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General Medicine

CLINICAL PROFILE AND OUTCOME OF PATIENTS WITH NEUROTOXIC SNAKE BITE

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ABSTRACT Snake bite is the common medical emergency in India which we are encountering in our day to day practice. It is an occupational hazard among agricultural workers. Worldwide, India is having the highest number of mortality due to snake bite. Most of the deaths in the snake bite are due to time delay in reaching the hospital. The outcome of snake bite mainly depends on time delay in reaching the hospital and ASV administration. Among those who presenting to the hospital lately there is increased incidence of respiratory failure, prolonged hospital stay. **AIMS & OBJECTIVES:** Based on this aim of our study is to evaluate the clinical profile of patients with neurotoxic snake bite and also to study the outcome of neurotoxic manifestations of snake bite in terms of recovery or death also to correlate the outcome of neurotoxic snake bite with the various factors. **MATERIALS AND METHODS:** Patients admitted with of history of snake bite-selected for clinical study as per inclusion/exclusion criteria are subjected to detailed history taking and clinical examination after obtaining informed consent. Type of snake, site and number of bites, occupation, time delay in reaching the hospital, amount of anti-snake venom needed, neurotoxic manifestations are recorded in detail. Routine blood investigations were done for all patients included in the study. Respiratory failure and need for mechanical ventilation among the study group was noted. Clinical progression over the day is observed in terms of deterioration of illness, recovery, death. **RESULTS:** In our study, we observed that majority of the victims were in the age group between 41-60 years. Most of them were males and from rural areas. Cobra envenomation was more common than other snakes. The most common neurological manifestation observed was ptosis, followed external ophthalmoplegia and neck muscle weakness. Prolonged ventilatory support had increased risk for VAP. Respiratory failure, time delay in reaching the hospital premises had significant effect on the outcome of the individual. Early treatment with ASV reduces the mortality. **CONCLUSION:** Snake bite is a preventable health hazard. Health education and awareness among the people reduces the mortality. There should be a National standardized protocol for managing snake bite. It should be strictly followed even in the primary health centres to reduce the mortality and also to prevent the time delay in accessing the tertiary care centre.

KEYWORDS : Snake bite, Anti snake venom , Outcome

INTRODUCTION

Snake bite is the common medical emergency in India which we are encountering in our day-to-day practice. Snake bite is the most common problem in rural area and peri-urban areas. Snake bite is preventable health hazard. Worldwide, India is having the highest number of mortality due to snake bite[1]. According to WHO the total number of bites is estimated to be around 83,000 cases among these there were about 11,000 deaths[2]. Most of the deaths in the snake bite are due to time delay in reaching the hospital. There are about 236 snakes in number only 52 snakes are poisonous in India.[3] Snake bite is an occupational hazard in farmers, plantation workers and outdoor workers. The large number of snake bite occur while the people walking at night or walking in bare foot or in early morning along road side. Snake bite can be prevented by educating the people working in agricultural fields:[4] should not walk in bare-foot and to wear protective gloves, by avoiding the harmful practices such as tourniquet application, herbal remedies, cutting and sucking the bitten area, quackery. These harmful practices are ineffective and dangerous too.
The outcome of snake bite mainly depends on time delay in reaching the hospital and ASV administration. Among those who presenting to the hospital lately there is increased incidence of respiratory failure, prolonged hospital stays and renal failure. Currently intensive work is done in the pathological, toxicological, pharmacological and immunological aspects of snake bite which led to the production of polyvalent and monovalent anti-snake venom.

National snake bite protocol is presented as a solution-based approach. It emphasizes the need for behavioral change in community to educate the people about the occupational risks and reduction. It emphasized that the patient with snake bite with envenomation when treated with ASV has better outcome[5]. Based on this aim of our study is to evaluate the clinical profile of patients with neurotoxic snake bite and also to study the outcome of neurotoxic manifestations of snake bite in terms of recovery or death also to correlate the outcome of neurotoxic snake bite with the following factors like time delay, respiratory failure, amount of ASV needed, type of snake, need for ventilatory support, Ventilator associated pneumonia.

Materials And Methodology

This study was done in Kanyakumari government medical college, Asaripallam from the period October 2019 to March 2021 as retrospective and prospective study.In our study 50 patients admitted with history of snake bite are analysed comprehensively. Patients admitted with history of snake bite showing features of neurotoxic manifestations in the form of ptosis, extra ocular movement restriction, neck muscle weakness, respiratory failure were included in the study, while patients in cholinergic crisis, hypokalemia, flaccid paralysis, myasthenia gravis and myopathy were excluded.

Patients admitted with of history of snake bite-selected for clinical study as per inclusion/exclusion criteria are subjected to detailed history taking and clinical examination after obtaining informed consent. Type of snake, site and number of bite, occupation, time delay in reaching the hospital, amount of anti-snake venom needed, neurotoxic manifestations are recorded in detail. Routine blood investigations were done for all patients included in the study.

