

# Study of Clinico-Pathological Profile of Renal Changes in Snake Bite Cases for a Period of 18 Months Reported to Victoria Hospital, Bangalore

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**Abstract- Objectives:** The present study was under taken to know the spectrum of renal histopathology in snake-bite cases autopsied in Victoria hospital mortuary, Bengaluru. To know the haematological and biochemical changes leading to renal pathology in nonfatal snake bite cases admitted to Victoria hospital, Bengaluru.

**Methods:** Collection of information from in patient case records during the period of 18 Months according to proforma. Medico legal autopsy (MEA) reports from Victoria Hospital, Bengaluru. The data collection is done as per the proforma.

**Results:** Neurotoxic envenomation was responsible for 14 deaths with mortality rate of 23.33% among snake bite cases. In autopsied cases of snake bite poisoning, microscopically renal parenchymal congestion & ischaemic changes in tubules are commonly noted, apart from inflammatory changes in Glomeruli. In 05 cases no abnormalities were noted

**Interpretation & Conclusion:** Majority of the snake bites were of Hemotoxic, though mortality was high in neurotoxic bites. Lack of transportation facilities, lack of easy accessibility to health care centres, more faith in traditional treatments, unaffordable cost of ASV, lack of knowledge about ancillary treatment modalities in snake bites among the medical faculty are the reasons.

**Index Terms-** ASV, ancillary, Hemotoxic, neurotoxic, MEA

## I. INTRODUCTION

Ophidic accidents represent a serious public health problem in tropical countries because of the high frequency in which they occur and the high morbidity and mortality they cause. Snake-bite is a well known occupational hazard amongst the outdoor workers and also a known cause of increased mortality and morbidity in our country. In developed countries the frequency of snake bites is increasing amongst those who unlawfully keep snakes as pets. Whereas hazardous snake bites occur mainly in developing countries especially among rural population active in agricultural works, laborers, herders, professional snake handlers, trekkers, snake charmers and fishermen<sup>1</sup>.

Accurate statistics of the incidence of snake-bites and its mortality and morbidity does not exist as there are very limited studies in India which have assessed incidence, severity and the role of anti-snake venom (ASV) in predicting the outcome of snake envenomation. However, it is certainly higher than what is reported, as there is under reporting of cases in rural area.

A total 4, 21,000 envenomations and 20,000 deaths occur globally from snakebite each year. It warns that these figures may be as high as 18, 41,000 envenomation and 94,000 deaths globally. The study also states that if an assumption is made based on the fact that one envenoming occurs in every four cases of snake bite, the global incidence of snake bite could range from 1.2 million to 5.5 million annually. The highest number of envenomings were estimated to be from South Asia (1,21,000) which was followed by South East Asia (1,11,000) and East Sub-Saharan Africa (43,000) annually. The study concluded, India to have most envenoming in the world i.e. 81,000 envenomings and 11,000 deaths annually<sup>2</sup>.

Among the Asian countries, Pakistan had 40,000 snake bites annually with 8,200 fatalities and Nepal was estimated to have more than 20,000 envenomings with 1,000 fatalities. A postal survey conducted in Bangladesh revealed snake bite incidence to be 4.3 per 1, 00,000 population. Of all the snake bites in this survey mortality was 20%.

In Asian countries reluctantly incidence rate has been increasing, in India the data regarding incidence and mortality are fragmentary because less than 40% of snake bite patients attend hospitals for medical care rather first consults traditional practitioners or quacks and only subsequently resort to modern medicine<sup>3</sup>

The data regarding the incidence of snake bite, the mortality and morbidity due to snake bite are unreliable due to poor and improper reporting system as majority of the snake bites (80% of all reported cases) occur among rural population<sup>3</sup>. In the context of incidence present study attempt to know the incidence rate of snake -bite -cases autopsied in tertiary care hospitals in Bangalore city.

