



## A LONGITUDINAL STUDY ON FOLLOW UP OF RENAL FUNCTIONS IN SNAKE BITE PATIENTS WITH AKI FOR A PERIOD OF ONE YEAR

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**ABSTRACT** **Context:** Acute kidney injury is an important consequence of snake bite and most of the patients requiring renal replacement therapy. The long term renal outcome of such survivors of severe AKI is not known.

**Aim of the study:** The aim of the study is to identify the persistent renal involvement in snake bite patients with acute kidney injury. The renal parameters were evaluated at a mean period of follow up of one year

**Settings and Design:** longitudinal study prospective and retrospective

**Materials and Methods:** This study was conducted in 100 patients with acute kidney injury following snake bite, admitted at Govt. Rajaji hospital Madurai

**Results:** A total of 40 persons (40%) showed persistent renal involvement in the form of renal dysfunction or proteinuria at a mean period of follow up of one year

**Conclusions** long term renal outcome of snake bite induced AKI is not benign and 40% of patients continue to have persistent renal abnormalities

**KEYWORDS :** snake bite, acute kidney injury, long term renal outcome

### INTRODUCTION:

Snake bite is a common and frequently devastating environmental and occupational disease, especially in rural areas of tropically developing countries. The pathogenesis of renal lesion is multifactorial and has been attributed to the nephrotoxicity of the venom, hypotension, circulatory collapse, intravascular hemolysis with hemoglobinuria, myoglobinuria, DIC, sepsis, hypersensitivity to venomous and antivenomous protein. Pathological investigations of human fatal cases revealed renal cortical necrosis, thrombotic microangiopathy and acute tubular necrosis. This study was meant to describe the outcomes in terms of renal parameters in snake bite patients with acute kidney injury after a follow up period of one year

### MATERIALS AND METHODS:

**Study population:** This study was conducted in 100 patients with acute kidney injury following snake bite, admitted in Medical ward at Govt. Rajaji hospital Madurai from January 2016 to December 2016

**Inclusion criteria:** snake bite patients with acute kidney injury Consent and willingness for participating in the study

### Exclusion criteria:

Known case of Diabetes, Hypertension, chronic kidney disease

### RESULTS:

Out of the 100 patients on follow up, 40 patients developed renal involvement either in the form of proteinuria or persistent renal dysfunction.

Out of the 100 patients, 64 were dialysis requiring and 36 were conservatively managed. In the dialysis dependent group, 34 persons had persistent renal abnormalities and 30 persons recovered completely. Among the conservatively managed group, 6 patients had persistent renal dysfunction on follow up and 30 persons recovered completely.

The baseline characteristics of the patients who developed CKD in comparison to those who had recovery of their renal function are shown in tables below

**Table 1 : Age And Sex Distribution Of Study Population**

Age	frequency	male	female
<20	3	2	1
20-30	15	10	5
31-40	42	33	9

41-50	26	22	4
51-60	24	18	6
>60	20	11	9
Total	100	66	34

**Table 2 Clinical spectrum of snake bite AKI patients**

	Patients with complete recovery of renal function	Patients who developed CKD
Total number of patients (100)	60	40
Male/ female	38/22	28/12
Mean age in years	37.35	36.12
Hypotension at presentation	7	9
Mean ASV dose	15	12
Mean time to ASV in hours	11.45	16
Mean creatinine at presentation	3.2	5.8
Mean serum albumin	3.55	3.12
Bleeding manifestations	30	26
Cellulitis	28	31
Dialysis requiring/ conservative management	30 / 30	34/6
Mean interval between bite and dialysis	54 hours	76 hours
Comorbid conditions - Diabetes/ hypertension / CKD	none	None

After a period of one year follow up, 24 persons (24%) developed CKD with GFR < 45 ml/min and 7 persons (7%) had GFR 45 – 60 ml/min. 9 persons (9%) had persistent proteinuria in subnephrotic range.

Among CKD patients, 5% (5) had end stage renal disease and was on maintenance hemodialysis.

### DISCUSSION:

AKI can occur as a complication of snake bite. The causes of kidney injury are multifactorial and include hypotension, circulatory collapse,

intravascular hemolysis, disseminated intravascular coagulation, direct nephrotoxicity of the venom, myoglobinuria, and hypersensitivity to venom and antivenomous protein itself. Most of the studies on snake bite and AKI are short term and confined to only during the hospital stay. Before the era of CKD staging, long-term outcome of patients with AKI was considered good. In recent times there has been few studies showing that the long-term outcome is not benign as thought before. However, most of the long-term studies had included mainly patients with sepsis, nephrotoxic medication induced AKI, or postsurgical AKI. We could not come across any long-term outcome studies of snake bite-induced AKI. It is not known whether the long term outcome is any different from other causes of AKI. Here we report the long-term outcome of 100 such patients who had AKI following snake bite.

