

Clinical Study of Snake Bite at a Tertiary Care Centre in Rewa

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ABSTRACT

BACKGROUND

Snakebite is an acute life-threatening time limiting medical emergency. In spite of the availability of optimum treatment in modern medicine, a major proportion of the victims of snake bite in India die. We wanted to study the clinical and demographic profile of snake bites, ratio between poisonous and non-poisonous bites, complication and mortality, along with various factors affecting the prognosis.

METHODS

This is a prospective observational study of 150 patients aged >15 years. Patients with h/o snake bite & patients presenting with clinical features suggestive of snake venom toxicity were included in the study.

RESULTS

Incidence of snake bites was most common (60%) in the age group of 21 - 40 years & was more common in males (60%). Maximum number of patients (76.67%) was from the rural areas. Maximum number of cases (66.87%) occurred during July to September. 40% cases were poisonous and 60% were non-poisonous. In the poisonous group, all patients developed neuroparalytic features. Overall mortality among hospitalized patients was 5.33% while in poisonous group it was 13.33%.

CONCLUSIONS

Public needs to be educated about pattern of behaviour of snakes, care while moving in night specially in fields, not to sleep on floors, not to waste time in seeking remedies from ojhas.

KEYWORDS

Rewa, SSMC, Snake Bite, Neurotoxic, ASV

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BACKGROUND

Snakebite is an acute life threatening time limiting medical emergency. It is a preventable public health hazard often faced by rural population in tropical and subtropical countries with heavy rainfall and humid climate. There are more than 2000 species of snakes in the world and about 300 species are found in India out of which 52 are venomous. The venomous snakes found in India belong to three families Elapidae, Viperidae and hydrophidae.¹

Snake is one of the most important venomous animal which comes in contact with the human beings. The true incidence is notoriously difficult to discover because snake bite is largely a problem of remote rural areas, where the victim's resort to traditional herbalists rather than try to reach hospital.²

Clinical effects of envenoming by same species of snake are almost similar except a few regional variations. Although total number of bites may be more than 5-6 lakhs but only 30% are venomous bites. Though snakebite is a life-threatening centuries old condition, it was included in the list of neglected tropical diseases.^{3,4}

In spite of the availability of optimum treatment in modern medicine, a major proportion of the victims of snake bite in India die. The reasons for this are lack of awareness of modern treatment, long distance to a facility centre where this treatment is available. A number of myths are associated with the treatment of snake bite poisoning which are further complicated by various ritualistic and religious practices.⁵

There is a huge gap between the number of snakebite deaths reported from direct survey and official data. Only 7.23% snakebite deaths were officially reported.^{6,7}

With its triad of high mortality, high disability, and substantial psychological morbidity, snake bite warrants high priority research.⁸

Objectives

1. To study the clinical and demographic profile of snake bites.
2. To find out ratio between poisonous and non-poisonous snake bites.
3. To study complication and mortality of snake bites.
4. To study the various factors affecting the prognosis of snake bites.

METHODS

This was a prospective observational study done during study period from April 2018 to June 2019, of 150 patients of snake bites aged >15 years admitted to the medical intensive care unit and wards in Department of Medicine, Shyam Shah Medical College and SGMH Rewa M.P. Detailed history will be taken and all patients will be examined thoroughly to elicit risk factors, clinical features of snake bite.

Inclusion Criteria

- History of snake bite given either by patient himself or by attendants.
- Patient presenting with clinical features suggestive of snake venom toxicity.
- Patient/attendant who had given consent for study.

Exclusion Criteria

- Patient/attendants who had not given consent for study.

