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Epidemiology, Clinical Profile and Outcome of Snakebite in Paediatric age group in a Tertiary Care Hospital in North India

Dr. Mohammad Irfan Dar, Dr. Ravi Kumar Parihar, Dr. Vidushi Bhat, Dr. G.S Saini
Department of Pediatrics Government Medical College Jammu, Jammu and Kashmir, India

***Corresponding Author:**
Dr. Mohammad Irfan Dar
Department of Pediatrics Government Medical College Jammu, Jammu and Kashmir, India

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Abstract

Background: Snakebites are one of the most common medical emergencies in rural areas of world. Bites can cause medical emergencies involving shock, paralysis, hemorrhage, acute kidney injury and severe local tissue destruction that can prove fatal or lead to permanent disability if left untreated.

Materials and methods: A retrospective hospital-based study was done in a paediatric tertiary care centre, Jammu, from May 2020 to April 2021, to ascertain the epidemiology, clinical profile and outcome of snakebite in pediatric age group.

Results: A total of 49 victims of snakebite were included in the study. Mean age of victims was 11.5 years. Most of the victims were bitten during months of June to August, in the evening and most frequently bitten site was the lower extremity. Eighty five percent snake bite victims were from the rural background. Only 50 % of the snake bite victims could come to the hospital within six hours of the bite. Eighteen percent of cases were non-venomous and 82 % were venomous. Neurotoxicity was seen in 32% cases and the Haemotoxicity was attributable to viper bites in 42% cases. Local pain and abdominal pain were chief symptoms seen in hemotoxic snake bites while ptosis and difficulty in breathing were predominant symptoms seen in neurotoxic snake bite victims. Twenty six percent of all victims and 81 % of neurotoxic snake bite victims required assisted ventilation with mean duration of 64 hours. Only 38% of victims felt need of pediatric intensive care. The death rate in our study was 4%.

Conclusion: Snakebite mainly affects the rural males of developing countries. Availability of expertise healthcare personnel, antivenom at primary healthcare centers, and rapid transportation facilities may change the morbidity associated with snakebites.

Keywords: antivenom, envenomation, mechanical ventilation, respiratory paralysis, snakebite

Introduction

Snakebites are one of the most common medical emergencies in rural areas of world. Considering the morbidity and mortality associated with snakebite, WHO included it in the category of neglected tropical disease [1-3].

Bites can cause medical emergencies involving shock, paralysis, haemorrhage, acute kidney injury and severe local tissue destruction that can prove fatal or lead to permanent disability if left untreated [4].

This retrospective, descriptive study aimed to ascertain clinical and epidemiological profile and outcome of snakebites in paediatric age group.

Subjects And Methods:

This was a retrospective observational study conducted in the 200 bedded paediatric department of government medical college Jammu, India over a period of 1 year between April 2020 and March 2021

.All the patients who had presented either with alleged history of snake bite or were having clinical signs of snakebite envenomation were registered for the study. Eligible patients were identified after review of individual patient files from hospital medical records department. Demographic data was obtained. It included name, age, sex, district of residence, area (rural/urban). Data was also collected regarding timing of snake bite, time gap between bite and report in hospital, history of any treatment by nonmedical personnel. Treatment by nonmedical personnel included incision, suction, tourniquet, herbal remedies, any first aid received in nearest healthcare centre. Clinical data was then analysed which included site of bite, species identified or unidentified, provoked or unprovoked bite, symptoms. Data related to signs and symptoms was obtained and categorised into non-venomous and venomous bites. Snakebites with no signs or symptoms were categorised into non-venomous snakebites. Venomous bites were further divided into Local envenomation and systemic envenomation depending on site of symptoms and signs. Local envenomation consisted of pain, oedema, bruising, blistering, cellulitis, bleeding, gangrene, abscess formation and complications like compartment syndrome. Systemic envenomation was defined by the presence of neurological features or haemostatic dysfunction. Drowsiness, altered sensorium, seizures, paraesthesia, ptosis, external ophthalmoplegia, paralysis of facial muscles, difficulty in talking and swallowing, difficulty in breathing and generalised flaccid paralysis were manifestations of neurotoxicity. Haemotoxicity was defined as spontaneous systemic bleeding, prolonged bleeding from site of bite, venepuncture sites and coagulopathy. Coagulopathy was considered if there was deranged coagulogram or prolonged (>20 min) whole blood clotting time.