## II. METHODS

Across sectional study -In-patient case records obtained from Victoria hospital, Bengaluru during the period of 18 months from November 2011 to May 2013 with written consent. By using crobanch alpha table sample size was drawn and all admitted patients were considered for the study. Medico legal autopsies conducted at Victoria hospital mortuary with alleged history of snake bite. Collection of information from in patient case records during the period of 18 months according to proforma. Medico legal autopsy reports from Victoria Hospital, Bengaluru. The data collection is done as per the proforma.

All patient meet inclusion and exclusion criteria, Inclusion; Both Sex groups of all ages with history of snake-bite after a

valid informed consent. Cases admitted to Victoria hospital of Bengaluru city with alleged history of snake bite. Autopsy done at Victoria hospital mortuary with alleged history of snake bite. Obscure histories are excluded; Cases with no visible snake bite mark. Bite from other reptiles/animals, Patients with history of bleeding disorders like ITP, Hemophilia, Patients who went DAMA or who were referred to other centres were excluded. Collected data were analysed by using SAS-6.50 version, univariate analysis were employed to draw the significant inference.

### III. RESULT

Majority of the cases about 54 % occurred at the age group of 20 – 39yrs. Male Predominance were noted in 20-29yrs and female predominance in age group of 30-39yrs. The two-tailed P

value equals 0.0261 & statistically significant. 30.69% of victims were farmers. Of the male victims maximum 43.85% were farmers. Similarly in female victims 84.81% were housewives, followed by 18.96% labourers. Among the study group, 7.22% of the subjects were illiterate and 92.78% were literates of which 43.34% had primary education, 37.02% had secondary education, 10.08% were at PUC level and 1.58% was graduates. Maximum victims 62.75% belonged to rural region. There is a statistically significant association of occurrence of cases in rural areas when compared to urban area. In autopsied cases of snake bite poisoning, microscopically renal parenchymal congestion & ischaemic changes in tubules are commonly noted, apart from inflammatory changes in Glomeruli. In 05 cases no abnormalities were noted.



**Figure 1: Fang mark on left foot**



**Figure 2: Fang mark on right foot**



**Figure 3: Gross changes in kidney**

#### IV. DISCUSSION

In the present study, maximum victims belonged to 20 – 39 yrs age group. Among 285 males and 158 females, 57.89% and 48.73% victims belonged to 20- 39 yrs age group respectively. In both the sex groups, a statistically significant difference was found to be occurrence of snake bite among 20– 39 yrs age group. Of both the sex groups, males were predominant 64.33% as compared to females 35.66%, with male to female ratio of 1.8:1. Similar observations were made in studies conducted by Kulkarni ML & Anees S (1994) 33 in Karnataka, Ganneru B & Sasidhar RB (2007) 20 in Andhra Pradesh and Suchitra N et al.

(2008) 22 in Kerala. This observation is not consistent with the findings recorded in the study conducted by Monterio NP et al. (2010) 24 in Manipal, where female predominance was recorded with male to female ratio of 1:1.5. The probable reason for predominance in males and 20-39 yrs age group is increased agricultural activity among these individuals. Maximum victims 31% were farmers by occupation. Among the male victims, majority 44% were farmers. Among female victims, majority 85% were Housewives followed by labourers constituting 19%. The above observations made in the study are consistent with the studies conducted by Lal P et al. (2001) 17 in JIPMER Hospital Pondicherry, Chauhan S et al. (2005) 19 in PGIMER

Hospital Chandigarh and Shetty AK & Jirli SP (2010)25 in Belgaum. The predominance of farmers can be attributed to increased frequency of human confrontation with snakes in agricultural fields owing to the snakes habits, habitat and prey preferences.

Observation depicts that victims with non technical (unskilled) education are more involved in agricultural works, hence more exposed to snake bites. The low literacy level also leads to lack of knowledge regarding precautions to be taken to avoid snake bites. In this study, maximum percent 37.86% of snake bites occurred between 12.01PM to 6 PM followed by 27.89% between 6PM to 12AM. Similar finding was observed in the study conducted by Bawaskar HS et al. (2008) in rural Maharashtra and Monterio NP et al (2010) in Manipal.

