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Original Research Article

Clinical profile and outcome of snake bite in children

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ABSTRACT

Background: Snake bite is generally considered to be a rural problem and has been linked with environmental and occupational condition is a neglected public health problem. This study was conducted to ascertain clinical profile, complication and outcome of snake bite in pediatric population.
Methods: Retrospective observational study was done in paediatrics wards and Paediatric Intensive care unit of tertiary care institute. A medical record files of 80 patients of snakebite, between the periods of January 2011 to February 2016 were recovered from Medical Record and Statistics Section of Institute. Files were analyzed for demographic data; variables included site of bite, time of bite, type of primary treatment and treatment provider, and type of snake poison, common symptoms suggestive of hematotoxicity, myotoxicity and neurotoxicity.
Results: Out of total 80 patients, 58.75% were male and most of snake bites were seen in age group of 6-12 years. Clinically 57.5% patients were presented with signs and symptoms of envenomation and most of them were bitten during the months of June to September. All bites were nonprovocative and in 57.5% lower limb was the commonest site of bite. A 77.5% patient were primarily treated by medical personnel, 56.25% patients were received treatment within 1 hour of bite and hospitalized within 6 hours of bite. Coagulation failure was commonest complication (58.33%) followed by hypotension (25%) in vasculotoxic snake bite and respiratory paralysis (68.18%) in neuroparalytic bites. Renal replacement therapy was required in 5%, blood/blood product transfusion in 11% patients and case fatality rate was 11.25%.
Conclusions: The most vulnerable to snake bites are boys aged more than 5 years. There is an urgent need to spread awareness among the community for avoidance of traditional treatment and any delay in medical intervention in snakebite incidents.

Keywords: Neglected public health problem**,** Snake envenomation, Snake bite

INTRODUCTION

In any language of the world, snake produces unimaginable fear and anxiety. They are curious creatures of nature and have countless superstitions about them. Snakes are found all over the world except in Arctic, New Zealand and Ireland, and are more commonly distributed in temperate and tropical countries.[1] Snakes are most likely to bite human being when they feel threatened, startled or provoked, and/or have no means of escape when cornered. There are about 52 species are known to be poisons out of total 216 species of snakes that are identifiable in India. The major families of poisonous snakes in India are Elapidae which includes common cobra (Najanaja), king cobra and common krait (bungaruscaerulus), viperidae includes Russell's viper, echiscarinatus (saw scaled or carpet viper) and pit viper and hydrophidae (sea snakes).[2] In Maharashtra, common poisonous snakes are cobra, russell viper, saw scaled viper and krait.

Snake bite is generally considered to be a rural problem and has been linked with environmental and occupational condition, is a neglected public health problem. Due to

long period of electric load shedding in villages which leaving them in darkness, snake bite cases have shoot up sharply. According to a new analysis, snake bite is a recent inclusion to the list of neglected tropical diseases by WHO.[3] In worldwide, snake bites are seen more frequently in South East Asia and Africa. In Africa the incidence of snake bite varies from 300-500 bites per lakh population in forested region to 50-100 bites per lakh in dry Savannah and the Sahara.[4] In Pakistan, 40 thousand and in Sri Lanka around 33 thousand cases of snake bites are reported annually. India has the highest number of deaths due to snake bites in the world.[5-7]

Snake bite is most common in school age children, adolescent and young adults. Snake bite is most common accounting morbidity and mortality in rural set up because they chose traditional therapy from tantriks, vaidyas and ojhas rather than medical facility. As a result, in rural set up, snake bite is an important medical emergency and important cause of admission. So, this retrospective descriptive study was carried out to ascertain clinical profile, complication and outcome of snake bite in pediatric population.

METHODS

This series of snake bite cases were retrospectively studied at one of the largest tertiary care & referral hospital that provide care to underprivileged, socioeconomically deprived population of central India from January 2011 to August 2016. As required by the government of Maharashtra, all snake bites are classified as medico-legal cases, whose records were kept separately in medical record section. After retrievening the registration number, the medical records were obtained from the medical case files from the Medical Record Section and Statistical Service of the institute. Information collected to conform to a pre-established protocol after approval from institutional ethical committee. We reviewed all the relevant data needed for our analysis. Besides demographic data, the analyzed variables included site of bite, time of bite, type of primary treatment and treatment provider, type of snake poison, whether cases had been directly admitted to this hospital or referred from other health centers, time interval between snake bite, common symptoms suggestive of hematotoxicity, myotoxicity and neurotoxicity, local symptoms including fang marks, condition of wound and initiation of treatment.

Cases where the patients were discharged against medical advised were excluded. Cases of unknown bites in the absence of fang marks or any other symptoms not suggestive of venomous snake bites were also excluded.

