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Research Article

A study on the clinical profile of children with snake envenomation in a tertiary referral centre at Dharmapuri, Tamilnadu, India

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ABSTRACT

Background: Snake envenomation is a well-known cause of morbidity and mortality in rural India. In the year 2009, WHO included snake bite in the list of neglected diseases.
Methods: This study was conducted in children admitted with snake bite in Pediatric Intensive Care Unit in the year 2015. Their demographic details, site of bite, arrival time, 20Minutes Whole Blood Cloting Time, Clinical signs and symptoms, complications and outcome were measured.
Results: The male: female ratio was 2.57:1. Peak age group affected was 6 to 12 years old children. Lower limbs were commonly bitten. 65% of children arrived in the hospital between 6 and 24 hours after the bite. Pain and swelling at the site of bite were the most common symptom of envenomation. 80% of envenomation was found to be hematotoxic, 11% of envenomation was neurotoxic and 68% of children were successfully treated with 10 vials of ASV. There was only one death during the study period.
Conclusion: This study reiterates the need for a more rapid transport and administration of ASV in the transit period. Other important observations in the study are that the number of neurotoxic snake bites is only 9% and the presence of allergic reactions to ASV in 6% of children. The development of monovalent ASV specific to the snake species may be considered, which will be associated with less anaphylaxis and more effective neutralisation of venom.

Keywords: Anti snake venom, Snake envenomation, Pediatric intensive care unit

INTRODUCTION

Total number of snake bites in the world annually is around 500,000 with approximately forty thousand to one lakh deaths as reported by various authors.[1-3] The incidence is relatively higher in tropical countries than in developed countries.[4]

Snake envenomation is a well-known cause of morbidity and mortality in rural India. The Government of India's Central Bureau of Health Intelligence reported about 985 snake bite deaths in 2010.[5] Its incidence is grossly underestimated in India because of lack of data. Since the disease is of tropical nature, there has been paucity of literature and research. In the year 2009, WHO finally included snake bite in the list of neglected diseases.[6] Snake bites are particularly common among agriculture workers and children in rural India. Providing Anti Snake Venom (ASV) is a specific life saving measure. WHO has estimated that annually 10 million anti venom vials are needed globally.

But the global production is far below the need. The prevention of mortality after snake envenomation largely depends on the availability of ASV. WHO has been giving guidelines for the member countries to improve

management and avoid deaths due to snake bites. In spite of wide spread availability of Poly Valent Anti Snake Venom, the deaths due to envenomation could not be completely avoided.

METHODS

This study was conducted in children admitted to the Pediatric Intensive Care Unit (PICU) of government Dharmapuri Medical College Hospital, Dharmapuri, Tamilnadu, India which is a tertiary referral hospital in the state of Tamilnadu, India.

The study period was from January'2015 to December'2015. Children with snake envenomation admitted during the study period formed the study group. Institutional ethical committee clearance was obtained.

The Inclusion criteria were children with definitive history of snake bite and children with doubtful history of snake bite but with signs of envenomation. Exclusion criteria were children with non-snake bites and children with doubtful history of snake bite but without signs of envenomation. A careful history was obtained. Vital signs were recorded. Local examination for fang marks, cellulitis and bleeding was done. A detailed systemic examination was done with special attention to the usual signs of envenomation like Ptosis and Tachycardia was done.

Routine investigations like Complete Blood Counts, blood urea, serum creatinine and urine examination were performed. For all the patients 20 minute Whole Blood Clotting Time (WBCT) was performed as per WHO protocol. Other investigations like ECG, X-rays, etc. were done if found necessary.

Initial dose of 10 vials of ASV was administered after a test dose as per WHO protocol. The children were continuously monitored for development of any allergic reactions.

Six hours later WBCT was repeated and if found abnormal again another 10 vials was given. For Neuroparalysis cases, Injections of Neostigmine and Atropine were also given. Ventilatory care, blood transfusion and dialysis were provided to children when indicated. Local cellulitis was treated with anti-inflammatory agents, antibiotics and with surgical management.

RESULTS

During the study period number of admissions in the PICU was 2223. There were 46 children with snake bite admitted during the study period. There was a significant male preponderance with a Male: Female ratio of 2.57:1. The peak age group to be affected with snake envenomation was 6 to 12 years old children. The peak incidence of snake bite was between October and January. Lower limbs (68%) were the common site of snake bite in the study. During the study period there were no cases of snake bite in the head. About 65% of children with envenomation arrived at the hospital 6 to 12 hours after the snake bite.

Table 1: Clinical profile of snake bite.