Majority of the victims 36.59% had bites on foot followed by bites on hands in 25.68%. Maximum 64.09% bites were on lower limbs (foot-161&leg- 121). Among the 443 cases, 63.20% (280) approached primary health centers first, of which only 40% of cases received ASV. A similar observation was made in the study conducted by Chauhan S et al.(2005)19 in PGIMER Hospital, Chandigarh.

Among the 443 cases, the most common presenting symptom was pain at local site constituting 84.87% followed by bleeding which constituted 36.79%. This observation depicts that pain at bite site is not a constant feature ASV was administered in 82% cases (362 victims). Of these remaining 81 cases, 78 cases were not given ASV as there were no clinical manifestations of envenomation and in 3 cases ASV was not given as the patient had severe reactions, thus the patient was maintained on ancillary treatment. Of the 362 victims who received ASV, 62% cases needed 5 to 20 vials. 2 cases with hemotoxic envenomation had persistent bleeding & given >50 vials of ASV. In studies conducted by Bawaskar HS (2002)18 in Mahad region of Maharashtra, majority required 10 vials; Singh J (2008)23 in North Indian Military Hospital, mean ASV required was 180 ml and ranged from 9 to 32 vials and Monterio NP et al (2010)24 in Manipal, average ASV requirement was 12.4 vials. In this study, most of the victims 43% had hemotoxic envenomation. Mortality rate of 04% (8 cases) was recorded. Neurotoxic envenomation was responsible for 14 deaths with mortality rate of 23.33%. The observations in other studies varied with the geographical regions in which the study was conducted. Similar observations were made in the studies conducted by Kulkarni ML & Anees S (1994)33 in Karnataka and Bawaskar HS et al. (2008)21 in rural Maharashtra.

## V. CONCLUSION

Incidence and mortality due to snake bite can be altering by the way of educate the rural people beside to take accurate preventive measures. Faculty development training programme disseminate to staff members for intervene to curb snake bite for good therapeutic options.