A detailed systemic and local examination was carried out in all patients. Routine and specific investigations were done, these includes complete hemogram, platelet count, peripheral smear, renal function test, liver function test, urine examination (protein, blood, hemoglobin, myoglobulin), BT, CT. Specific investigation includes serum electrolytes, prothrombin time, activated prothrombin time and electrocardiogram in some patients.

All patients were treated as per WHO protocol.[6] Neostigmine along with atropine was administered to patients with neuroparalysis till reversal of neurotoxic manifestation. All patients were studied for complication during hospital stay. Blood/platelet transfusion, ventilatory support and dialysis were carried out as and when indicated. Patients developing severe cellulitis received appropriate antibiotics and anti-inflammatory agents. The data regarding the numerical variable were summarized through average, median and deviation pattern. Comparisons of categorical data were carried out using Pearson's Chi Square or Fisher's exact test where appropriate. A P value of less than 0.05 was taken as statistical significant

RESULTS

In this series, total of 80 patients were registered for the study. Amongst them, 47 (58.75%) were male and 33(41.25%) females. Most of the bites were seen in children of age group of 6-12 years and youngest one of 9 months, mean age was 7.09±2.93 years. Fifty-two (65%) patients were from rural area and from lower socioeconomic class. In 16.25% patients, toilets facilities were not available and 48.75% were from areas facing problem of night time electric load shedding (Table 1).

Table 1: Demographic profile of snake bite patients.

Variables	N=80	Percentage
Age in years		
0-1	03	3.75
1-3	09	11.25
3-6	15	18.75
6-12	53	66.25
Sex		
Male	47	58.75
Female	33	41.25
Residence		
Urban	28	35
Rural	52	65
Socioeconomic Status		
Upper	01	1.25
Middle	28	35
Lower	51	63.75
Toilet facility		
Yes	67	83.75
Electric load shedding		
Yes	39	48.75

As per the parents observation and description, 36 snake bites were due to poisonous snake,18 of nonpoisonous and in 26 patients snake was not observed but fang marks

were present in all cases. Clinically 46 (57.5%) patients were presented with signs and symptoms of envenomation. Forty-four (55%) patients were bitten during the months of June to September when the most of bites have occurred (Figure 1).

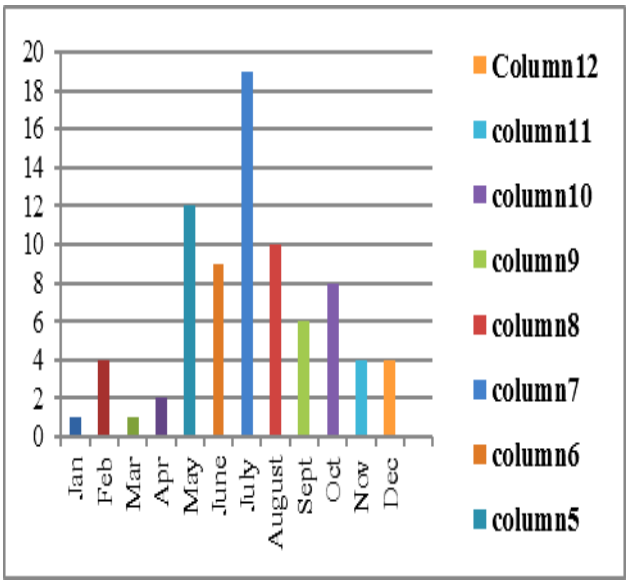

Figure 1: Month wise distribution of snake bite patients.

All bites were nonprovocative and in 57.5% in night times. Lower limb 46(57.5%) was the commonest site of bites followed by upper limb but unusual site like head and trunk was not observed in our study. A 77.5% patient were primarily treated by medical personnel, 56.25% patients were received treatment within 1 hour of bite and hospitalized within 6 hours of bite. A 38.75% patient received Antisnake venom and 90% tetanus Toxoid as a primary treatment. There was various mode of clinical presentation of patients suggestive of either vasculotoxic or neuroparalytic nature of bite (Table 2). Local edema and cellulitis was observed in 38.75% patients. Bleeding from local sites, hematuria was present in vasculotoxic bites. Among the neuroparalytic bites, 10 (45.45% patients were admitted with altered consciousness, 7 (31.82%) and 5 (22.73%) patients developed diplopia and ptosis in 8 hours of bites respectively and 15 (68.18%) patients developed respiratory failures for which ventilatory support was provided.

Coagulation failure was commonest complication (58.33%) followed by hypotension (25%) in vasculotoxic snake bite and respiratory paralysis (68.18%) in neuroparalytic bites. (Table 3) Renal replacement therapy was required in 5(%) and blood/blood product transfusion in11 (%) patients. In our study, 9 deaths with case fatality rate of (11.25%), which occurred in subjects who reported to hospital more than 6 hours after bite and was primarily treated by Quack and other persons and most of cases died within 10 hours hospitalization.