RESULTS

1. The incidence of snake bites was most common (60%) in the age group of 21-40 years. There was decline in the incidence with the advancing age.
2. The incidence of snake bites was more common in male (60%).
3. Most of the snake bite victims (52.66%) belonged to labour class which included farmers also.
4. Maximum number of patients (76.67%) were from the rural areas.
5. The incidence of snake bite was higher (65.33%) in the evening and night hours. The ratio between night-time bite and daytime bite in non-poisonous group was 1.3: 1 while in poisonous group it was 3.6: 1.
6. Maximum number of snake bites (66.87%), occurred during July to September (Monsoon) seasons. Higher incidence of snake bites was closely related to rainfall.
7. Most of the snake bite accidents (60%) occurred outside the home, out of them 23.33% were bitten by snakes when they were asleep on the floor in their houses.
8. The commonest site of bite (53.33%) was found to be the lower extremities. 11.33% bites were on unusual sites (forehead, chin, ear lobule, front and back of chest etc) and all of them were poisonous.
9. In this study 40% cases were poisonous and 60% were non-poisonous. In the poisonous group all the patients developed neuroparalytic features. No patients developed vasculotoxic features.
10. Ghabrahat (94.67%) and local pain (57.33%) were the chief presenting complaints in both groups. Redness and tenderness were the main local findings in non-poisonous group (32.22%) and poisonous (43.33%)
11. In the poisonous group difficulty in opening of eyes (90%), difficulty in swallowing (76.67%), difficulty in speaking (66.67%) and difficulty in breathing (43.33%) were the main presenting complaints. Signs of envenomation in decreasing order were bilateral ptosis (90%), bulbar palsy (71.67%), generalized paresis (56.67%), drowsiness (45%), respiratory paralysis (43.33%) and abdominal tenderness (21.67%).
12. In poisonous group main systemic complications were respiratory failure (43.33%), coma (25%) and local complications were cellulitis (13.33%) and gangrene (1.67%).

- 13. The mean time interval between bite-toxic features and bite-medical aid, were 2.47 and 3.8 hours respectively.
- 14. In the present study, overall 21.34% patients did not take first aid measures while 118 patients (78.66%) took first aid measures in form of tourniquet (63.33%), incision (5.33%), tourniquet & incision both (10%).
- 15. Overall mortality among hospitalized patients was 5.33% while in poisonous group it was 13.33%.
 - a. Mortality rate was higher in rural patients (4.66%) than in urban patients (0.67%). It was also found that mortality rate was higher in nocturnal bites (3.33%) than daytime bites (2%).
 - b. Mortality rate was higher (23.53%) in those patients who did not take first aid measures, while 9.3% mortality rate was recorded in those patients who

- took first aid measures in form of tourniquet, incision and immobilization.
- c. Mortality rate was higher in extremes of ages, 40% in younger age group (15-20 years) and 50% in older age groups (>60 years).
- d. Mortality rate was higher in upper extremity bites (27.78%) as compared to lower extremity bites (4%).
- e. Mortality rate was higher (25%) in those patients who consulted traditional healers while in patients who reached hospital, it was 5.56%.
- f. Mortality rate was higher (41.67%) when there was more than 12 hours delay in hospitalization while 5% mortality was recorded when patient was admitted within 6 hours of bite.

Clinical Group	Age Group in Years								Total	%
	15 – 20 (10)		21 – 40 (38)		41-60(10)		> 60 (2)			
	No.	%	No.	%	No.	%	No.	%		
Survived	6	60.0	36	94.73	9	90	1	50	52	86.67
Death	4	40.0	2	5.27	1	10	1	50	8	13.33

