A STUDY OF PROFILE, MANAGEMENT AND OUTCOME OF PATIENTS ADMITTED FOR SNAKE BITE WITH ENVENOMATION IN GENERAL MEDICINE DEPARTMENT, GOVERNMENT CHENGALPATTU MEDICAL COLLEGE AND HOSPITAL

Nanda Kumar Ramachandran[1], Arjunan Senthil Kumaran[2]

[1]Assistant Professor, Department of Medicine, SRM Medical College and Hospital, Potheri.
[2]Assistant Professor, Department of Medicine, Chengalpattu Medical College and Hospital.

ABSTRACT

BACKGROUND

In any part of the world, snake produces unimaginable fear and anxiety. India is reported to have the highest snakebite incidence and mortality in the world. World Health Organization (WHO) estimates the total number of bites to be 84,000 per year with 11,000 deaths. In our Government Chengalpattu Medical College and Hospital, situated in Kanchipuram district, snake bite cases comprises a major proportion among hospital admissions.

OBJECTIVES

In spite of good care and timely management some cases end up in complications or death. Main reasons are patients presenting lately for treatment due to lack of awareness, patients undergone native treatment and then getting admitted to hospital with complications, comorbid illness of the patients. So a detailed clinical profile study of patient admitted with snake bite with envenomation becomes necessary, which can aid in treating and predicting the complication of these patients in future.

METHODS

This study was carried out from June 2013 to May 2014 (One Year Study); the study was conducted prospectively. The study comprised of 181 cases of snakebite patients (>13 years) with signs of envenomation admitted to the Department of General Medicine, Government Chengalpattu Medical College and Hospital, Chengalpattu.

RESULTS AND CONCLUSION

Neurotoxicity constitutes (35.38%) among all the toxicities followed by pure haemotoxicity (25.42%) and local reactions like cellulitis oedema (22.65%). A significant association was noted between prolonged bite to needle time and mortality with 7 out of 9 patients (78%), who presented more than 6 hours after bite were dead. Native treatment especially tourniquet application is a strong determinant of outcome with 100% prevalence in dead and 85.28% in patients who had undergone surgeries and 27.28% in alive patients without surgeries. On analysing all the comorbid illness with outcome, we found that comorbid illness is not a strong determinant in determining the mortality.

KEYWORDS

Anti-Snake Venom, Neurotoxicity, Haemotoxicity, Envenomation.

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INTRODUCTION

In any part of the world, snake produces unimaginable fear and anxiety. This fear has been present from ancient civilisation. Right from the past, snakes are the cause for one of the first poisoning heard. The death caused then might have been first alarm of sensing death at vision of a snake.[1]

At the beginning of twenty first century, annual mortality from snakebites continues to be as high, around 30 to 60 thousands in the world. Snakebite morbidity and mortality is a major health problem in rural areas.

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Corresponding Author:
Dr. Nanda Kumar Ramachandran,
Assistant Professor,
Department of Medicine,
SRM Medical College and Hospital,
Potheri.
E-mail: nandy.ramachandran@gmail.com
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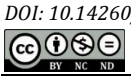

Mortality rates of around 5.5 per 100,000 residents, Indian rural coastal population tell about the magnitude of the problem. According to Frayer in his study of Thanatophidia of India, it was estimated that about 1 in 1 lakh population died due to snake bite.[2] But in spite of this, snake bite has been overlooked through ages. Snake bite is also responsible for about 2.85% - 5.3% of the mortality of total hospital admission in India. India is reported to have the highest snakebite incidence and mortality in the world.[3] World Health Organisation (WHO) estimates the total number of bites to be 84,000 per year with 11,000 deaths. A national survey in India suggests that snake bite deaths estimated are more than 30 fold higher than documented. Most of the death are mainly due to the snake bite victims not reaching the hospital in time.

Studies signify that primary care treating doctors hesitate to treat snakebite patients immediately mainly due to lack of experience and confidence. At the secondary and tertiary level hospitals, several treatment protocols and schedules were being followed for Anti-Snake Venom (ASV) administration, mainly based on foreign textbooks.

Mortality rate is further increased by inappropriate administration of first dose of ASV, particularly in Krait and Russell's viper snakebite.[4] There is also delay in providing a simple method of endotracheal intubations and artificial ventilator or Ambu bag ventilation in neurotoxic envenoming.