Data regarding treatment received was obtained. It included type and maximum dose of ASV received, complications, type and duration of any assisted ventilation, transfusion of any blood component, renal replacement therapy, surgical debridement, and drugs received their doses and duration, duration of hospital stay and outcome.

The presentation of the Categorical variables was done in the form of number and percentage (%). On the other hand, the quantitative data were presented as the means ± SD and as median with 25th and 75th percentiles (interquartile range).

The data entry was done in the Microsoft EXCEL spreadsheet and the final analysis was done with the use of Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, ver 21.0.

Results:

A total of 49 victims of snakebite were included in this study, who had reported to the hospital from May 2020 to April 2021. In this study sample, a majority of snake bite victims were aged between 3-18 years. The mean age of victims was 11.5 years (SD 4 years). Forty five percent (22) of victims were females and 55 % (27) were males.

The detailed demographic profiles of the snake bite victims have been presented in (table 1).

The peak incidence of snake bite was seen in the month of June (28%). Most of the victims in our study were bitten during the evening time (40.8%). The most frequently bitten site was the lower extremity (63%). A majority of the snake bite victims (85%) were from the rural areas, with a rural to urban ratio of 6:1.

Definitive fang marks were seen in 94.5% of the cases and in 10 cases, scratch marks were present at the site of the bite. Only 50 % (25) of the snake bite victims could come to the hospital within six hours of the bite.

First aid measures were employed in a 51 % (25) of the patients among which tourniquet application was seen in 12 % (6) victims, while the other 49 % victims did not receive any first aid treatment. Eighteen percent of cases were non-venomous and 82 % were venomous. Among venomous bites 36 % victims showed local signs of envenomation while 65 % victims showed systemic features of envenomation (table 2).

Neurotoxic features which are a hallmark of cobra and krait bites, were seen in 16 cases (32%) and the hemotoxic manifestations were attributable to viper bites in 21 cases (42%).Local pain (44 %) and pain abdomen (40 %) were chief symptoms seen in hemotoxic snake bites while as drooping of eyelids (32 %) and difficulty in breathing (18 %) were

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predominant symptoms seen in neurotoxic snake bite victims.

Acute kidney injury (8%), disseminated intravascular coagulation (DIC) (4 %), cellulitis (4%), hypertension (4%) were the commonest complications seen in snakebite victims.

Twenty six percent (13) of victims required mechanical ventilation all of them were having neurotoxic features and respiratory paralysis i.e. 81 % of neurotoxic snake bite victims required mechanical ventilation with mean duration of 64 hours . Eight percent (4) victims required dialysis for acute kidney injury all of them reported to hospital with a minimum lag of 18 hours from the time of bite. Seizures were seen in two (12%) neurotoxic snakebite victims while as hypertensive urgency was seen in 3 (18 %) neurotoxic snakebite victims (figure 2).

At our hospital, all the venomous snake bite victims received the equine polyvalent Anti-Snake Venom (ASV). The mean dose of ASV which was given for the neurotoxic snake bites was 18 vials (range 10-20 vials) and 28 vials (range 15-35) were given for the viper bites.

Allergic reactions to ASV were noted in 3 (6%) cases (febrile reaction in 1 case, and urticarial reactions in 2 cases). A supportive treatment with the blood component therapy was given in 5 (10%) cases.