Characteristics	No. of patients	Percentage
Sex distribution		
Male	33	72
Female	13	28
Age distribution		
0-12 months	1	2
1-5 years	12	26
6-12 years	33	72
Seasonal distribution		
Feb-may	16	35
Jun-sep	12	26
Oct-jan	18	39
Site of bite		
Head	0	0
Upper limb	13	28
Trunk	2	4
Lower limb	31	68
Snake bite – admission interval		
<6 hours	14	30
6-24 hours	30	66
>24 hours	2	4
Presence of envenomation		
Present	42	91
Absent(non-poisonous)	4	9
Symptom distribution		
Pain and swelling	40	87
Ptosis	5	11
Vomiting	20	43
Respiratory distress	18	39
Altered sensorium	4	9
Bleeding	5	11
Pattern of envenomation		
Hematotoxic	37	80
Neurotoxic	5	11
Cardiotoxic	0	0
Non poisonous	4	9
No. of vials of anti-snake venom used		
10 vials	36	78
20 vials	5	11
30 vials	1	2
Outcome		
Discharged	43	94
Lama	2	4
Died	1	2

Two children were referred from other hospitals after 24 hours of bite for tertiary care. In about 91% of children with snake bite, there were signs of envenomation. While

in 9% cases there was no sign of envenomation. Pain and swelling at the site of bite was the commonest symptom of snake bite which was present in 87% of cases. Vomiting and respiratory distress were the other common symptoms. Ptosis was seen in 5 children with neurotoxic signs.

Table2: Complications and duration of stay.

Complications		
Cellulitis	30	65
DIVC	2	4
Neuroparalysis	5	11
ATN	2	4
Respiratory failure	1	2
Hemodynamic instability	1	2
Reaction to anti venom	3	6
Duration of stay		
<3 days	8	17
4-7 days	34	74
>8 days	4	9

About 80% of cases had hemotoxic and 11% had neurotoxic type of envenomation. There was no cardiotoxic type observed during the study period. In 78% of cases envenomation was successfully treated with 10 vials of ASV. Only one case required 30 vials of ASV. Cellulitis (65%) was the most common complication observed.

Other complications observed were Disseminated Intra Vascular Coagulation (DIVC), Acute Tubular Necrosis (ATN) and Shock. Three cases (6%) developed allergic reactions to ASV and they were treated as per WHO protocol. 74% of children were discharged between 4 to 7 days of admission. Only 9% of children stayed in the hospital for more than 8 days. 94% of children were successfully discharged after treatment. There was one death observed during the study period and the cause of death was Acute Tubular Necrosis/Acute Kidney Injury/Uremia.

DISCUSSION

During the study period there were 2223 children admitted in the PICU, among which there were 46 cases of snake bite. Thus snake bites constitute about 2.06% of admissions to PICU. There was higher incidence in boys in this study. A similar trend was also observed in a study by Lingayat AM et al and various other studies.[7-10]

Children between 6 and 12 years were most affected in the study period. There were similar trends noted by many other researchers.[11] This could be due to the fact that boys play and indulge in more outdoor activities than the girls. In the present study October-January witnessed more number of cases of snake envenomation. In a study by Varhala AM et al, the peak incidence was in the month of July.[12]

About 68% of snake bites were in the lower limbs. In a study by Varhala AM et al the incidence of lower limb snake bites was 53.5%. In the present study about 65% of children with snake bite arrived at the hospital between 6 and 12 hours. This is in contrast to many studies where the mean arrival time is very less.[12]

This may be due to the fact that the study hospital is a rural medical college hospital catering to mainly remote and hilly areas in the state.

About 91% of snake bites in the study were due to poisonous snakes. In a study by Gupta BD et al, only 78% of snake bites were poisonous.[13] In the study period pain and swelling at the site of bite and vomiting were the most common symptoms. A similar trend was also reported by many researchers. The incidence of ptosis was also similar to other studies. With regard to type of envenomation, hemotoxicity was significantly common than neurotoxicity. About 9% of envenomation is of neurotoxic type in the present study.

Many researchers reported a larger number of neurotoxicity in their studies.[7] India being a diverse country, the distribution of poisonous snakes varies from place to place. Hence the toxicology of snake envenomation is also diverse. About 78% of children were successfully treated with 10 vials of ASV. Only 1 child needed 30 vials of ASV. Many studies demonstrated higher need for ASV than the present study.[12]

This is due to the fact that the number of neurotoxic envenomation is very less in the present study. There was only one death observed in the study period. Many studies reported larger number of deaths than the present study, which could be attributed mainly to the larger number of neurotoxic envenomation in their studies.[14-16] Cellulits and gangrene at the site of bite and neuro paralysis were the most common complications seen in the study group. A similar trend was seen in many other studies.[7,12]

CONCLUSION

As WHO has stated the snake bite remains as a neglected disease. Various measures have to be taken to avoid snake bite especially in children. The important observation in the present study is the time taken for a snake bite victim to reach the health care facility which is more than 6 hours in about 65% of children. Thus there is a need for a more rapid transport and administration of ASV in the transit period, both of which needs further evaluation. Other important observations in the study are that the number of neurotoxic snake bites is only 9% and the presence of allergic reactions to ASV in 6% of children. Hence the development of monovalent ASV specific to the snake species may be considered, which will be associated with less anaphylaxis and more effective neutralisation of venom.

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