



## SNAKE BITE IN JHARKHAND:A HOSPITAL BASED STUDY

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**ABSTRACT** Plenty of snake bite cases get admitted to the emergency ward of Bokaro General Hospital having dialysis and ventilator facilities. One hundred patients attending emergency ward, of snake bite were taken into study irrespective of whether the bite was due to poisonous or non-poisonous snake. Duration of study was June 1st week to end of September, 2018. 41 bites were viper, 13 by cobra, 3 by common krait rest 43 bites were due to non-poisonous snakes. Clinical manifestation and complications were coagulation abnormality, neurotoxicity, Respiratory failure, disseminated intra vascular coagulation and Acute renal failure. Out of 57 venomous snake bites 9 deaths were recorded. Classification and regression tree algorithm revealed two most important predictors of mortality to be acute kidney injury and respiratory failure. Death due to snake bite of this proportion cannot be called trivial. Causes can be manifold requiring further elucidation.

**KEYWORDS :** Snake bite, Neurotoxicity, Respiratory failure

## INTRODUCTION

Snake bite cases are not systematically reported in most countries. Very few countries possess a reliable epidemiological reporting system capable of providing precise data on snake bite. Survey analysis, hospital records, and health authority records generally provide data on snake bite morbidity and mortality rate [1]. Despite extensive knowledge of snake venom's composition and its mode of action with ample production of anti snake venom especially by Indian manufacturers management of patients remains unsatisfactory. It is because our rural population who are the people more exposed to the risk of snake bite are ill informed. During the critical period the time is wasted applying inappropriate measures before the victim is transported to the treatment centre. According to Ahuja et al [2] estimated annual number of snake bite is 300,000 to 400,000 with overall death rate about 10%. It is also suggested to make a definitive diagnosis in the absence of snake by neurotoxic symptoms & blood coagulation abnormality. This knowledge may be of considerable value. Bite by cobra can be successfully treated even after a long delay. But delay in poisoning by viper can be life threatening. In India data are fragmentary because less than 40% report to public hospitals. Most common snakes encountered are vipers, cobra and common kraits. Pathogenesis of factors contributing to acute kidney injury are bleeding, hypotension, intravascular haemolysis, DIC, haematuria and direct nephrotoxicity of venom. Rhabdomyolysis, leading to myoglobinuria can result in direct pigment related renal injury. Microangiopathic haemolytic anaemia, thrombocytopenia in subjects with cortical necrosis suggests DIC playing important role in the pathogenesis of snake bite induced renal changes.

## MATERIAL AND METHODS

This was a prospective study of 100 snake bite patients who got admitted to the emergency ward of Bokaro General Hospital, Bokaro Steel City, Jharkhand, during the months of June -September, 2018. It is a tertiary hospital catering to about one million population surrounding the Industrial township. Occupation of most of the people is agriculture, working bare foot in the field tending to the crops, mostly paddy. When they attend emergency history, symptoms, signs, bite marks if visible, vitals were recorded. Blood was sent for haematological and biochemical tests. 10 ml of blood was preserved in a dry, sterile test tube and shaken every 10 minutes to look for clotting. This was done for thirty minutes. If blood failed to clot after 20 minutes coagulation abnormality was confirmed. Even if there was a delay of 24 hours post bite 10 vials of anti snake venom diluted in 300 ml of normal saline was administered slowly over half an hour taking care of hypersensitivity reaction. This dose was repeated every six hours to a maximum of 30-35 vials or normalization of clotting in case of viper bite. Patients of renal failure requiring dialysis were put on dialysis. Respiratory failure cases with neurotoxicity were kept on ventilator and gradually weaned. All patients with no fang marks and stable for six hours with no feature of late neurotoxicity were assured and discharged.

## Statistical Analysis

Descriptive statistics was applied to find mean, standard deviation for continuous variables, frequency distribution and percentages for categorical variables. T test was done to find mean difference with p value set at 0.05.

Logistic regression analysis was conducted to know important predictors of survival outcome with odds ratio.

Classification and regression tree algorithm was created to support the findings of logistic regression. These analysis were performed using software R (Version-3.5.0).