The median duration of the hospital stay was 5 days (IQR 5 -7 days) and range of 1-29 days. We noticed that 46 % of the patients had reached hospital after a delay of 6 hours. The incidence of the complications like acute renal failure, gangrene at the bite area, DIC and shock were more in the subgroup of patients who presented to the hospital after a delay of >6 hours. No fatal outcome was reported in the victims who were admitted within 24 hours of the snake bite.

One victim died due to intracranial haemorrhage and one victim died due to pulmonary edema, capillary leakage syndrome and disseminated intravascular coagulation, with an overall mortality rate of 4.08%.

Discussion:

Snake bites are a neglected health problem in global health as notified by WHO. India ranks first in mortality from snakebite in the world [5]. India is contributing 58000 deaths due to snakebite envenomation out of 1.11 – 1.77 million bites, contributing to about 0.5% of all-cause mortality in India.WHO estimates that 81000 -138000 people die annually from snake bites worldwide, and about three times that number survive but are left with amputation and permanent disabilities [4]

WHO in 2019 launched a strategy for prevention and control of snakebite, aiming to halve the number of deaths and cases of serious disability by 2030[6].Social, cultural, and economic reasons also contribute immensely to the death toll [7].Most deaths and serious consequences from snakebite envenomation are avoidable by timely access to safe and effective anti-venoms [2]. Russell's viper bites are most common snakebites in India [5].

Average risk of an Indian dying from snakebite is approximately 1 in 250.In India snake bite mortality trends show seasonal, temporal as well as spatial distribution over the last two decades. About 94% of snakebite deaths occur in rural areas and 77 % occur out of hospital [4]. Around 30 % of snakebite deaths are contributed by paediatric age group [5]. Most of the bites in our study occurred in adolescent age group, might be due to nature of outdoor activities of this age among paediatric age group. Male predominance as victims in our study concurred with those of earlier studies.Studies show that more than 50 % occur during monsoon (August–October) [9]. In our study, there was a higher incidence of snakebites during the month of June. Majority of the victims (40 %) in our study were bitten during the evening time on the lower limbs (63%) whereas studies done in adult population have shown day time predominance of bites [10].

Bleeding, cellulitis, blistering and pain at site of bite are most commonly seen in hemotoxic snake bites while as pain abdomen and dyspnea are most common signs of neurotoxic snake bites[11,12].

Acute kidney injury, coagulopathy, DIC and shock are seen mostly in hemotoxic snake bite victims [13]. Respiratory paralysis, hypertensive emergencies and seizures are mostly seen in neurotoxic snake bites due to venom induced sympathetic over activity [14].

A major determinant of the outcome of snakebites is the time taken to reach the hospital following the bite [10]. A prolonged arrival delay (>18 hours) was seen in all those patients who presented with acute kidney

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injury, DIC and shock.Delay in the arrival to health center could be attributed predominantly to the lack of awareness of the hazards of snakebite and an unrelenting belief in the traditional system of medicines by the family. Prolonged arrival delay affected duration of hospital stay, requirement for admission in intensive care unit, renal replacement therapy and assisted ventilation.

Requirement of assisted ventilation is the major determinant of outcome in neurotoxic snake bites in case of delayed arrival to hospital [15]. In our study 81 % of neurotoxic snake bite victims needed assisted ventilation. Eighteen percent of these victims were in need of assisted ventilation at first contact with health center at primary and secondary level.

This signifies the expertise healthcare personal, prompt recognition of symptoms and signs of neurotoxicity, prompt administration of atropine, neostigmine, calcium and ASV and rapid transportation to tertiary healthcare level in neurotoxic snake bites.

In conclusion, snakebite mainly afflicts the rural males of developing countries. Availability of expertise healthcare personnel, antivenom at primary healthcare centers, and rapid transportation facilities may change the morbidity associated with snakebites. There is an urgent need to educate the rural population about the hazards of treatment delay in snakebites.

