-bite	Ptosis	21	100%
	Dysphagia	9	42.85%
	Ophthalmoplegia	18	85.71%
	Unconsciousness	6	28.57%
	Flaccid limb paralysis	6	28.67%
	Convulsions	-	0%
	Cellulitis	8	38.09%
	Respiratory paralysis	19	90.47%

DISCUSSION

The number of poisonous snake bites in our study was 76 and the number of non-poisonous cases was 74. Amongst the poisonous snake bites, the number of Viperine bites was 42, Neuroparalytic bites was 21 and locally toxic cases was 13. In the present study maximum no. of patients bitten were between

the age group of 14-30 years of age. Next in order of frequency was the age group 31-50 years. These observations go more in favour of the study of Russel *et al* and Hutchison *et al* (1929). Among the group of 14 to 30 years, 43 patients had poisonous snake bite & in the age group of 31-50 years, 28 patients had poisonous bites.[4] In the age group above 51, 5 bites were poisonous in nature.

Figure 1 Image showing photos of common poisonous snakes in India

In the present study, 66% (n=99) patients were male victims whereas the female victims were 34% (n=51) in number. All the previous reports mention the same findings. Ahuja and Singh in 1954 reported the ratio as 4:1 (M:F). Bhat *et al* in 1974 reported the incidence as 7:3 (M:F).[10] In 2012, Pramiladevi *et al* also reported the male preponderance. Among male patients 61 were poisonous whereas in females 15 were poisonous snake bites. [5] In the present study, 122 were farmers, 13 were students, 14 were housewives and one was a snake charmer. Studies undertaken by Bhat *et al* (1974), Saini *et al* in (1984), Sarangi *et al* in (1977) and Pramiladevi *et al*[5] showed the incidence in farmers to be 75%, 78%, 72% and 53% respectively. In the present study, rural prevalence of snake bite was 117 out of 150 cases. Among them 69 were poisonous snake bites. Incidence of bites in present study is as follows. In lower extremities bites are 88.66% (n=133) & in upper extremities 11.33% (n=17). Among them, upper extremity poisonous cases were 3 & lower extremity was 73. Reid HA *et al* mentions that most of the bites in tropical countries are on lower extremities because the victims are bitten by treading on or near the snake, while in non-tropical countries most bites are on fingers and hands because the victim deliberately handles the snake.[6] In the present study the day was divided into four groups. Maximum no. of cases were detected in the interval between 4.00 pm to 8.00 pm. (109/150 patients). Next on the list was the time interval between 8.00 pm to 6.00 am, where no. of patients bitten was 41. These figures show close resemblance with the observation of S.K. Virmani & O.P.Dutt.[7] They have noted 12% cases during day time. In the present study, higher incidence was found in summer (March to May), 77 (51.33%) were total snake bites in summer, among them 42 were poisonous bites and 35 were non-poisonous bites. Next on the list was Monsoon where the total no. of snake bites was 52, among which 24 were poisonous bites & 28 were non-poisonous. Neuroparalytic snake bites were more at the end of summer and beginning of monsoon. Incidence of vasculotoxic bites was comparatively more in winter. We defined summer as period of the year from March to May, winter period is between Oct. to Feb. & Monsoon is June to Sept. In 1978, Banerjee R.N. *et al* noted incidence of 70-80% during May to October. [8] In the present study, we have noted one case of a snake catcher from Satara district who was a professional. He had a neuroparalytic cobra bite. Remaining cases were all unprovoked. In the present study, only 8 patients had brought snakes along with them and they were identified in this hospital. Among them 3 were cobras, 2 vipers, and one was Krait and 2 were echis carinatus. In the present study, 57.33% (n=86) patients were admitted within first 6 hrs. Among which 24.41% (n=21) cases were vasculotoxic & 18.60% (n=16) were neuroparalytic. 76% of neuroparalytic bites got admitted within the first 6 hrs. 52 patients were admitted within the first 24 hrs but after 6 hrs, among which 15 were vasculotoxic & 4 were neurotoxic. 2 neurotoxic bites expired within one to two hours after admission. In a series of 135 patients by Lahori *et al*, 85% patients were admitted in the first 24 hours after bite. Among 150 patients, 67 (44.66%) had applied tourniquet. Out of 67 patients, 45 were poisonous bites and 22 non-poisonous bites. Out of 45 cases of poisonous bites, 23 were vasculotoxic, 12 were neuroparalytic and 10 were locally toxic bites. In a study conducted in 1988 by George Watt *et al*, tourniquet was applied in 94% patients, 4 were asymptomatic prior to release of their tourniquet and in 11 patients symptoms worsened precipitously. [9] In the present series, 69.73% (n=53) patients had local pain. Among which 16.98% (n=9) were locally toxic, 62.26% (n=33) were vasculotoxic & 20.75% (n=11) were neuroparalytic bites. In the present study, local oedema was present in 84.20% (n=64) patients of poisonous snake bite. Out of which 40 patients had vasculotoxic snake bite, 11 patients had neuroparalytic snake bite and 13 bites were locally toxic. In vasculotoxic bite, 95.23% patients had local oedema while in neuroparalytic snake bite 52.38% patients had local oedema. Local cellulitis was seen in 57.14% (n=24) patients of vasculotoxic snake bite & 28.57% (n=6) patients of neuroparalytic snake bites. 32.66% of patients in the present study had local bleeding. Out of which 11 patients had locally toxic bite, 35 patients had vasculotoxic bite & 3 patients had neuroparalytic snake bites.In the present study, 3 (7.14%) patients had gum bleeding but Purohit (1944) described gum bleeding as the commonest manifestation of viperine bite. Corkill *et al* (1956) described haematuria as the commonest manifestation but in the present study 18 (42.85%) patients had haematuria. Ecchymosis was present in 2 (4.75%) patients in the present study but Bhat (1974) described ecchymosis in 43% of patients. Haematemesis was present in 2 (4.75%) patients in the present study, whereas Bhat *et al* [10] showed that 37 patients among 310 patients had haematemesis. In the present study, 24.75% (n=2) patients had haemoptysis and 2.3% (n=1) patient had epistaxis. Fundal haemorrhage was seen in one 2.3% (n=1) patients who expired within 2 days. Reid *et al* in his study of 281 cases of viper bite had not found a single case with fundal haemorrhage. Saini *et al* and Sharma *et al* (1984) in their study of 200 cases of poisonous bite did not report about fundal haemorrhage. In the present study, 100% patients developed ptosis among 21 cases of neuroparalytic bite. Ophthalmoplegia was seen in 85.71% (n=18) patients of