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## REFERENCES

- [1] Alirol E, Sharma SK, Bawaskar HS, Kuch U, Chappuis F (2010) Snake Bite in South Asia: A Review. *PLoS Negl Trop Dis* 4(1): e603. Available from: <http://www.dx.doi.org/doi:10.1371/journal.pntd.0000603>.
- [2] Kasturiratne A, Wickremasinghe AR, 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. WHO. Available from: <http://www.dx.doi.org/10.1371/journal.pmed.0050218>.
- [3] Chippaux JP. Snake-bites: appraisal of the global situation. *Bulletin of the World Health Organization*. 1998;76(5):515-24.
- [4] Mohapatra B, Warrell DA, Suraweera W, Bhatia P, Dhingra N, Jotkar RM et al. Snakebite Mortality in India: A Nationally Representative Mortality Survey. *PLoS Negl Trop Dis*. 2011 Apr;5(4):e1018.
- [5] B. Vijayraghavan. A Book For India. Occasional Papers No 4, Chennai Snake Park.
- [6] Whitaker R, Whitaker S. Analysis of Snakebite Data from Pappinisseri Vishchikilsa Society, Kannur, Kerala (India). *Calicut Medical Journal* 2005;4(2):e2. Available from: <http://www.calicutmedicaljournal.org/2006/4/2/e2>.
- [7] Registrar General of India. Report on causes of death in India, 2001–2003: Sample Registration System. New Delhi: Government of India. 2009. Available: [http://cghr.org/publications/Causes\\_of\\_death\\_2001-03\\_20RGI\\_CGHR.pdf](http://cghr.org/publications/Causes_of_death_2001-03_20RGI_CGHR.pdf) (accessed 2011)96
- [8] Mattison C. Snakes of the World. Bounty Books.
- [9] B. Vijayraghavan. 400 Questions Answered About Snakes With Special Reference To Snakes In India.
- [10] Smith MA. The Fauna of British India, Ceylon and Burma including the whole of the Indo-Chinese sub-region. Today & Tomorrow Printers & Publishers, New Delhi. 1981; vol 3.
- [11] Joerg Blessmann, Chanhom Khonesavanh, Phanalone Outhaitit, Saikham Manichanh, Konkeo Somphanthabansouk and Phaisy Siboualipha. Venomous Snake bites in Lao PDR: vol 41. No1. 2010 Jan: 195-202
- [12] Jae Seok Kim, Jae Won Yang, Min Soo Kim, Seung Tae Han, Bi Ro Kim, Myung Sang Shin, et al, Coagulopathy in patients who experience snakebite; *The Korean Journal of Internal Medicine* :2008 June; 23:94-99.
- [13] Alain Bernheim, Enrico Lorenzetti, Abraham Licht, Kurt Markwalder, Markus Schneemann. Three cases of severe neurotoxicity after cobra bite (Najakaouthia); *Swiss Med Wkly* 2001; 131:227-228.
- [14] Graham Ireland, Simon GA Brown, Nicholas A Buckley, Jeff Stormer, Bart J Currie, Julian White, et al. Changes in serial laboratory test results in snakebite patients: when can we safely exclude envenoming?; *MJA* 2010; 193: 285–290.
- [15] Eric K. I. Omogbai†, Zuleikha A. M. Nworgu, Michael A. Imhafidon, Anwakang A. Ikpeme, David O. Ojo and Charles N. Nwako. Snake bites in Nigeria: A study of the prevalence and treatment in Benin City; *Tropical Journal of Pharmaceutical Research*, June 2002; 1 (1): 39-44-97
- [16] Patricia Aline Boer-Lima, Jose Antonio Rocha Gontijo, and Maria Alice da Cruz-Hoeling. Bothrops moojeni snake venom-induced renal Glomeruli Changes in rat: *am. J. Trop. Med. Hyg.*, 67(2), 2002, pp. 217–222.
- [17] Lal P, Dutta S, Rotti SB, Danabalan M, Kumar A. Epidemiological Profile of Snakebite cases admitted in JIPMER Hospital. *Indian journal of Community Medicine*. 2001; vol 26:1.
- [18] Bawaskar HS. Profile of snakebite envenoming in Western Maharashtra, India. *Trans of the Royal Soc of Trop Med and Hyg*. 2002;96:79-84.
- [19] Chauhan S, Faruqi S, Bhalla A, Sharma N, Varma S, Bali J. Pre-hospital treatment of snake envenomation in patients presented at a tertiary care hospital in Northwestern India. *J venom anim toxins incl Trop Dis*. 2005; vol 11.
- [20] Ganneru B, Sashidhar RB. Epidemiological profile of snake-bite cases from Andhra Pradesh using immunoanalytical approach. *Indian J Med Res*