References:

1. World Health Organization (WHO) Neglected tropical diseases. [August 10, 2021];2019b https://www.who.int/neglected_diseases/diseases/en/
2. Gutiérrez JM, Calvete JJ, Habib AG, Harrison RA, Williams DJ, Warrell DA. Snakebite envenoming. *Nature Reviews Disease Primers*. 2017; 3:17063. doi: 10.1038/nrdp.2017.63.
3. Chippaux JP. Snake-bites: appraisal of the global situation. Bull World Health Organ. 1998;76(5):515-24. PMID: 9868843; PMCID: PMC2305789
4. Suraweera W, Warrell D, Whitaker R, et al. Trends in snakebite deaths in India from 2000 to 2019 in a nationally representative mortality study. *Elife*. 2020; 9:e54076. Published 2020 Jul 7. doi:10.7554/eLife.54076
5. Bipin Jose. Snake envenomation. In principles of pediatric and neonatal emergencies, Gupta P, 4rd ed. New Delhi: Jaypee Brothers; 2020.p.580 -584
6. World Health Organization (WHO). 2019c. Snakebite envenoming - A strategy for prevention and control. WHONeglected tropical diseases/Snakebites reference number: 9789241515641. WHO Press. https://apps.who.int/iris/bitstream/handle/10665/324838/9789241515641-eng.pdf?ua=1 [Accessed August 9, 2021].
7. Inamdar I F, Aswar N R, Ubaidulla M, Dalvi S D. Snakebite: admissions at a tertiary health care centre in Maharashtra, India. SAMJ, S. Afr. med. j. [Internet]. 2010 July [cited 2021 sept. 14]; 100(7). Available from: http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0256-95742010000700022&lng=en.
8. Halesha B.R., Harshavardhan L., LokeshAJ., Channaveerappa P.K., Venkatesh K.B .A study on the clinico-epidemiological profile and the outcome of snake bite victims in a tertiary care centre in southern India. *J Clin Diagn Res*. 2013;7(1):122-126. doi:10.7860/JCDR/2012/4842.2685
9. Hansdak SG, Lallar KS, Pokharel P, ShyangwaP, Karki P, Koirala S. A clinico-epidemiological study of snake bite in Nepal. Trop Doct. 1998 Oct;28(4):223-6. doi: 10.1177/004947559802800412. PMID: 9803844.
10. Saravu K, Somavarapu V, Shastry AB, Kumar R. Clinical profile, species-specific severity grading, and outcome determinants of snake envenomation: An Indian tertiary care hospital-based prospective study. Indian J Crit CareMed 2012;16:187-92
11. Slagboom J, Kool J, Harrison RA, Casewell NR. Haemotoxic snake venoms: their functional activity, impact on snakebite victims and pharmaceutical promise. *Br J Haematol*. 2017;177(6):947-959. doi:10.1111/bjh.14591

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12. Mitrakul C, Dhamkrong-At A, Futrakul P, Thisyakorn C, Vongsrisart K, Varavithya C, Phancharoen S. Clinical features of neurotoxic snake bite and response to antivenom in 47 children. Am J Trop Med Hyg. 1984 Nov;33(6):1258-66. doi: 10.4269/ajtmh.1984.33.1258. PMID: 6507733.
13. Vikrant S, Jaryal A, Parashar A. Clinicopathological spectrum of snake bite-induced acute kidney injury from India. *World J Nephrol*. 2017;6(3):150-161. doi:10.5527/wjn.v6.i3.150
14. Meenakshisundaram R, Senthilkumaran S, Grootveld M, Thirumalaikolundusubramanian P. Severe hypertension in elapid envenomation. *J Cardiovasc Dis Res*. 2013;4(1):65-67. doi:10.1016/j.jcdr.2013.02.008
15. Longkumer T, Armstrong LJ, Finny P. Outcome determinants of snakebites in North Bihar, India: a prospective hospital based study. *J Venom Res*. 2017;8:14-18. Published 2017 Jun 28

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