Detailed clinical examination will be done daily and close monitoring was done. Clinical progression over the day is observed in terms of deterioration of illness, recovery, death. Respiratory failure and need for mechanical ventilation among the study group was noted. All patients included under the study were treated with anti-snake venom and other supportive measures. Mechanical ventilation was provided for patients in respiratory failure. Patients in ventilator were assessed for the duration on ventilator and development of ventilator associated pneumonia. They were followed till the end point of outcome either in the form of recovery or death Data were analyzed using statistical package-SPSS software. The values are presented as mean, standard deviation, frequency of occurrence. Percentages were used to express the proportion of discrete variables. Chi square (x2) test and Fisher exact test were used for evaluation

RESULTS

This study was sone in 50 patients with snake bite, In our study, 17 out of 50 patients were in the age group between 41-60 years. But this is not statistically significant followed by 13 patients in 21-40 age group and 2 patients in 21-30 age group. Among the 50 persons, 30 were found to be male and 20 were found to be females with a ratio of 1.5:1.

In our study group, 70% of the cases were from agricultural sector and the remaining 30% of the cases from manual laborers and others. Death was most common in people working in agricultural sector.
Among the 50 victims, 78% of them are from rural area and the remaining 22% are from urban area, in that 3 persons were died in the

rural area and 4 were in the urban area. There was not much significance on outcome based on the domiciliary area.

Table 1. Type Of Snake And Outcome

S.No	Type of snake	Frequency (n)	Percentage (%)	Recovery	Death
1.	Cobra	24	48%	20(83.3%)	4
2.	Krait	15	30%	14(93.3%)	1
3.	Viper	11	22%	9(81.8%)	2
Total		50	100%	43	7

In our study population, 24 patients were bitten by cobra, 15 cases by krait and 11 cases by viper. 93% of the patients bitten by krait ,83% bitten by cobra and 81.8% bitten by viper were recovered and this is statistically insignificant (P-0.614). Coming to site of bite 32 victims were bitten in the lower limb and 14 persons in the upper limb. According to this data, most common site of bite being the lower limb but this is statistically insignificant(P>0.05)

One another important factor is time delay in seeking the hospital treatment increases the mortality rate. Among the 7 persons who were dead, 5 cases were accessed the hospital premises late and this is statistically significant with P value of about 0.01.

Table 2 – Time Delay And Outcome

S.No	Time delay	Recovery	Death	Frequency (n)
1.	<3 hours	20(47%)	1(14%)	21(42%)
2.	3-6 hours	11(26%)	1(14%)	12(24%)
3.	>6 hours	12(28%0	5(7%)	17(34%)
TOTAL		43(86%)	7(14%)	50

All patients were administered neostigmine, Of these 24 patients were responded to neostigmine while the remaining 26 were non-responders. Neostigmine responders were found to be bitten by the cobra. Among the 50 patients, 35 of the cases received ASV in the dosage of 23 vials and remaining cases received in the dosage of 16 vials.

In our study group, all the 50 patients had ptosis, 43 patients had neck muscle weakness, 37 patients had muscle weakness. In our study group, about 32 patients had respiratory failure.

All the patients were given mechanical ventilator support. Number of deaths caused by respiratory failure is statistically significant (P value - 0.02). In our study, 32 patients needed ventilator support. Among them, 6 patients were on ventilator for more than 7 days and out of these 5 patients died. Association between duration of mechanical ventilation and outcome is statistically significant (P value -0.012). Association between the VAP and outcome was not statistically significant. Patients on ventilation for more than 7 days developed VAP. Thus, the prolonged ventilatory support exposes the patient for acquiring VAP.

In our study, the total number of patients stayed in the hospital for more than 7 days was about 7 patients, of these 3 patients were died. This was statistically significant (p<0.05)

DISCUSSION

Our study was conducted in the patients admitted with neurotoxic manifestations of snake bite. Our study group size was 50. Patients included in the study was closely monitored for the parameters listed in methodology. All the 50 patients was followed up till the discharge of the patients and the outcome was observed in terms of either recovery or death.

Out of the 50 patients, maximum number of cases were in the age group between 40-60 years as observed in the frequency distribution table. Maximum percentage (35%) of the cases were in the age group between 40-60 years. Similarly, a prospective study conducted in Andhra Pradesh by Brundha G et al[6] showed that 71% of the patients were in the age group between 30-50 years. Working age group peoples were mainly affected. Target age group people should undergo proper health education and personal protection in the working premises.

Out of the 50 patients included in the study, 30 (65%) of the patients were found to be male, 20 (40%) were females. There is gender predilection for males as compared to that of females. But the correlation between the sex and outcome was not statistically significant (p value >0.05). A study conducted in Andhra Pradesh showed male preponderance[6]. Age and sex did not have any influence on the outcome. (P value >0.05)

In our study, 35 out of 50 patients were agricultural workers. 70% of the patients were from the agricultural sector and the remaining 30% of them were unskilled labourers and others. Maximum number of cases were from the rural area where agriculture is the sole occupation. Mortality was equally distributed among the agricultural and non-agricultural workers. It is statistically insignificant. (P >0.05). Prevalence of Snake bite is common among the agricultural workers. There is increased risk of snake bite among the farmers, plantation workers.