Table 1. Relation between Age and Mortality in Poisonous Group

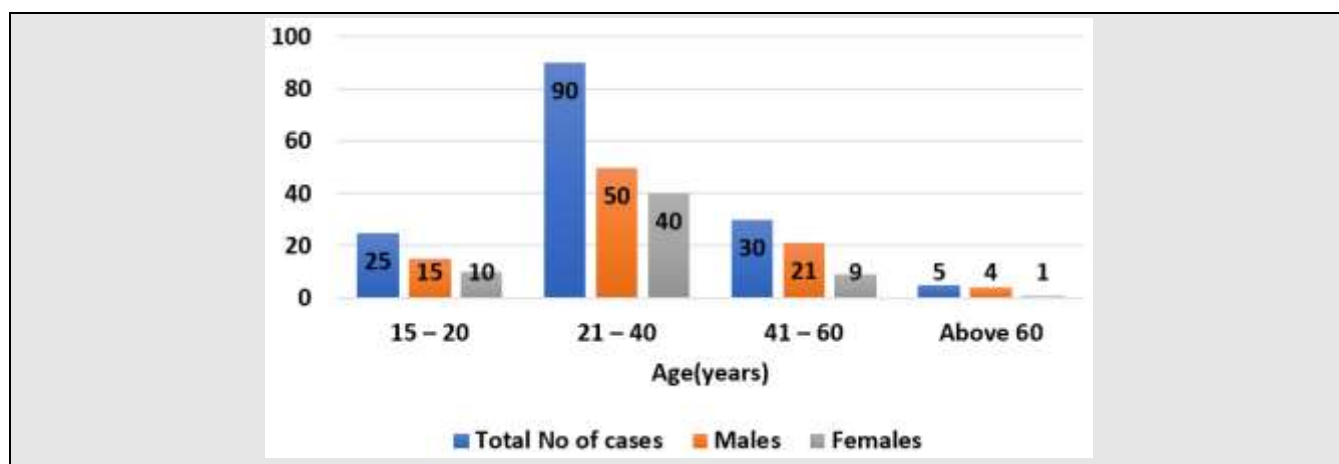


Figure 1. Distribution of Cases According to Age and Sex

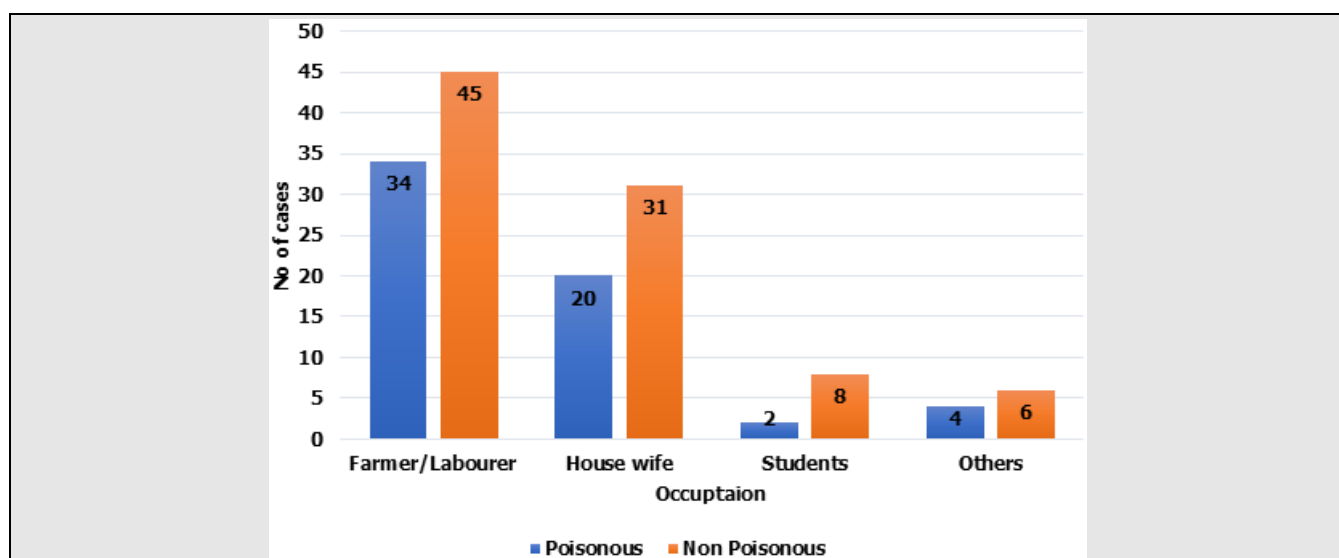


Figure 2. Occupational Distribution of Snake Bite Cases

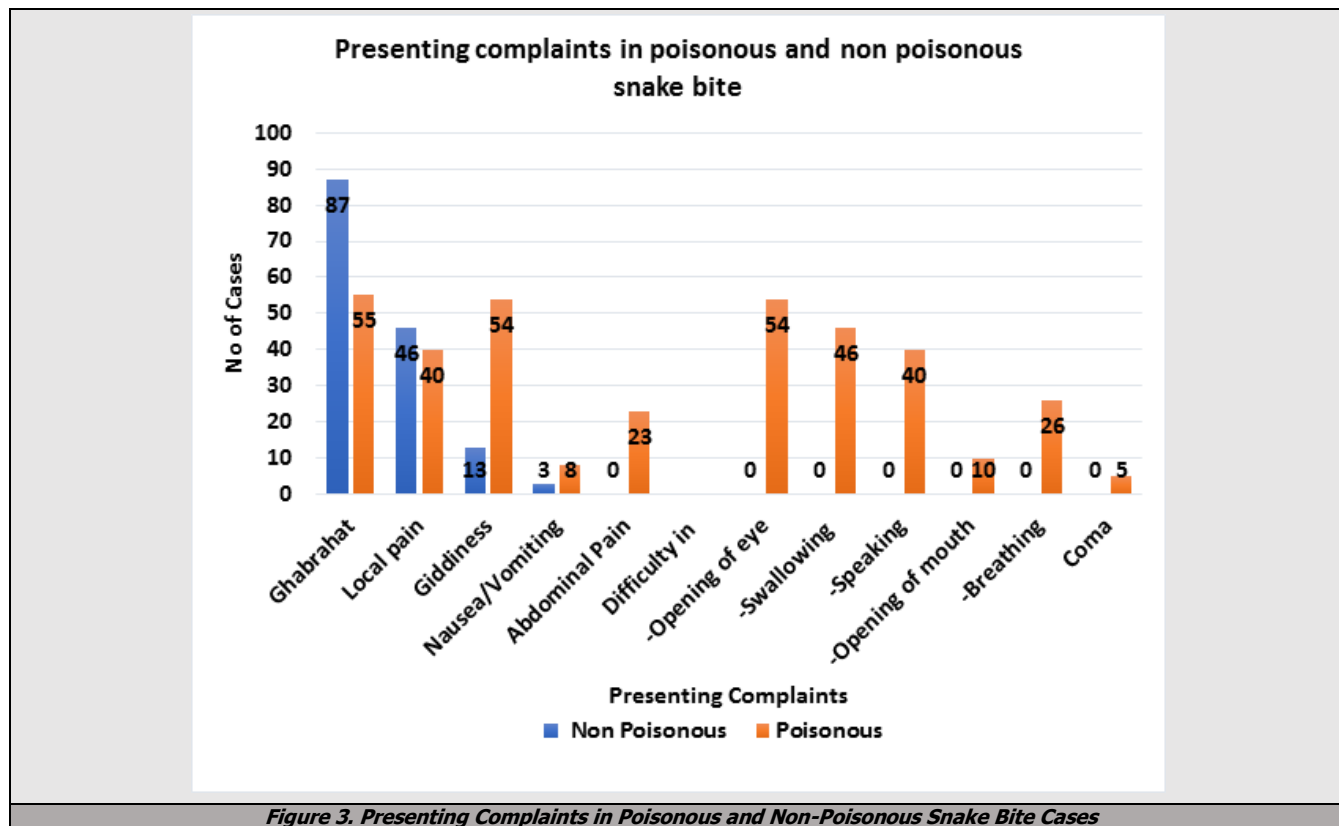


Figure 3. Presenting Complaints in Poisonous and Non-Poisonous Snake Bite Cases

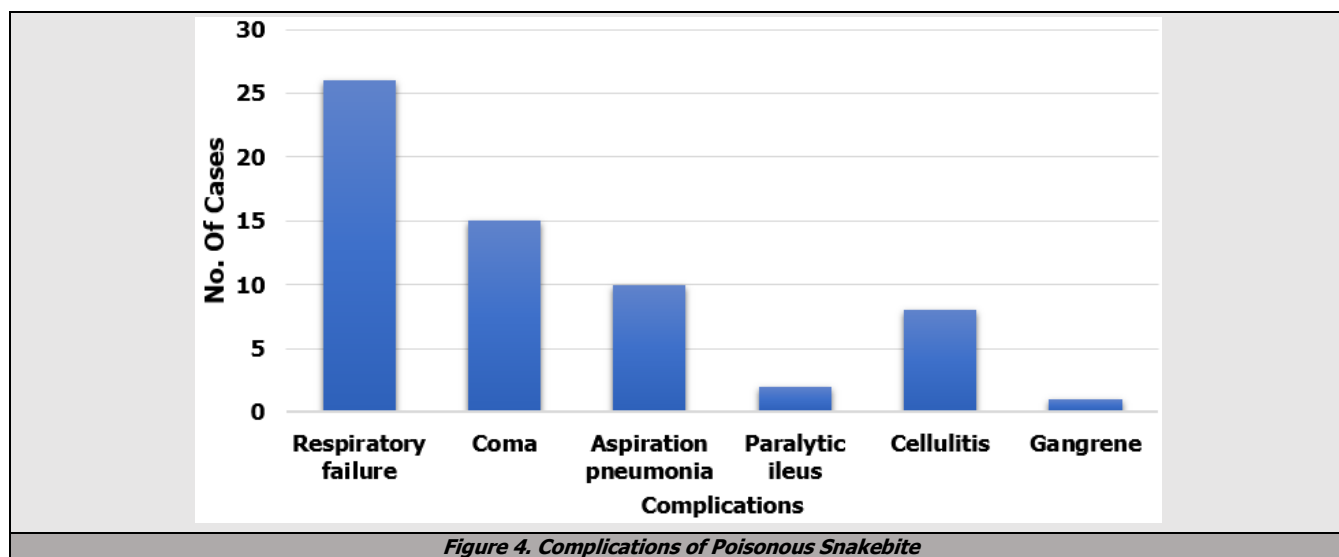


Figure 4. Complications of Poisonous Snakebite

DISCUSSION

Age and Sex Distribution

According to the observation obtained in the present study, the majority of the snake bite victims were in the age group of 21 – 40 years (60%). Hati et al (1992)⁹ and Nayak et al (1990).¹⁰ also recorded majority of snake bite in this age group. These observations also go in favour of the study of Russel et al. (1979)¹¹ The sex distribution shows that 60% cases were male and 40% were female. Hati et al (1992)⁹ in their study found similar figure in snake bite victims, males were 54.72% and females were 45.23%. Study by Bhalla et al (2014),¹² out of 150 patients, 99 (66%) patients were