In our study persistent renal abnormalities in the form of either functional derangement or proteinuria were detected in 40 (40%) patients at a mean follow-up of 12 months. Totally 24 (24%) patients had an estimated GFR < 45 mL/min, 7 (7%) had GFR between 45 – 60 mL/min while 5 (5%) patients progressed to end-stage renal disease (ESRD). Subnephrotic range of proteinuria was present in 9 (9%) of the patients. These figures suggest that long-term outcome of snake bite is not benign and is comparable to that of other causes of AKI.

Recently, Lo et al.<sup>9</sup> showed that dialysis-requiring AKI was associated with 28-fold risk of developing CKD Stage 4/5. Nearly 20% of patients with an in hospital diagnosis of acute tubular necrosis progressed to CKD Stage 4 or greater within the next 12 months.

Previously, various risk factors for predicting the development of CKD following AKI have been identified, which include advanced age, low serum albumin, presence of diabetes, and advanced RIFLE score<sup>10</sup>. However, we could not find any correlation between the age of the patients, the number of ASV vials, time to ASV administration, the presence or absence of bleeding manifestations, severity of the local reaction, serum creatinine at presentation, serum albumin, and the presence or absence of hypotension with renal function at follow-up. One of the factors that could be responsible for the high incidence of AKI in our population could be the delay in ASV administration. The mean time to ASV administration was 11.45 and 16. h for those who recovered their renal function and those who developed CKD, respectively. This suggests that in the majority of the cases ASV was administered very late. Pinho et al.<sup>11</sup>

showed that delay in administration of ASV was a risk factor for the development of AKI following *Crotalus durissus* snake bite.

## CONCLUSION:

The long term outcome of snake bite induced AKI is not benign and as high as 40 % of patients have persistent renal abnormalities

## REFERENCES

- [1] Kasturiratne A, Wickremasinghe AR, de Silva N, et al. The global burden of snakebite: A literature analysis and modelling based on regional estimates of envenoming and deaths. *PLoS Med.* 2008;5:e218.
- [2] Mohapatra B, Warrell DA, Suraweera W, et al. Snakebite mortality in India: A nationally representative mortality survey. *PLoS Negl Trop Dis.* 2011;5(4):e1018.
- [3] Chugh KS. Snake bite induced acute renal failure in India. *Kidney Int.* 1989;35:891–907.
- [4] Shastry JC, Date A, Carman RH, Johnny KV. Renal failure following snake bite. *Am J Trop Med Hyg.* 1977;26:1032–1038.
- [5] National Kidney Foundation. K/DOQI clinical practice guidelines for chronic kidney disease: Evaluation, classification, and stratification. *Am J Kidney Dis.* 2002;39:S1.
- [6] Schiff H. Renal recovery from acute tubular necrosis requiring renal replacement therapy: A prospective study in critically ill patients. *Nephrol Dial Trans.* 2006;21:1248–1252.
- [7] Wald R, Quinn RR, Luo J, et al. Ray for the University of Toronto acute kidney injury research group chronic dialysis and death among survivors of acute kidney injury requiring dialysis. *J Am Med Assoc.* 2009;302(11):1179–1185.
- [8] Ponte B, Felipe C, Muriel A, Tenorio MT, Liano F. Longterm functional evolution after an acute kidney injury: A 10-year study. *Nephrol Dial Trans.* 2008;23:3859–3866.
- [9] Lo LJ, Go AS, Chertow GM, et al. Dialysis-requiring acute renal failure increases the risk of progressive chronic kidney disease. *Kidney Int.* 2009;76(8):893–899.
- [10] Chawla LS, Amdur RL, Amodeo S, Kimmel PL, Palant CE. The severity of acute kidney injury predicts progression to chronic kidney disease. *Kidney Int.* 2011;79: 1361–1369.
- [11] Pinho FMO, Zanetta DMT, Burdman EA. Acute renal failure after *Crotalus durissus* snakebite: A prospective survey on 100 patients *Kidney Int.* 2005;67:659–667.
- [12] British Medical Journal. Snake bites. *BMJ.* 1892;2:620.
- [13] British Medical Journal. Indian sanitary reports. *BMJ.* 1927;1:538–539.
- [14] Swaroop S, Grab B. Snakebite mortality in the world. *Bull World Health Organ.* 1954;10(1):35–76. [PMC free article] [PubMed]
- [15] Bhalla G, Mhaskar D, Agarwal A. A study of clinical profile of snake bite at a tertiary care centre. *Toxicol Int.* 2014;21:203–8. [PMC free article] [PubMed]
- [16] Anjum Arshad, Husain M, Hanif SA, Ali SM, Beg M, et al. (2012) Epidemiological Profile of Snake Bite at Tertiary Care Hospital, North India. *J Forensic Res* 3:146. doi:10.4172/2157-7145.1000146