In response to our Health and Family Welfare Department, Government of India, after careful analysis of trials has prepared a National Snakebite Management Protocol for snake bite to provide doctors and lay people a best evidence-based treatment approach to deal with this problem in our country.[5]

Around 235 species of snakes are found in India, most of which are non-venomous. Most of the bites will cause panic reaction, but do not cause envenomation, However, there are few snake species that are venomous and of these four (Big four) namely Russell's viper (Daboia russelii), common cobra (Naja naja), saw-scaled viper (Echis carinatus) and common krait (Bungarus caeruleus) are highly venomous and believed to be responsible for most of the poisonous bites in India.[6]

In our Government Chengalpattu Medical College and Hospital situated in Kanchipuram district, snake bite cases comprises a major proportion among hospital admissions. We are well equipped and trained in managing this most common problem. In spite of good care and timely management some cases end up in complications or death; main reasons are patients presenting lately for treatment due to lack of awareness, patients undergone native treatment and then getting admitted to hospital with complications or comorbid illness of the patients. In 2012 total number of snake bite cases were 424, out of which 167 cases were poisonous bites with signs of envenomation.

MATERIAL AND METHODS

This study was carried out from June 2013 to May 2014 (One Year Study). The study was conducted prospectively. The study comprised of 181 cases of snakebite patients (>13 years) with signs of envenomation admitted to the Department of General Medicine, Government Chengalpattu Medical College and Hospital, Chengalpattu.

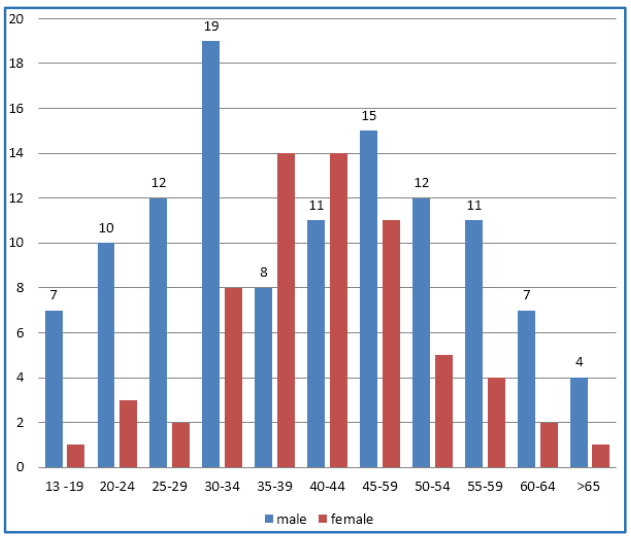

Fig. 1: Age vs. Sex Wise Distribution of Study Population

Type of Snake Identified Snake Name	Female		Male		Total	
	No.	%	No.	%	No.	%
Cobra	10	15.38	20	17.24	30	16.57
Krait	11	16.92	12	10.34	23	12.71
Russell Viper	3	4.62	15	12.93	18	9.94
Unidentified	41	63.08	69	59.48	110	60.77
Total	**65**	**100.00**	**116**	**100**	**181**	**100.00**

Table 1: Identified Snake vs. Unidentified Snake Wise Distribution of Study Population

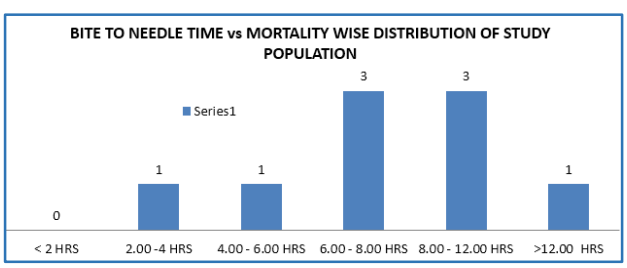

Fig. 2: Bite to Needle Time vs Mortality Wise Distribution of Study Population

Occupation	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
Agriculture	72	62.07	12	18.46	84	46.41
Industry	1	0.86	4	6.15	5	2.76
State Govt.	7	6.03	1	1.54	8	4.42
Central Govt.	0	0.00	1	1.54	1	0.55
Business	3	2.59	4	6.15	7	3.87
Small Trade	5	4.31	3	4.62	8	4.42
Private	3	2.59	4	6.15	7	3.87
Not Working/Home Maker	13	11.21	35	53.85	48	26.52
Forest Worker	2	1.72	0	0.00	2	1.10
Student	9	7.76	1	1.54	10	5.52
Snake Handler	1	0.86	0	0.00	1	0.55
Total	**116**	**100**	**65**	**100**	**181**	**100**