male victims, whereas the female victims were 51 (34%) in number. Various studies suggest snake bite was more in male, this could be because of more outdoor activity in male.

Distribution According to Occupation

In the present study maximum number of victims (56.67%) belonged to labour class which included farmers also. Tembe et al (1975)¹³ reported majority of cases were labourers and farmers while Dhand et al (1986)¹⁴ found that (63.8%) victims were rural field workers. Most of the snake stays in burrows and fields in the rural area, so labour class people are more prone to be involved in snake bite.

Rural and Urban Distribution

The present study revealed that 76.67% cases were from rural areas and 23.33% from urban areas. Banerjee et al (1972)¹⁵ reported 88.6% and Ghosh et al (1985)¹⁶ reported 87% patients from rural area. This revealed the higher prevalence of snake bite in rural area.

Diurnal Distribution

Present study revealed that maximum snake bites occurred in the evening and night hours (65.33%). These figures show close resemblance with the observation of Virmani and Dutt (1987).¹⁷ The ratio between night time bite and day time in non-poisonous group was 1.3: 1 while in poisonous group it was 3.6: 1. This shows the nocturnal habitat of poisonous snakes. Snakes usually move during night time for search of food in the residential area.

Seasonal Distribution

The present study revealed that maximum number of snake bite cases (66.87%) occurred during July to September (Monsoon) season. Tembe et al (1974)¹³ showed that maximum number of snake bite victims came during period of July to October. While Dhand et al (1986)¹⁴ found that the peak seasons of snake bite cases in monsoon season. This data shows that the incidence of snake bite is directly related to rainfall which compels the reptiles to come out of their shelter and pits.

