

Original Research Article

Clinical Profile and Outcome Of Snake Bite in Pediatric Population in A Rural Tertiary Care Center, Aims, Mandya, Karnataka,India**Madhunandan K¹, Chandan CK², Sunil Kumar P^{3*}, Shreyas V⁴**¹*Assistant Professor, Department of Pediatrics, Adichunchanagiri Institute of Medical Science, Mandya, Karnataka,India*²*Assistant Professor, Department of Pediatrics, SIMS & RH, Sira Road, Tumkur, Karnataka,India*³*Professor, Department of Pediatrics, Adichunchanagiri Institute of Medical Science, Mandya, Karnataka,India*⁴*Junior Resident, Department of Pediatrics, Adichunchanagiri Institute of Medical Science, Mandya, Karnataka, India*

Received: 22-05-2021 / Revised: 22-06-2021 / Accepted:31-07-2021

Abstract

Background & Objectives: Cobra (Najanaja), Russell's viper (Daboia russelii), Saw-scaled viper (Echiscarinatus), and Common krait (Bungarus caeruleus), they are popularly known as "Big four" are highly venomous and responsible for most of the poisonous bites in India. Snakes are most likely to bite human being when they feel threatened, startled or provoked, and/or have no means of escape when cornered. The peak age for Snake bite is school age children, adolescent and young adults and peak fatality rate is in young children and the elderly. This retrospective descriptive study was carried out to ascertain clinical profile and outcome of snake bite in pediatric population. **Material & Methods:** This is a retrospective observational study done from January 2018- December 2020, in Adichunchanagiri Institute of Medical Sciences, Mandya, Karnataka,India involving childhood snake bite. Data was noted on a pre-designed proforma, it was compiled and entered in MS Excel spread sheet; descriptive statistics was applied. **Results:** There were 36 children who were enrolled in the study. Out of which 25 (69.4%) were males and 11(30.6%) were females. Most commonly affected age group was between 14-18 years i.e. 13 cases (36.1%). Most of the children experienced bite in night time i.e. 31 children (86.1%) and lower limb was most common site i.e. 32 children (88.9%). Viper was most common snake we encountered in our study i.e. 20 cases (55.5%), which was followed by non-poisonous snakes i.e. 13 cases (36.1%). 2 cases (5.5%) were krait and 1 (2.8%) was cobra. Among local signs and symptoms fang mark was seen in majority of cases i.e. 32 children (88.9%), which was followed by bite site pain, was seen in 23 cases (63.9%). Among systemic signs and symptoms majority of the cases had deranged coagulation profile i.e. 11 cases (30.6%). Cellulitis was the most common complication seen in 12 cases (33.3%). Out of 36 cases, 35 (97.2%) cases improved and 1 (2.8%) case got succumbed. **Conclusion:** Snake bite remains a major health problem in children causing significant morbidity and mortality. Community education, early presentation to hospital and high index of suspicion will reduce the mortality from Snake bite.

Keywords: Snake bite, Anti-snake venom, Viper, Cobra, Krait.

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Introduction

Snakes are legless, cold blooded reptiles found every part of the world except the Arctic, New Zealand, and Ireland.[1] It has been estimated that 5 million snake bite cases occur worldwide every year, causing about 100,000 deaths.[2] India is reported to have the maximum snake bites (81,000) and deaths (11,000) per annum.[3] India has around 216 species of snakes out of which 52 are poisonous.[4] Cobra (Najanaja), Russell's viper (Daboia russelii), Saw-scaled viper (Echiscarinatus) and Common krait (Bungarus caeruleus), they are popularly known as "Big four" are highly venomous and responsible for most of the poisonous bites in India.[5] Envenomation by Viperidae results in hematological disturbances like hemorrhage from various sites including recent wound and fang marks. They also induce prominent local signs (edema, blistering and necrosis), cardiovascular shock and acute

renal failure. Neurological involvement like increase salivation, ptosis, respiratory and generalized paralysis are seen with Elapidae bite. [6] Snakes are most likely to bite human being when they feel threatened, startled or provoked, and/or have no means of escape when cornered. The peak age for Snake bite is school age children, adolescent and young adults and peak fatality rate is in young children and the elderly. Children and young adults are the factors associated with severe envenomation as large amount of venom relative to body surface area.[7] This retrospective descriptive study was carried out to ascertain clinical profile and outcome of snake bite in pediatric population.