Out of 50 patients, 39 patients were from rural area and the remaining 11 were from urban area. 78% of the patients were from rural area. Similar retrospective study in Chandigarh by Sharma et al[7] found out that 82.4% of the cases were reported from the rural areas[7]. Among these 61% of the bites occurred during the night time. In rural areas, access to health care providers is minimal and the awareness about the preventive measures were also lacking in the individuals. In our study, we highlighted the health education regarding the preventive measures and early access to health care providers will reduce the mortality among the individuals.

In our study, 32 patients were bitten in the lower limb and 14 patients in the upper limb. This shows that most of the cases were bitten in the lower limb. This is not statistically significant. Snakes have the easy accessibility to bite the lower limbs than the upper limb. A study in West Bengal by Hati AK et al [8] showed that the 53% of bites were in the lower limb and that too in night time during sleep.

In our study, among the 50 patients, 22 (44%) patients were undergone local procedures in the form of cutting, ligature, sucking the wound. A similar retrospective study in Singapore done by Tan HH[9] for 5 years duration observed that 15% (8) of the victims used the tourniquet as the first procedure, 2% (1) of the person was treated by cutting the wound and 6% (3) of the persons were treated by sucking the wound. This is due to the false beliefs and traditional methods followed in our country. In our study, we highlighted the early treatment in the hospital and the health education to the people and eradicating the false beliefs reduces the mortality among the snake bite victims.

In our study, 21 patients were reached the hospital within 3 hours, 12 patients in the duration between 3-6 hours and 17 patients reached the hospital in the duration of about more than 6 hours. Among the 17 patients who reached the hospital late, 5 patients were dead. This shows that the time delay in seeking the hospital treatment increases the mortality among the victims. This is statistically significant. (p <0.05). Nigam et al[10] reported that 14 persons were died due to the delay in reaching the hospital, they were admitted in the hospital after receiving some traditional treatment in the time duration of about > 6 hours. Thus there should be some standard protocol to be followed even in the primary health care centres to prevent the mortality among the individuals who seek late admission the hospital.

In our study group, Cobra (n-24 cases) was the frequent cause, of snake bite. Remaining 21 cases were bitten by krait and 11 cases by viper. But the type of snake bitten by the individual and the outcome has no correlation i.e, it is statistically insignificant with P value of about 0.614. Similar study done in Nepal by Sharma SK et al[11], observed that the most common bite is due to Cobra, they showed that 58% of the patients were bitten by the cobra.

In our study group, 100% of the patients were having ptosis as the commonest manifestation of neurotoxic bite. 94% (n-47) of the patients were having EOM restriction, 86% (n-43) of the patients were having neck muscle weakness, 74% (n-37) of the patients were having muscle weakness and 64% (n-32) of the patients were having respiratory failure. According to Nigam et al 85% of the patients were having ptosis, 43% of the patients having EOM restriction, 71% of the patients were having palatal palsy, 42% with respiratory failure,7% with muscle weakness.

Among them, 32 patients had respiratory failure in our study, all of them were put on mechanical ventilation. Respiratory failure affected the outcome of the individuals. 6 patients were on mechanical

ventilation for more than 7 days and out of these 5 patients died. Association between the duration of mechanical ventilation and the outcome is statistically significant with p value- 0.012.

Respiratory failure has significantly correlated with the outcome and the duration of MV and outcome is also significant. Thus, the respiratory failure patients were to be closely observed to prevent the mortality.

Prolonged ventilatory support had increased risk for VAP (ventilator associated pneumonia). Out of the 32 patients on ventilator, 12 patients developed VAP. In our study group, VAP were developed in the patients who were on ventilator for more than 4 days. Correlation between the VAP and outcome was statistically analysed using the Chi Square test, but the association is not statistically significant (p value>0.05)

In our study group, 15 cases were received 16 vials of ASV, 35 cases were received 23 vials of ASV. If the patient had come earlier to the hospital had better prognosis and the amount of ASV need for the treating the victim was also low. There should be some standard protocol for treating the patients, that should be strictly followed to reduce the mortality among the individuals. A study in West Bengal by Ghosh et el[12] proved that the protocol treatment showed a marked decrease of about 66% in the amount of ASV administration and with 24% reduction in mortality. ASV received in the early hours of bite with the correct dosage has high influence over the outcome of the individual and has significant reduction in mortality.

CONCLUSION:

Snakebite is a typically under-reported and negligent life-threatening emergency in rural areas. Many patients fall prey to various mythologies and never reach out to the hospitals. In our study, we observed a occupational incidence, making farmers more vulnerable victims. It is often difficult to identify the type of snake, and thus polyvalent anti-snake venom remains the only available treatment resource. Readily available treatment resources, timely intervention, appropriate referral, and close ICU will alleviate mortality as it was observed at our tertiary care hospital.

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