Circumstances of Bite

The present study shows that majority of snake bite incidents occurred outside the home (60%). Dhand et al (1986)¹⁴ in their study found that 86.63% of snake bite accidents occurred during outdoor activity. This study also shows that a significant number of victims, 35 (23.33%) were bitten by snakes when they were sleeping on the floor outside the home. Because of nocturnal habitat of snake, people who sleep on the floor were affected more.

Site of Bite

The present study revealed that the lower extremity was the most common site of bite (53.33%). Hati et al (1992)⁹ found 53% cases were bitten in the lower extremity. The present study also revealed some unusual sites of bite i.e., ear lobule, chin, front and back of chest, abdomen etc. (11.33%) and all of them were poisonous. Tembe et al (1974)¹³ reported 6.67% cases were bitten at unusual sites. Bites over lower extremity were more due to more chances of exposure to the bite.

Type of Snake Bite

In the present study, out of 150 cases, 60 (40%) cases were poisonous snake bites. Mathew et al (1988)¹⁸ and Hati et al (1992)⁹ found 32.1% and 15.64% poisonous snake bite victims respectively in their study. In present study

neuroparalysis (100%) was the main clinical presentation and no patient had haemorrhagic manifestation similar study was done by Singh J et al (2008)¹⁹. Sharma N et al (2005)²⁰ reported (60.5%) neuroparalytic case which was lesser than present study. No patient developed vasculotoxic features. Ghosh et al (1985)¹⁶ shows that Cobra bite is the commonest poisonous snake bite seen in India.

Clinical Presentation

In this study, all the 60 poisonous snake bite victims showed signs and symptoms of Elapidae envenomation. Neuroparalysis is common with Elapidae group of snakes which are more prevalent in the surrounding areas. Ghabrahat and local pain were the main presenting complaints in non-poisonous group (96.77% and 51.11% respectively). The local pain may be due to multiple bite marks, first aid measures like tourniquet, incision etc.

The presenting features of poisonous snake bite (due to Elapidae envenomation) in decreasing order were ghabrahat (91.67%), giddiness (90%), difficulty in opening eyes (90%), difficulty in swallowing (76.67%), difficulty in speaking (66.67%) and difficulty in breathing (43.33%) and 5 (8.33%) patient were comatose at admission. The present study revealed the signs of envenomation in decreasing orders as- bilateral ptosis (90%), bulbar palsy (71.67%), generalised paresis (56.67%), drowsiness (45%), respiratory paralysis (43.33%) and abdominal tenderness (21.67%). Saini et al (1986)²¹ found the neuroparalytic signs consist of ptosis (75%), bulbar palsy (60%), flaccid limb paralysis (80%) and respiratory paralysis (75%), coma (30%) and convulsion (15%). More Respiratory paralysis, coma & convulsions in the study of Saini et al (1986)²¹ as compared to our study explains higher mortality rate in their study which was 25% as compared to our study (13.33%).

The Local Effects

The present study revealed that the tenderness at the local site was the main presentation in 43.33% of the poisonous group as compared to 32.22% in non-poisonous group. Redness of the local part, oedema and bleeding were the common local effects seen in poisonous snake bite, but this may be due to local treatment like tight tourniquet, incision or both.

Complications

In the present study respiratory failure (43.33%) was the main complications, while coma (25%), aspiration pneumonia (10%) and paralytic ileus (3.33%) were also recorded. Among local complications, cellulitis was seen in 8 patient (13.33%) and gangrene in 1 (1.67%) patient.

Investigations

In this study bleeding and clotting time were within normal limits in poisonous group.

Electrocardiographic Changes

In the present study electrocardiogram was recorded in 60 cases of the poisonous snake bites. It revealed sinus tachycardia (46.67%), Tall T. in V₂₋₃ (15%), ST-T changes (11.66%), sinus bradycardia (5.00%). ECG's of 13 patients (21.67%) did not show any abnormality. These changes were similar to study done by Nayak et al (1990)¹⁰.