Materials and Methods

This is a retrospective study conducted at Adichunchanagiri Institute of Medical Sciences (AIMS), which is a tertiary care teaching hospital, situated in rural area of Mandya district, Karnataka,India. The study involved review of cases of snake bite in Pediatric age group (0-18 years) during the period January 2018 to December 2020. Data for the study was collected from inpatient case sheets.

Inclusion criteria

Any case with history of snake bite or clinical symptoms and signs suggestive of snake bite were included in the study.

Exclusion criteria

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History of unknown bite in the absence of fang marks or symptoms not suggestive of snake bites were excluded.

We studied the clinical presentation, treatment methods, and outcome of pediatric patients who met the inclusion criteria. Data regarding age, sex, place, type of snake, time of snake bite, intent, time of presentation to hospital, symptoms and signs, investigations, diagnostic and therapeutic interventions, and outcome were noted on a predesigned proforma. Data thus obtained was compiled and entered in MS Excel spread sheet; descriptive statistics was applied, cross tables were constructed, data was expressed in terms of frequency and percentage.

Results

There were 36 children who were included in the study. Out of which 25 (69.4%) were males and 11(30.6%) were females. Most commonly affected age group was between 14-18 years i.e. 13 cases (36.1%). Majority of the bites occurred in outdoor areas i.e. 29 cases (80.6%). Among outdoor areas most common area of bite was in fields i.e. 11 cases (30.6%). Most of the children experienced bite while they were playing i.e. 13 children (36.1%) and running/walking i.e. 12 children (33.3%).

Table 1: Demographic profile of Snake bite

Variables	N=36	Percentage
Gender		
Male	25	69.4
Female	11	30.6
Age		
1-4 Years	4	11.1
5-10 Years	10	27.8
10-14 Years	9	25
14-18 Years	13	36.1
Place of bite		
Outdoor	29	80.6
Indoor	7	19.4
Outdoor bite areas (n=29)		
Field	11	30.6
Outside the house in close vicinity	9	25
Road & pavement	7	19.4
School	2	5.5
Activity at the time of bite		
Playing	13	36.1
Walking or running	12	33.3
Sleeping	5	13.9
Moving bricks / object	5	13.9
House work	1	2.8

In our study most of the children experienced bite in night time i.e. 31 children (86.1%) and lower limb was most common site i.e. 32 children (88.9%). Viper was most common snake we encountered in our study i.e. 20 cases (55.5%), which was followed by non-poisonous snakes i.e. 13 cases (36.1%). 2 cases (5.5%) were krait and

1 (2.8%) was cobra. Majority of cases, 31 cases (81.1%) did not receive first aid treatment. 5 (13.9%) children had got tourniquet applied, 4 (11.1%) children with limb immobilisation and 1 (2.8%) child had got local herb application.

Table 2: Nature of bite and first aid

Variables	N=36	Percentage
Time of bite		
Night	31	86.1
Day	5	13.9
Site of bite		
Lower Limb	32	88.9
Upper Limb	4	11.1
Type of snake		
Viper	20	55.5
Non poisonous	13	36.1
Krait	2	5.5
Cobra	1	2.8
First aid treatment		
Not received	31	81.1
Received	5	13.9
Type of first aid treatment (n=5)		
Tourniquet	5	13.9
Limb immobilization	4	11.1
Local herb application	1	2.8