Table 1: Haemato-Biochemical profile

Parameters	Viper (mean±sd)	sd	sg	sgj
Hb(gm/dl)	11.6 ± 1.67	11.48 ± 1.41	10.5 ± 2	12.28 ± 1.49
ALT(U/L)	50.22 ± 16.2	39 ± 7.27	36.33 ± 8.08	32.95 ± 7.705
AST(U/L)	45.54 ± 15.47	32.69 ± 6.94	35 ± 6.08	28.63 ± 6.68
Potassium	5.39 ± 1.17	4.26 ± 0.59	4.57 ± 0.5	4.1 ± 0.61
Platelet(lakhs)	0.87 ± 2	1.34 ± 25	1.1 ± 1	163.21 ±
CPK(U/L)	487.49 ± 188.49	233.15 ± 77.41	262 ± 63.5	61.44
				0.83 ± .22
Creatinine(mg/dl)	3.09 ± 1.92	1 ± .24	1.17 ± .06	

Table 2: Overall percentage of outcome in snake bites &amp; complications

Parameters	Survived(%)	Expired(%)
Viper	85.4	14.6
Cobra	77	23
Krait	100	0
AKI	77	23
DIC	62.5	37.5
Resp failure	66.7	33.3

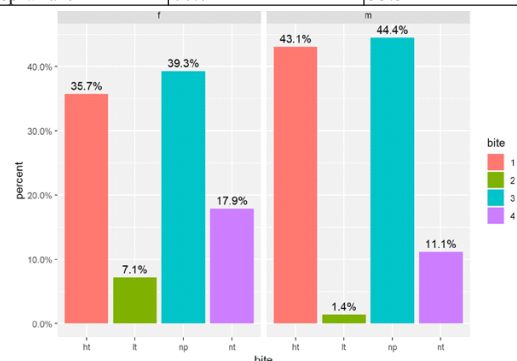


Figure 1: Percentage distribution of snake bite genderwise

**Table 3: Logistic regression analysis :Important risk factors**

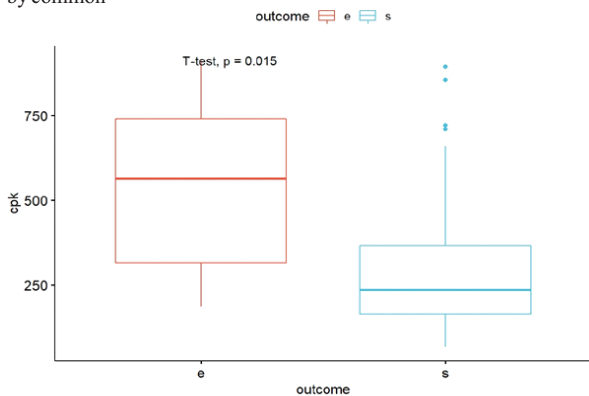
Parameters	Odds Ratio	P-Value	Confidence interval
Respiratory failure	93.9	0.01	6.68-9716
CPK+AKI+DIC	1.008	0.01	1.003-1.016

**Table 4: Dose range of antsnake venom(Vials)**

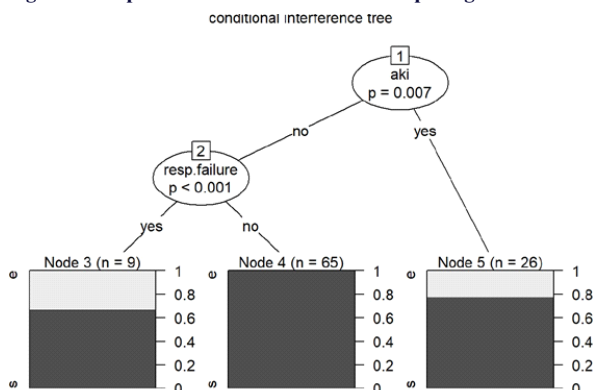
Parameters	mean ± sd	Range
Viper	23.05 ± 6.7	10-30
Cobra	20.38 ± 5.58	10-30
Krait	20.38 ± 5.58	10

**RESULT**

There were 100 patients of snake bite including bites by venomous as well as non venomous who attended the emergency wing of the hospital. On verification, 41 had viper bite, 13 cobra bite, 3 were bitten by common