Treatment

Before Hospitalisation-

The present study revealed overall 21.34% patients did not take any type of first aid measures. 118 patients (78.66%) took first aid measures in the form of tourniquet (63.33%), incision (5.33%), tourniquet and incision both (10%). The present study revealed that the high mortality (23.53%) was found in those patients who did not take any first aid measures.

In the study it was seen that in 60 poisonous snakes bite cases, 24 patients (40%) consulted traditional healers (Ojhas, tantrik & mantrik) before hospitalization and in them 3 patients (12.5%) were comatose because of delay in hospitalization and mortality was (20.83%). While in patients who did not go for traditional method only 8.33% mortality was recorded.

After Hospitalization-

Out of 60 poisonous snake bites, anti-snake venom (polyvalent) was given in 60 patients according to the severity of envenomation. It was observed that average ASV requirement used in this study was 200 ml. Side effects observed with ASV administration, in 16.67% cases, were pyrexia (18.33%), rashes (11.67%), hypotension (8.33%) and anaphylactic (5.0%). Of the 60 patient in whom ASV was used, 52 patients (86.67%) survived and 8 patients (13.33%) died.

Neostigmine - Atropine combination therapy was given in 60 patients till recovery, out of them 8 (13.33%) died. Ghosh et al (1985)¹⁶ reported 22.23% mortality in this group. The usefulness of Neostigmine-Atropine regimen was also reported by Hande et al (1985)²² and Saini et al (1985).²¹ Endotracheal intubation was done in 26 patients with varying degrees of respiratory paralysis. Survival rate of 69.2% showing the efficacy of this treatment modality.

Morbidity and Mortality

In the present study overall mortality rate among hospitalized patients was 5.33%. In the poisonous group, mortality was 13.33%. Mortality rate reported by various authors in their studies was 25% (Saini et al)²¹, 22.22% (Ghosh et al 1985)¹⁶ 12% (Mathew et al 1988)¹⁸, 10% (Nayak et al 1990)¹⁰, and 10.09% (Hati et al 1992)⁹.

The present study shows that mean time interval between the bite and medical aid (after hospitalization) in poisonous group was 3.8 hours and in non-poisonous group it was 5.3 hours. It may be due to reason that, if the signs

and symptoms of envenomation develop early, patient reaches the hospital as early as possible.

The present study shows that mean time-interval between bite and development of toxic features was 2.47 hours and the range was 1-6 hours. Kulkarni et al (1985)²³ found that most of the patients develop neuroparalytic signs and symptoms within 30 minutes to six hours. The present study revealed that mean time interval between bite and death was in 18.5 hours with the range of 4-36 hours.

The mortality rate was high (40%) in younger age group (15-20 years) as compared to 5.27% in 21-40 years age group. It suggest that younger patients are at a greater risk may be because of higher concentration of venom in relation to area of distribution available for its distribution.

The present study revealed that the mortality rate was higher in the upper extremity bites (27.78%), while in lower extremity group 4% mortality was recorded. Statistically it is significant (p<0.005). It suggests that more proximal the site of bite, graver the prognosis will be.

It was also observed that higher mortality was found in those patients, who came to the hospital after several hours of bite, 41.67% mortality was recorded when delay was more than 12 hours and only 4% mortality recorded when patient was hospitalized within 6 hours of bite. Statistically it is highly significant (p<0.001).

The cause of delay in hospitalization may be lack of transport facilities and time lapsed in local traditional treatment by "Mantras" & "magic". The high mortality in patients with delayed hospitalisation may also be due to fixation of the snake venom to the organ tissues hence its effects were not reversed by ASV.

CONCLUSIONS

The general public needs to be educated about behavior of snakes, care while moving in night specially in fields, not to sleep on floors, importance of first aid with use of tourniquet and immobilization of bitten parts, not to waste time in seeking remedies from ojhas etc. and above all shift the afflicted person at the earliest to nearest medical centre where specific therapy for dealing with such victims is available. All these measures will go a long way in saving many of the unfortunate victims of snake bite.