Table 2: Clinical profile of patients with snake bite.

Variables	Patients	Percent
Time of bite		
Day	34 (n=80)	42.5
Night	46 (n=80)	57.5
Site of bite		
Upper limb	34 (n=80)	42.5
Lower limb	46 (n=80)	57.5
Type of bite		
Nonprovocative	80 (n=80)	100
Primary treatment provider		
Medical person	62 (n=80)	77.5
Paramedical staff	15 (n=80)	18.75
Quack/tantric	03 (n=80)	3.75
Type of primary treatment		
Tourniquet application	01 (n=80)	1.25
ASV	31 (n=80)	38.75
Tetanus Toxoid	72 (n=80)	90
Primary treatment <1hr of bite	45 (n=80)	56.25
Primary treatment >1hr of bite	35 (n=80)	43.75
Admission <6Hrs of bite	52 (n=80)	65
Admission >6Hrs of bite	28 (n=80)	35
Local edema	31 (n=80)	38.75
Pain	35 (n=80)	43.75
Diplopia	7 (n=22)	31.82
Altered consciousness	10 (n=22)	45.45
Ptosis	5 (n=22)	22.73
Respiratory distress	15 (n=22)	68.18
Local site bleeding	10 (n=24)	41.67
Hematuria	5 (n=24)	20.83

Table 3: Complication of snake bite envenomation.

Complication	N=80	Percent
Vasculotoxicity	24 (n=80)	30
Neuroparalysis	22 (n=80)	27.5
Cellulitis	31 (n=80)	38.75
Hypotension	06 (n=24)	25
Respiratory paralysis	15 (n=22)	68.18
Acute renal failure	5 (n=24)	20.83
Coagulation failure	14 (n=24)	58.33
Death	9 (n=80)	11.25

DISCUSSION

Snake bite is an environmental hazard and life threatening emergency associated with significant morbidity and mortality in children. In India, no reliable statistics are available. To remedy the deficiency in reliable snake bite data, it is strongly recommended that snake bites should be made a specific notifiable disease. We bring a result of retrospectively collected data on clinical profile of snake bites in children from central India.

The most vulnerable age group for snake bites includes children over 5 years of age because they are engaged in outdoor games and also older children in rural areas sharing the responsibilities of carrying out outdoor activities like grass cutting, cattle grazing, firewood collection. In this study, 66.25% of the total cases belong to age group 6-12 years. The youngest patient was 9 months old boy bitten at home. Similar types of age distribution were reported by Kumaravel KS et al, Chandrashekar C et al, Krishana VM et al.[9-11] Incidence was more in boys (58.75%) as compared to girls (41.25%), this is in accordance with other studies where high incidence is reported in male children which can be attributed to their behavior and nature to play more outdoor games.[12-14] In our study, 65% patients were from rural areas and most from lower socioeconomic status. In rural areas, most of the homes do not have toilet facility and recently curtailment of electricity at night as snakes are nocturnally active; incidence of snake bite is more in night times. We observed 57.5% snake bite in night times and all are nonprovocative. Most (55%) of snake bites in our study in month of June to September, as in heavy rain during monsoon, where the holes and burrows occupied by snakes and rats are filled with water and thus the snakes have no shelter. Similar types of observations were reported in previous studies.[1,15]

Snake bites are usually encountered in the lower limb, around the ankle due to accidental stampede while walking or playing in the dark. In this study, 46 (57.5%) of cases were bitten on the lower limb, 42.5% on upper limb. Similar observations are reported in Indian and world literature but unusual sites like head, trunk was not observed in present study.[2,8,9,16,17] In rural India, due to mentality of the people to seek treatment from quacks they present to the hospital late after the bite and because of lack of transport facility during night hours the primary centre is not approachable. In fact, time of transport and early antisnake venom administration improves the outcome of such patient.[18] In present study, 77.5% patient were primarily treated by medical personnel, 56.25% patients received treatment within 1 hour of bite and hospitalized within 6 hours of bite. A 38.75% patient received antisnake venom and 90% tetanus toxoid as a primary treatment, death of 9 patients in our study was due to delay in seeking primary treatment, these cases received treatment from unqualified person leading to delay in hospitalization.