Among local signs and symptoms fang mark was seen in 32 children (88.9%), bite site pain was seen in 23 cases (63.9%), 19 cases (52.8%) had developed swelling, bleeding was seen in 9 cases (25%), 7 cases (19.4%) developed blisters and itching in 2 cases (5.5%). 6 children (16.6%) did not have any local signs. Among systemic signs and symptoms majority of the cases had deranged coagulation profile

i.e. 11 cases (30.6%). Vomiting was seen in 7 cases (19.4%), pain abdomen in 6 cases (16.6%), ptosis, diplopia, muscle paralysis was seen in 3 cases (8.3%). Cellulitis was the most common complication seen in 12 cases (33.3%), which was followed by coagulopathy in 11 cases (30.6%), 6 cases (16.6%) had reaction to anti snake venom (ASV).

Table 3: Clinical features of snakebite

Variables	N=36	Percentage
Local signs/ symptoms		
Fang mark	32	88.9
Pain/ Tenderness	23	63.9
Swelling	19	52.8
Bleeding	9	25
Blister	7	19.4
No local signs	6	16.6
Itching	2	5.5
Systemic signs / symptoms		
Prolonged whole blood clotting time	11	30.6
Vomiting	7	19.4
Pain abdomen	6	16.6
Fever	4	11.1
Ptosis	3	8.3
Diplopia	3	8.3
Limb Paralysis	3	8.3
Altered sensorium	2	5.5
Hematuria	1	2.8
Complications		
Cellulitis	12	33.3
Coagulopathy	11	30.6
Acute kidney injury	3	8.3
Respiratory paralysis	2	5.5
Reaction to ASV	6	16.6
Death	1	2.8

23 cases (63.9%) received anti snake venom, 29 cases (80.5%) received tetanus toxoid, wound debridement was done in 12 cases

(33.3%), 2 cases required ventilator support. Out of 36 cases, 35 (97.2%) cases improved and 1 (2.8%) case got succumbed.

Table 4: Treatment and outcome of the snakebite

Variables	N=36	Percentage
Treatment received		
Anti-Snake Venom	23	63.9
Tetanus Toxoid	29	80.5
Wound care	19	52.8
Debridement	12	33.3
Atropine and Neostigmine	3	8.3
Ventilation	2	5.5
Outcome		
Improved	35	97.2
Death	1	2.8

Discussion

Male children were most commonly affected 25 cases (69.4%) this could be because male children spend more time outdoors, similar results were seen in study done by Hanumanna AK et al, Kshirsagar VY et al and Krishna VM et al.[8-10] Saborio P et al found that there was no gender difference in snake bite.[11] Most bite 29 cases (80.6%) occurred outdoor, similar findings were seen in Hanumanna AK et al and Krishna VM et al.[8,10] Bites were more commonly occurred at night time i.e. 31 cases (86.1%), similar findings were seen in Bhusanpatnaik B et al, Pandala et al and Digra S et al.[12-14] Most common site of bite was lower limb as observed by Hanumanna AK et al, Kshirsagar VY et al and Sahni GS et al.[8,9,15] Bites were common while child was playing and walking as observed by Hanumanna AK et al and Kshirsagar VY et al.[8,9] In our study most common snake causing bite was vasculotoxic i.e. 20 cases (55.5%) similar to the study done by Pandala et al, Shyna et

al.[13,16] But other studies done by Sahni GS et al, Pal et al found that most common snake to cause bite was neurotoxic.[15,17] This explains the geographical distribution of snakes. Children who had signs of envenomation were administered anti snake venom i.e. 23 cases (63.9%), wound debridement was required for 12 cases (33.3%), ventilator requirement was there for 2 children (5.5%), both the ventilated children were neuro-paralytic snakes. In our study, 35 cases (97.2%) got improved and 1 case (2.8%) got succumbed, which was krait bite.