**Figure 2: Boxplot with T-Test :CPK levels comparing outcome**



**Figure 3: Important predictors of survival:CART Algorithm**

krait. Rest 43 cases had been bitten by non venomous snakes. Among them 28 were females and 72 were males. Gender wise in case of women 36.7% had viper bite, 17.9% had cobra bite, 7.1% were bitten by krait and rest 39.3% by non poisonous ones. In case of men 43.1% were bitten by viper, 11.1% had cobra bite, 1.4% by common krait, remaining 44.4% by non venomous snakes. All 41 patients with viper bite were having abnormal coagulation. Neurotoxicity was found in 11 of the patients with cobra and krait bite. On enzymatic, electrolyte estimation serum potassium ranged from 3.5-7.8 mEq/L (mean 5.39 ± 1.17) (viper only). Serum creatinine ranged from 0.9-7.1 mg/dl with patients of viper bite having higher creatinine (mean 3.09 ± 1.92). In case of viper bite Creatine kinase ranged from 236 – 914U/L (mean 487 ± 188.49). Acute renal failure, DIC occurred only in patients of viper bite (DIC-16/41, AKI-26/41). Seven patients with cobra and krait bite developed respiratory failure. 10-30 vials (10 ml vial) were administered to patients of viper (mean 23.05 ± 6.7) and cobra bite (mean 20.38 ± 5.58) respectively and 10 vials were required for common krait. 14.6% of viper bite died, 23% from cobra bite expired and no death occurred from krait bite. Acute kidney injury & DIC which happened only in cases of viper bite death occurred in 23% , 37.5% respectively. Mortality from respiratory failure was 33.3%. In case of viper bite CPK level more than 500 U/L was found to be associated with mortality (p-value < .05). Logistic regression analysis showed respiratory failure to be predictive of mortality (P-value < 0.01). The analysis also revealed interaction among DIC, AKI, CPK in predicting mortality (p < 0.01).

**DISCUSSION**

One hundred patients with snake bite were studied. 43 of these were nonvenomous snake bite cases who after assurance were discharged. Majority of snake bite cases were males (n=72) and most of the bites occurred between June-September which is in consonance with other studies [3;4;5]. We found coagulation abnormality in all viper bites which was also commonest venomous snake bite in our cases, slightly different from Sharma et al. Monteiro from Manipur and Halesha et al [6] from Karnataka also found viper bite to be most common [7], which is different from study by Brunda et al [8] who found 6 cases with cobra bite 8 patients with krait but they did ELISA to diagnose type of snake bites. 16 of our viper bite patients went on to develop disseminated intravascular coagulation, 26 viper bites were complicated by acute renal failure. Sharma et al in their study of 142 cases reported 86 of their patients with cobra bite with neurotoxicity, 52 with viper bite having haemostatic features, male predominance, 27 cases developing acute renal failure which almost similar to our viper bite renal complication [9]. Harshavardhan et al [10] reported 246 cases of venomous snake bites and found viper bite to be the commonest (91.6%) and among them 77.7% developed acute kidney injury much higher than our study. One interesting laboratory finding in viper bite in our series was high creatine kinase ranging from 236U/L – 914U/L (mean 487.49 ± 188.91). It could be because of muscle necrosis or mild rhabdomyolysis. Our patients required around 10-30 vials in case of viper (mean 23.05 ± 6.7) as well as in cobra bite (mean 20.38 ± 5.58) whereas only 10 vials were needed in case of krait bite. 14 patients with renal failure required dialysis 9 patients having respiratory failure were put on ventilators. Supportive ventilator therapy varied from 25-56 hours. Looareesuwan et al [11] from Thailand reported 46 cases of fatal snake bite 13 deaths from kraits, 12 from cobra and 7 cases of viper bite, major cause of death in cobra bite was respiratory failure (26) emphasizing the importance risk of death due to respiratory failure in cobra bite. None of our patients of common krait envenomation succumbed whereas 23% of patients with cobra bite and 14.6% of cases with viper bite expired. Total mortality irrespective of type of snake in our cases was 9/57. Death due to acute renal failure was 23% and mortality attributed to respiratory failure was 33.3%. Halesha et al in their series of 180 patients reported overall 3.8% deaths much lower than ours but to be considered are almost double the number of patients. Suchitra et al [12] observed out of 586 snake bite, 200 bites to be by poisonous ones with total mortality 3% .25% of their cases had acute renal failure at par with ours. Sharma et al found 27 of their 142 patients having acute renal failure. They administered around 51.2 vials of anti snake venom to their patients with cobra bite much higher than our patients and average 31 vials to viper bite cases similar to ours. Mortality reported by them was 3.5%. Inamdar et al [5] studied 5632 cases of snake bite and observed overall death to be 5.4% not an insignificant number considering their large number of patients. Kalantri et al reported 29 deaths out of their 277 patients almost at par with ours. Hansdak et al [13] from Nepal reported a hospital based study where they found death from bite by neurotoxic snakes to be 22% of their 52 cases of suspected snake bites and overall mortality to be 3.8% which can be understood considering suspected.

**CONCLUSION**

Snake bite remains an important cause of morbidity and mortality inspite of availability of ant snake venom in India. Inappropriate application of unproved and unscientific remedy causing delay in proper management including administration of anti snake venom and other appropriate measures leads to complications as well as deaths which is preventable. Health centres need to be properly staffed ,medically trained ,last but not the least appropriate distribution of ant snake venom is the need of hour.

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