REFERENCES

- [1] Alirol E, Sharma SK, Bawaskar HS, et al. Snake Bite in South Asia: a review. *PLoS Negl Trop Dis* 2010;4(1):e603.
- [2] Warrell DA. Snake bite and snake venoms. *QJM: An International Journal of Medicine* 1993;86(6):351-353.
- [3] World Health Organization. Neglected tropical diseases. [Http://www.who.int/neglected_diseases.EB132_R7_en](http://www.who.int/neglected_diseases.EB132_R7_en).
- [4] Bawaskar HS. Snake bite poisoning: a neglected life-threatening occupational hazard. *Indian J Crit Care Med* 2014;18(3):123-124.

- [5] Jacob J. Snake venom poisoning: The problem, diagnosis and management of snake venom poisoning. Bombay: Varghese Publishing House 1990.
- [6] Majumder D, Sinha A, Bhattacharya SK, et al. Epidemiological profile of snake bite in South 24 Parganas district of West Bengal with focus on underreporting of snake bite deaths. *Indian J Public Health* 2014;58(1):17-21.
- [7] Mohapatra B, Warrell DA, Suraweera W, et al. Snakebite mortality in India: a nationally representative mortality survey. *PLoS Negl Trop Dis* 2011;5(4):e1018.
- [8] Snake bite--the neglected tropical diseases. *Lancet* 2015;386(9999):1110.
- [9] Hati AK, Mandal M, De MK, et al. Epidemiology of snake bite in district of Burdwan, West Bengal. *J Indian Med Assoc* 1992;90(6):145-147.
- [10] Nayak KC, Jain AK, Sharda DP, et al. Profile of cardiac complications of snake bite. *Indian Heart J* 1990;42(3):185-188.
- [11] Russell FE, Emery JA. Effects of corticosteroids on lethality of ancistrodon contortrix venom. *Am J Med Sci* 1961;241:507-511.
- [12] Bhalla G, Mhaskar D, Agarwal A. A study of clinical profile of snake bite at a tertiary care centre. *Toxicol Int* 2014;21(2):203-208.
- [13] Tembe VS, Sant SM, Purandare NM. A clinicopathological study of snake bite cases. *J Postgraduate Med* 1975;21(1):36-47.
- [14] Dhand VP, Anand AC. Snake bite: A clinical study of 202 cases. *J Assoc Physicians India* 1986;34(1):37.
- [15] Banerjee RN, Sahni AL, Chacko KA, et al. Neostigmine in the treatment of Elapidae bites. *J Assoc Physicians India* 1972;20(7):503-609.
- [16] Ghosh SK, Prasad U, Singh B, et al. Snakebite cases in an Industrial city hospital. *JAPI* 1985;33(1):45.
- [17] Virmani SK, Dutt OP. A profile of snake bites poisoning in Jammu region. *J Indian Med Assoc* 1987;85(5):132-134.
- [18] Mathew MT, Warrie CBC, Rajaratnam K, et al. Rate and delayed complications following poisonous snake envenomation – 10 year follow up. *JAPI* 1988;36(1):24.
- [19] Singh J, Bhoi S, Gupta V, et al. Clinical profile of venomous snake bites in north Indian military hospital. *J Emerg Trauma Shock* 2008;1(2):78-80.
- [20] Sharma N, Chauhan S, Faruqi S, et al. Snake envenomation in a north Indian hospital. *Emerg Med J* 2005;22(2):118-120.
- [21] Saini RK, Singh S, Sharma S, et al. Snake bite poisoning presenting as early morning neuroparalytic syndrome in Jhuggi dwellers. *JAPI* 1986;34(6):415-417.
- [22] Hande HS, Nagabhusan TK, Venkatravanappa PK, et al. Snake bites in Karnataka. *JAPI* 1985;33(1):46.
- [23] Kulkarni VA, Borade VB, Kulkarni BN, et al. Clinical study of snake bite. *JAPI* 1985;33(1):45.