Conclusion

Snake bite remains a major health problem in children causing significant morbidity and mortality. Children are particularly vulnerable because of their active and explorative nature. Early diagnosis with a high index of suspicion (Krait bite), appropriate treatment, and close monitoring of children for the development of complications and its prompt management can reduce the mortality.

Community education, early presentation to hospital and high index of suspicion will reduce the mortality from Snake bite.

References

- Mulay DV, Kulkarni VA, Kulkarni SG, Kulkarni ND, Jaju RB. Clinical profile of Snakebites at SRTR Medical College Hospital, Ambajogai (Maharashtra). *Indian Med Gaz.* 1986;131:363-6.
- Kasturiratne A, Wickremasinghe AR, de Silva N, Gunawardena NK, Pathmeswaran A, Premaratna R et al. The global burden of snakebite: A literature analysis and modelling based on regional estimates of envenoming and deaths. *PLoS Med.* 2008;5(11):e218.
- David AW. Guidelines for the Clinical Management of Snake-Bites in the South-East Asia Region. New Delhi: World Health Organization, Regional Office for South East Asia, 2005, 1-67p.
- Sundaram MS, Parameswari G, Michael A, Ramalingam S. Neutralization of the pharmacological effects of Cobra and Krait venoms by chicken egg yolk antibodies. *Toxicon.* 2008; 52:221-7.
- Simpson ID, Norris RL. Snakes of medical importance in India: Is the concept of the "Big 4" still relevant and useful? *Wilderness Environ Med.* 2007;18(1):2-9.
- Shah KB, Shrestha JM, Thapa CL. Snake Bite Management Guideline. In: Department of Health Services EaDCDaZCS-S, editor. 1st ed, 2003, 1-32p.
- Habib AG. Public health aspects of snakebite care in West Africa: perspectives from Nigeria. *J Venom Anim Toxins Incl Trop Dis.* 2013;19(1):27.
- Hanumanna AK, Kariyappa M, Vinutha GN. Clinico-epidemiological profile of snake bite in children in a tertiary care centre: a hospital based study. *Int J ContempPediatr.* 2018;5:124-8.
- Kshirsagar VY, Ahmed M, Colaco SM. Clinical profile of snake bite in children in rural India. *Iranian J Pediatr.* 2013; 23(6):632-6.
- Krishna VM. Clinical profile and outcome of snakebite envenomation in children: a retrospective study in a tertiary care centre kimsnarkeppally. *Int J Information Res Rev.* 2014;1 (11): 155-8.
- Saborio P, Gonzalez M, Cambronero M. Snakebite accidents in children in Costa Rica: epidemiology and determination of risk factors in development of abscess and necrosis (Spanish). *Toxicon.* 1998; 36(2):359-66.
- Bhusanpatnaik B, Varma CD, Sujatha NV, Satyasree TJ, Sreya A, Priyanka V. Clinical profile and outcome of snake bite in children. *Int J Pediatr Res.* 2019;6(03):107-112.
- Pandala P, Thota U, Gangadhari S, Kotha R, Naik BN. Clinical profile and outcome of snakebite in children at tertiary care centre in Hyderabad, India: a hospital based prospective observational study. *International Journal of Health and Clinical Research.* 2020; 3(4):5-12.
- Digra S, Singh V. A clinical profile of neurotoxic snakebite in pediatric population of Jammu region. *JK Sci.* 2016;18(2):67-70.
- Sahni GS. Clinico-epidemiological profile of snake bite in children - A descriptive study. *Indian J Child Health.* 2017; 4(4): 503-6.
- Shyna K, Sudhakaran K, Mohammed M. A clinical profile of poisonous Snakebite in children of North Kerala, India. *International Journal of Contemporary Pediatrics.* 2018;5(2) :310-3.
- Amitabha Pal. Clinical Profile and outcome of Snakebite in patients attending a tertiary care hospital in Bankura, West Bengal. *IOSR Journal of Dental and Medical Sciences.* 2018;17(10):3439.

Conflict of Interest: Nil

Source of support: Nil