Most of envenomous bites developed local and systemic complication. Vasculotoxic bites resulting into local edema, cellulitis and bleeding from local site were observed. Coagulation failure (58.33%), hypotension (25%), acute renal failure (20.83%) and these patient required blood/blood product transfusion and renal support. Among neurotoxic bite, pain at local site (43.75%, altered consciousness (45.45%) and respiratory failure (68.18%), ptosis (22.73%), diplopia (31.82%) were noted. Similar types of complications were reported by Gautam P et al, Adhisivam B et al.[19,20] Amongst 9 deaths in present study, 6 were vasculotoxic bite and 3 neurotoxic. All patients were hospitalized after 6 hrs of bite and received primary treatment from paramedical or quack.

CONCLUSION

We conclude that the most vulnerable to snake bites are boys aged more than 5 years. Mortality after snake bite is preventable if the victim receives timely treatment. Delay in seeking medical aid and ignorance among primary care physicians about the correct treatment of snake bite is also responsible for the morbidity and mortality. There is an urgent need to spread awareness among the community for avoidance of traditional treatment and any delay in medical intervention in snakebite incidents.

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REFERENCES

1. Inamdar IF, Aswar NR, Ubaidulla M, Dalavi SD. Snake bite: Admissions at a tertiary health care centre in Maharashtra, India. S Afr Med J. 2010;100(7):456-8.
2. Kshisagar VY, Ahmed M, Colaco SM. Clinical profile of snake bite in children in rural India. Iran J Pediatr. 2013;23(6):632-6.
3. Savioli L. Neglected Tropical Diseases. Available from: http://www.who.int/neglected_disease/Savioli_presentation.pdf?ua=1
4. Chaudhary S, Singh S, Chaudhary N, Mahato SK. Sanke bite in Nepal. J University College Med Sci. 2014;2(3):45-53.
5. Kasturirantne A, Wickremasinghe AR, Silva N, Gunawardena NK, Pathmeswaran A. The global burden of snake bite: a literature analysis and modeling based on regional estimates of envenoming and deaths. PloS Med. 2008;5(11):218.
6. Warrell DA. Epidemiology of snake bite in South East Asia Region. In: Warrel DA(ed) Guidelines for management of snake bite. New Delhi: WHO regional office for South Asia. 2010;1:135.
7. Chippaux JP. Snake bites: appraisal of the global situation. Bull World Health Organ. 1998;76(5):515-24.
8. Kumaravel KS, Ganesh J. A study on the clinical profile of children with snake envenomation in a tertiary referral centre at Dharmapuri, Tamilnadu, India. Int J Res Med Sci. 2016;4(6):2142-5.
9. Chandrashekar C, Shariff MA, Gopal K, Ravichander B. Clinical profile of snakebite in children. J Evidence Based Medi Healthcare. 2015;2(29):4176-84.
10. Krishana VM, Sheikh NA, Soren C. Clinical profile and outcome of snake bite envenomation in

children: a retrospective study in a tertiary care centre KIMS Narketpally. Int J Information Res Rev. 2014;1(11):155-8.
11. Sani UM, Jiya NM, Ibitoye PK, Ahmad MM. Presentation and outcome of snake bite among children in Sokoto. North-western Nigeria. Sahel Med J. 2013;16(4):148-53.
12. Reddy MP, Sudharshan RC. Clinical, epidemiological and hematological profile of snake bite in children in rural teaching hospital. Int J Health Sci Res. 2015;5(7):58-63.
13. Lingayat AM, Wankhade PR. Study of clinical profile complications and outcome in patients of snake bite in pediatric age group. Int J Healthcare Biomed Res. 2015;3(3):203-8.
14. Digra S, Singh V. A clinical profile of neurotoxic snakebite in pediatric population of Jammu region. JK Sci. 2016;18(2):67-70.
15. Chew KS, Khor HW, Ahmad R, Rahman H. A five year retrospective review of snakebite patients admitted to a tertiary university hospital in Malaysia. Int J Emerg Med. 2011;4:41.
16. Wang JD, Tsan YT, Chiao M, Wang LM. Venomous snakebites and antivenom treatment according to a protocol for pediatric patients in Taiwan. J Venom Anim Toxins Incl Trop Dis. 2009;15(4):667-79.
17. Paudel KM, Poudyl VP, Rayamajhi RB, Budhathoki SS. Clinico-epidemiological profile and outcome of poisonous snake bites in children using the WHO treatment protocol in western Nepal. J Nobel Medical College. 2016;4(7):21-5.
18. Chinchorlikar SV, Patniak B, Raje S. Awareness of snake bite and its first aid management in rural areas of Maharashtra. Indian J Community Health. 2014;26(3):311-5.
19. Gautam P, Sharma N, Sharma M, Choudhary S. Clinical and demographic profile of snake envenomation in Himachal Pradesh, India. Indian Pediatr. 2014;51(15):934-5.
20. Adhisivam B, Mahadevan S. Snakebite envenomation in India: a rural medical emergency. Indian Pediatr. 2006;43:553-4.

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