- 125, 2007May;661-8. Available from: <http://www.icmr.nic.in/ijmr/2007/may/0508.pdf>.
- [21] Bawaskar HS, Bawaskar PH, Punde DP, Inamdar MK, Dongare RB, Bhoite RR. Profile of Snakebite Envenoming in Rural Maharashtra, India. *J Assoc Physicians India*. 2008;56:88-95.
- [22] Suchithra N, Pappachan JM, Sujathan P. Snakebite envenoming in Kerala, South India: Clinical profile and factors involved in adverse outcomes. *Emerg Med J*. 2008;25:200-04.
- [23] Singh J, Bhoi S, Gupta V, Goel A. Clinical profile of venomous snake bites in North Indian Military Hospital. *J Emerg Trauma Shock* 2008 Jul;1(2):78-80.98
- [24] Monteiro NP, Kanchan T, Bhagavath P, Pradeep Kumar G. Epidemiology of Cobra bite in Manipal, Southern India. *J Indian Acad Forensic Med*. 2010;32(3):224-27.
- [25] Shetty AK, Jirli SP. Incidence of Snake Bites in Belgaum. *J Indian Acad Forensic Med*. 2010;32(3):139-41.
- [26] Ali G, Kak M, Kumar M, Bali S.K, Tak SI, Hassan G, Wadhwa MB: Acute renal failure following echis carinatus (saw – scaled viper) envenomation: *Indian J Nephrol* 2004;14: 177-181.
- [27] Pal M., Maiti A K., Roychowdhury U.B., Basak S., Sukul B.; Renal Pathological Changes in Poisonous Snake Bite: *J Indian Acad Forensic Med*, 32(1):19-21.
- [28] Mukhopadhyay P.P, Ghosh S, Ghosh, T. K.; Pattern of Renal Pathology in Fatal Envenomation by Indian Cobra (Naja naja): *J Indian Acad Forensic Med*, 32(2):132-33.
- [29] Khaire N. A Guide To The Snakes of Maharashtra, Goa & Karnataka, United Multicolor Printer Pvt Ltd, Pune.
- [30] Whitaker R & Captain A. Snakes of India: A Field Guide, Draco books Chennai.
- [31] Whitaker R. Common Indian Snakes: A field guide, Macmillan publication.
- [32] Daniel J.C. The Book of Indian Reptiles and Amphibians, Oxford University Press.
- [33] Kulkarni ML, Anees S. Snake venom poisoning: experience with 633 cases. *J of Indian pediatrics*. 1994 Oct ;31(10):1239-43.99
- [34] Indian National Snakebite Protocols 2007. WHO. Available from: [http://files.meetup.com/1166925/Snakebite\\_Protocol\\_India\\_2007.pdf](http://files.meetup.com/1166925/Snakebite_Protocol_India_2007.pdf).
- [35] Guidelines for clinical Management of Snake-bites in South East Asia Region. WHO Regional Office for South East Asia. Available from: [http://203.90.70.117/PDS\\_DOCS/B0241.pdf](http://203.90.70.117/PDS_DOCS/B0241.pdf).
- [36] Das I. A photographic Guide to Snakes and other Reptiles of India. Om Books International; New Delhi; 2002. p 9-68.
- [37] Bawaskar HS. Profile of snakebite envenoming in Western Maharashtra, India. *Trans of the Royal Soc of Trop Med and Hyg*. 2002;96:79-84.
- [38] Khadwal A, Bharti B, Poddar B, Basu S, Virdi VS, Parmar V. Persistent Coagulopathy in Snake Bite. *Indian J of pediatrics*. 2003 May;70: 439-41.39) Menon V, Tandon R, Sharma T, Gupta A. Optic neuritis following snake bite.
- [39] Indian J Ophthalmology [serial online] 1997 [cited 2010 Jul 12];45:236-7. Available from: <http://www.ijo.in/text.asp?1997/45/4/236/14993>.
- [40] Dhaliwal U. Cortical Blindness: An Unusual Sequela of Snake Bite. *Indian Journal of Ophthalmol*;47(3):191-2.
- [41] John J, Gane D B, Plakkal N, Aghoram R, Sampath S. Snake bite mimicking brain death. *Case Journal* 2008, 1: 16. doi:10.1186/1757-1626-1-16. Available at: <http://www.casesjournal.com/content/1/1/16>.
- [42] Bhattacharya P, Chakraborty A. Neurotoxic snake bite with respiratory failure. *Indian J Crit Care Med* 2007;11:161-4.100
- [43] Goyal JP, Shah VB. Suppression of Brainstem Reflexes in Snakebite. *Indian Pediatrics* 2009 Apr 17;46:360.
- [44] Srivastava A, Taly AB, Gupta A, Moin A, Murali T. Guillain-Barre syndrome following snake bite: An unusual complication. *Ann Indian Acad Neuro* 2010;13:67-8.
- [45] Awasthi R, Narang Shiva, Chowdhury PP. Cerebellar Ataxia following Snake Bite. *J Indian Acad Ped*. 2010 Jun;58:389-90.
- [46] Singh A, Biswal N, Nalini P, Sethuraman, Badhe A. Acute Pulmonary Edema as a complication of Anti-snake venom therapy. *Indian J of paed*. 2001;68(1):81-82

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