neuroparalytic bite. 28.57% (n=6) patients became unconscious, 28.57% (n=6) patients with flaccid limb paralysis, 90.47% (n=19) patients developed respiratory paralysis, among which 15 patients needed respirator. ARF was seen in 47.61% (n=20) of patients of vasculotoxic bite. In all the cases of ARF, except one, DIC was the cause for it. Basu *et al* (1977) observed ARF in 27 cases of viper bite and attributed it to circulatory collapse and shock in 5 cases, direct nephrotoxicity in 4 cases. Lahori *et al* (1981) showed mortality rate to be 2% and 3 deaths were due to CNS involvement. Bleeding time, clotting time was raised in all patients of vasculotoxic snake bites. Similar incidence has been reported by Saini *et al* & Lahori *et al* in their studies. BT, CT, PT gradually returned to normal within 3-4 days after full dose of ASV and blood transfusion in present study. Prothrombin time was abnormal in almost all the vasculotoxic bites. In the present study, thrombocytopenia was noted in 24 patients of vasculotoxic bite with coagulation defects. Saini *et al* (1981) noted thrombocytopenia in only 5% patients & Reid HA mentioned that platelet count may be depressed but is often normal in viperine bites. [6] In the present study, two patients developed anaphylaxis for ASV and they were treated with steroids & adrenaline. In the present study, 50.66% (n=76) patients received ASV. According to Reid *et al*, ASV is not very effective against local effects of venom. In the present study, 69/76 reversed completely. 3 deaths in neuroparalytics were because of delay in administration of ASV producing respiratory paralysis and delay in ventilatory support who were transferred from other hospital to our hospital. In the present study, four (9.52%) patients of viperine snake bites received blood transfusions. Saini *et al* (1984) and Reid *et al* feel that blood transfusion is not required routinely. In the present series, neostigmine with atropine was given to 13 patients out of 21 patients of neuroparalytic snake bite. Most of the patients responded to it within 4-6 hours. In these patients, first to improve was respiratory paralysis, then ophthalmoplegia and lastly ptosis. G.K. Dubay *et al* (1981), Banerjee *et al*, Dash S.C. *et al* (1976) are strong supporters of this regime but Reid had doubts about the benefits of this mode of therapy.

Among those who received first aid treatment, maximum gave history of application of tourniquet proximal to the site of bite and local application of lime, chillies, herbal medicine etc. Very few cases had taken incision and attempted sucking over site of bite. Same form of first aid treatment was observed by Lahori *et al* (1981), Saini *et al* (1984) and Kulkarni and Anees (1994) and Wanje *et al*.[11]

In the present series, ARF was observed in 20 patients among 42 (47.61%) patients of vasculotoxic snake bite. 11 patients were treated conservatively with diuretics, renal diet and fluid restriction. 7 patients needed haemodialysis. 3 patients died of renal failure among which 2 patients died after haemodialysis and one died because of acute renal failure. Saini *et al* reported 8 cases of ARF and 7 cases recovered with conservative treatment. In the present study, among 21 patients of neuroparalytic bite (71.42%), 15 needed ventilatory support & 4 (19.04%) patients needed only intubation. Among which 3 patients died. Total duration of ventilator was less than 24 hours for most of the patients except one.

Not a single patient needed tracheostomy. In the present study, 9 patients required surgical intervention, out of which 8 patients had viper bite and one patient had Elapid bite. Reid *et al* recommended that early surgical intervention to prevent extension of infection and development of gangrene.

CONCLUSIONS

Snake bite still remains a major occupational hazard. Current medical practice lacks the standard guidelines for the use of ASV and, at places, it is used in higher dose without knowing the adverse effects of the same. There is need for proper training and coordination between PHC staff, doctors, nurses, health inspectors and hospital staff to treat the snake bite victims and maintain the record properly.

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International Journal of Recent Scientific Research

ISSN 0976-3031