ORIGINAL ARTICLE

To determine cases of acute kidney injury in snake venomic patients

Arshied Hussain Bhat

MD Medicine
PHC, Verinag, Anantnag, Jammu and Kashmir, India

ABSTRACT:
Background: Snake envenoming is an important yet neglected tropical disease. The present study was conducted to determine cases of (AKI) acute kidney injury in snake venomic patients. **Materials & Methods:** The present study was conducted on 89 patients of snake venomic patients who had AKI of both genders. In all patients clinical characteristics, complications and outcome of duration of hospital stay, requirement for intensive care unit support, treatment with dialysis, survival and mortality were analyzed. **Results:** Out of 89 patients, males were 57 and females were 32. 56 patients were farmer, 28 were labourer and 5 were home makers. The mean Prothrombin time was 30.7 seconds, INR was 2.7 and partial thromboplastin time was 50.4 seconds. Maximum creatine kinase was 6578 IU/L. Mean ICU stay was 3.4 days and patients on ventilator were 65. The snake-envenomed syndromes were as isolated renal in 9, renal and hematological in 27, renal and neurological in 5 and renal, hematological and neurological in 48 patients. The difference was significant (P< 0.05). **Conclusion:** Authors found that Snake bite is a significant public health problem causing considerable morbidity and mortality. In present study, renal outcomes were relatively good.
Key words: Acute kidney injury, Prothrombin time, Snake bite

Corresponding author: Dr. Arshied Hussain Bhat, MD Medicine, PHC, Verinag, Anantnag, Jammu and Kashmir, India

Introduction
Snake envenoming is an important yet neglected tropical disease. It has a rural predisposition and is associated with strong economic and health implications.[1] Globally, the estimated snake envenoming is around 5.5 million annually and, in India, it is estimated that about 45 900 deaths occur annually due to snake bite. The 'Indian Big four' have been implicated in the majority of serious snake bites in India. They are the Viperidae-Daboia russelii (Western Russell's viper), Echis carinatus (Saw-scaled Viper), Elapidae— Naja naja (Spectacled Cobra) and Bungarus caeruleus (Common Krait).[2]
Snakebite-related AKI (sAKI) is a type of cAKI reported to affect from 8.0–43.0% of patients with snakebite envenomation, among whom approximately 15.0–55.0% required renal replacement therapy (RRT) and the fatality rate was 8.0–39.0%. Previous reports from Brazil have shown greater susceptibility to sAKI with increasing age.[3] Reported factors associated with sAKI included age 2 h, time from snakebite to receiving antivenom >2 h, longer duration from snakebite to hospital arrival, cellulitis, regional lymphadenopathy, hypotension, higher total bilirubin level, lower hemoglobin level, intravascular hemolysis, incoagulable blood on 20-min whole blood clotting test (20WBCT), prolonged bleeding time, prolonged prothrombin time (PT), hemorrhagic manifestations, serum creatine kinase >2000 IU/L, dark or brown urine color, albuminuria, and longer length of hospitalization.[4] The present study was conducted to determine cases of AKI in snake venomic patients.

Materials & Methods
The present study was conducted in the department of Internal Medicine. It consisted of 89 patients of snake venomic patients who had AKI of both genders. All were informed regarding the study and written consent was obtained. Ethical approval was obtained prior to the study.
General information such as name, age, gender etc. was recorded. A thorough clinical examination was done in all patients. In all patients clinical characteristics, complications and outcome of duration of hospital stay, requirement for intensive care unit support, treatment with dialysis, survival and mortality were analyzed. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