Table 2: Occupation Wise Distribution of Study Population

Comorbids	Male		Female		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
DM	8	6.90	7	10.77	15	8.29
HT	11	9.48	6	9.23	17	9.39
CAHD	2	1.72	3	4.62	5	2.76
CVA	2	1.72	0	0.00	2	1.10
BA/COPD	6	5.17	1	1.54	7	3.87
Malignancy	0	0.00	1	1.54	1	0.55
Residual Polio	1	0.86	0	0.00	1	0.55
NIL	80	68.97	46	70.77	126	69.61
CKD	0	0.00	0	0.00	0	0.00
Pregnant	0	0.00	1	1.54	1	0.55
DM+HT	4	3.45	0	0.00	4	2.21
DM+HT+CAHD	2	1.72	0	0.00	2	1.10
Total	**116**	**94.82758621**	**65**	**98.46153846**	**181**	**96.13259669**

Table 3: Comorbids Distribution of Study Population

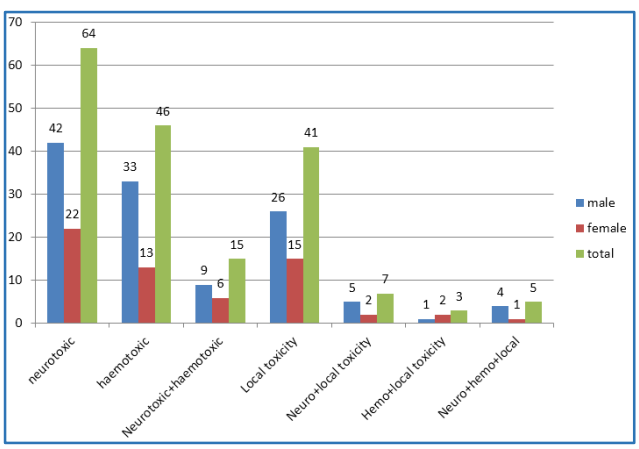

Fig. 3: Distribution of Population Based on Toxicity

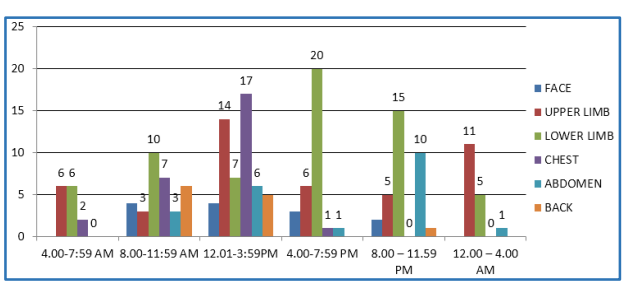

Fig. 4: Distribution of Study Population Based on Time of Bite vs. Sight of Bite Distribution

RESULTS AND DISCUSSION

Among 181 cases, most of the victims (26.8%) belongs to fourth decade of life. Many similar studies conducted in the past show similar distribution, one such study in JIPMER[7] show that majority of victims belong to 15-60 yrs. of age. Another study by Sawai et al show that most of the cases belong to 10 to 30 years. There is a rapid decline in the incidence of cases after 5th decade of life.

In our study, male-to-female ratio of incidence of bite is 1.8:1. Comparing this with studies done earlier like study conducted by Banerjee RN,[8] a higher preponderance of males than females was observed. Similar to studies done at JIPMER[7] and in Safdarjung Hospital,[8] our present study clearly showed that the incidence of bite is more among agricultural workers, i.e. 46.41% in our present study. We also observed that 10 victims (5.52%) are school or college students.

In our present study we noticed majority of patients (60.77%) did not identify the snake. Among the identified cases, most common was cobra (16.57%) followed by krait (12.71%).

To evaluate the outcome of patients in relation to comorbid illness, we obtained a detailed history of comorbid illness among snake bite victims. Nearly 9.39% of cases were hypertensives and 8.29% were diabetic. One patient was antenatal mother (5 months gestation). In our present study, maximum incidence of snake bite (29.28%) was between 4:00 PM to 8:00 PM. Least number of bites were distributed in morning hours, i.e. 4 to 8:00 AM (9.94%) and 8 to 11:59 AM (9.94%).

Among 181 cases, 50.83% of victims reported to have bitten in lower limb and most common site was feet. Other sites in decreasing order were upper limb (33.15%), abdomen (7.73%) and face (4.42%). These findings clearly suggests that the site of bite is determined mainly by inadvertent contact of the snake during activities. All these findings are more or less similar to that of study conducted by Viramani SK,[9] Dutt OP and Bhat RN. About 131 (72%) cases are outdoor (farm, work place, school ground, forest), and 50 (28%) cases are indoor bite (Home, other buildings).

Neurotoxicity (35.38) is high among the toxicities observed, next comes the pure haemotoxicity (25.42%), local reactions like cellulitis, oedema comprises 22.65%, bite to needle time is the interval between time of bite and administration of ASV, 42% cases were given ASV within 2-4 hrs. of bite followed by 36% of cases within 4-6 hrs. This helps in the evaluation of severity and administration of ASV in a crucial period.

In patients those who were alive history of tourniquet application was present in 48 (27.91%) cases, 7 cases (4.07%) had history of other methods of native treatment like cutting, suction, etc. About 117 cases did not receive any native treatments. A significant association was found between tourniquet application, other native treatments and study population. Out of 9 patients who were dead, history of native treatment in the form of tourniquet application, wound cutting, suction, etc. were present in all cases.

Out of 181 cases 100 patients (55%) showed no reaction to ASV, while in remaining 81 cases 64 (35%) developed minor reactions in the form of fever, urticarial rashes and rigors, 17 cases (10%) developed severe anaphylactic reactions.

This clearly shows that majority of cases who received ASV developed no or only mild reaction to ASV. Among 9 dead patients, 7 patients (78%) presented late with bite to needle time of >6 hours and 2 (22%) patients presented less than 6 hours from time of bite. Of 181 patients, 57 patients had undergone surgical procedures out of which 45 patients (24.8%) had simple wound debridement, 9 cases (4.97%) had fasciotomy and 3 patients (1.66%) had amputations. Remaining 124 cases (68.51%) got treated without any surgical interventions. On analysing comorbid illness versus death wise distribution of study population, we found that among 15 diabetic patients 93.33% were alive and 6.67% were dead. Among 17 hypertensive patients, only 5.88% died. Similarly on analysing all the comorbid datas, we found that comorbid illness is less significant in determining the mortality.

We had one antenatal woman (5 months of gestation) who received ASV in 4 hours and she was alive, but resulted in intrauterine death due to feticide effect of ASV. On analysing various antenatal snake bite cases in the past, the feticide effect of ASV is confirmed.

On analysis of bite to needle time with surgery we found that out of 25 patients with BTN time < 2 hrs., 40% had surgery and 60% without surgery. At BTN time of 2-4 hrs., 33% with surgery and 67% without surgery. At 4-6 hrs., values were 23% with surgery and 77% without surgery. At >8 hrs., one patient with surgery. This shows that unlike bite to needle time as an important determinant of mortality, it is not an important determinant in case of surgical interventions.

CONCLUSION

Snakebite although a preventable problem, it remains to be one of the common emergency.

1. In the present study, the adult snakebite cases with envenomation brought to Government Chengalpattu Medical College and Hospital, Chengalpattu, were mostly males (64%) between the age group of 30 to 40 years (26.8%).
2. With rural background, snake bite is more common among agricultural related activities (46.41%).
3. The most common site of bite was lower limb and the maximum cases were recorded between 4:00 PM to 8:00 PM (29.28%) in the rainy season of July to September.
4. Neurotoxicity constitutes (35.38%) among all the toxicities followed by pure haemotoxicity (25.42%) and local reactions like cellulitis oedema (22.65 %).
5. A significant association was noted between prolonged bite to needle time and mortality with 7 out of 9 patients (78%), who presented more than 6 hours after bite were dead.
6. On analysing comorbid illness versus death wise distribution of study population, we found that among 15 diabetic patients 93.33% were alive and 6.67% were dead. Among 17 hypertensive patients, only 5.88% died. Similarly on analysing all the comorbid illness with outcome, we found that comorbid illness is not a strong determinant in determining the mortality.
7. Native treatment especially tourniquet application is a strong determinant of outcome with 100% prevalence in dead and 85.28% in patients who had undergone surgeries and 27.28% in alive patients without surgeries.

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