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Results

Table I Distribution of patients

Total- 89		
Gender	Males	Females
Number	57	32

Table I shows that out of 89 patients, males were 57 and females were 32.
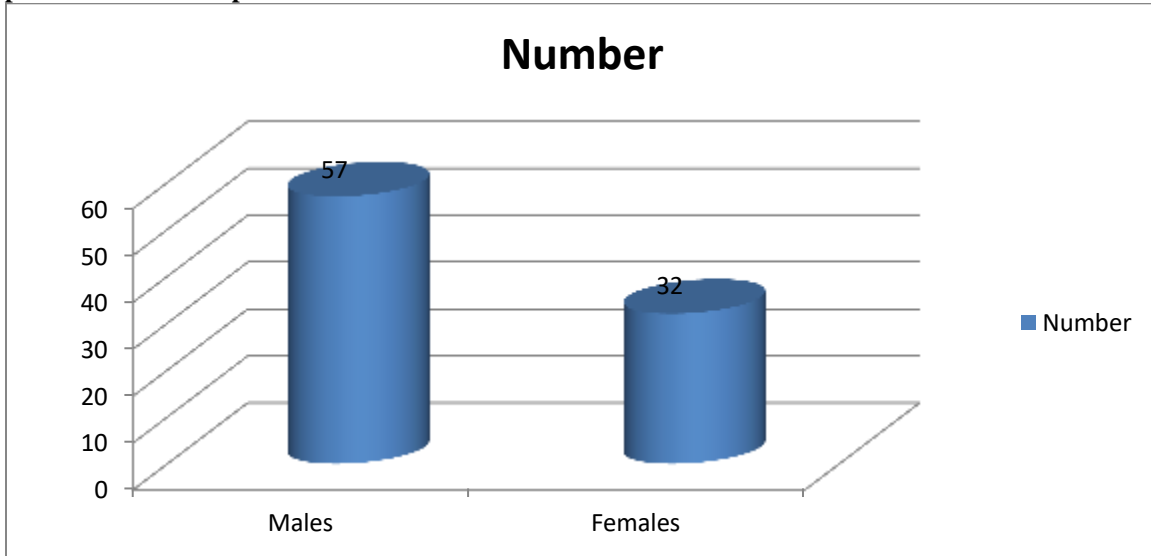
Graph I Distribution of patients

Table II Occupation of patients

Occupation	Number	P value
Farmer	56	0.02
Labourer	28	
Home makers	5	

Table II, graph II shows that 56 patients were farmer, 28 were labourer and 5 were home makers.
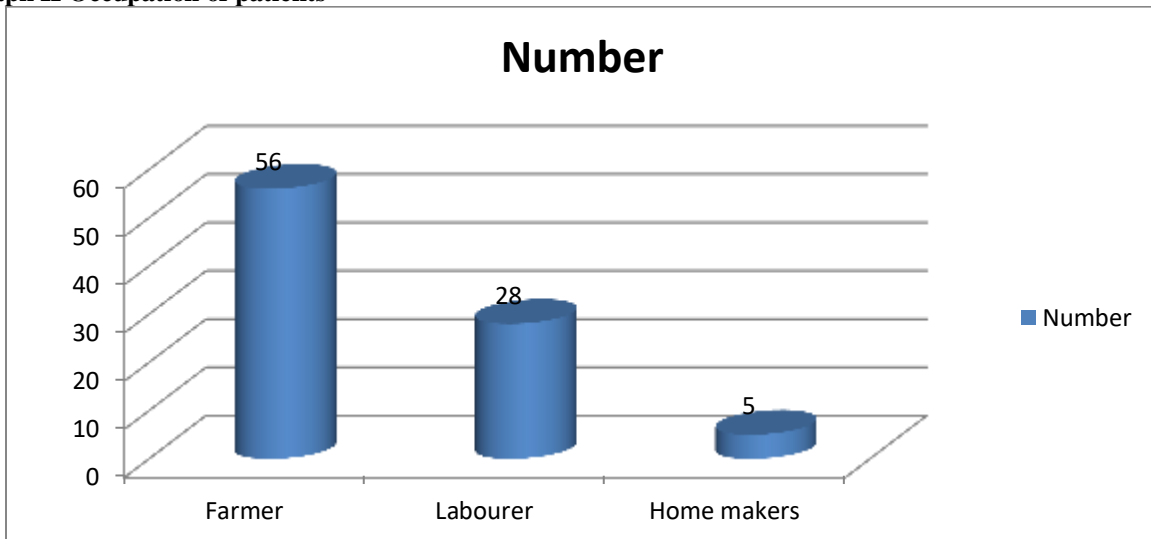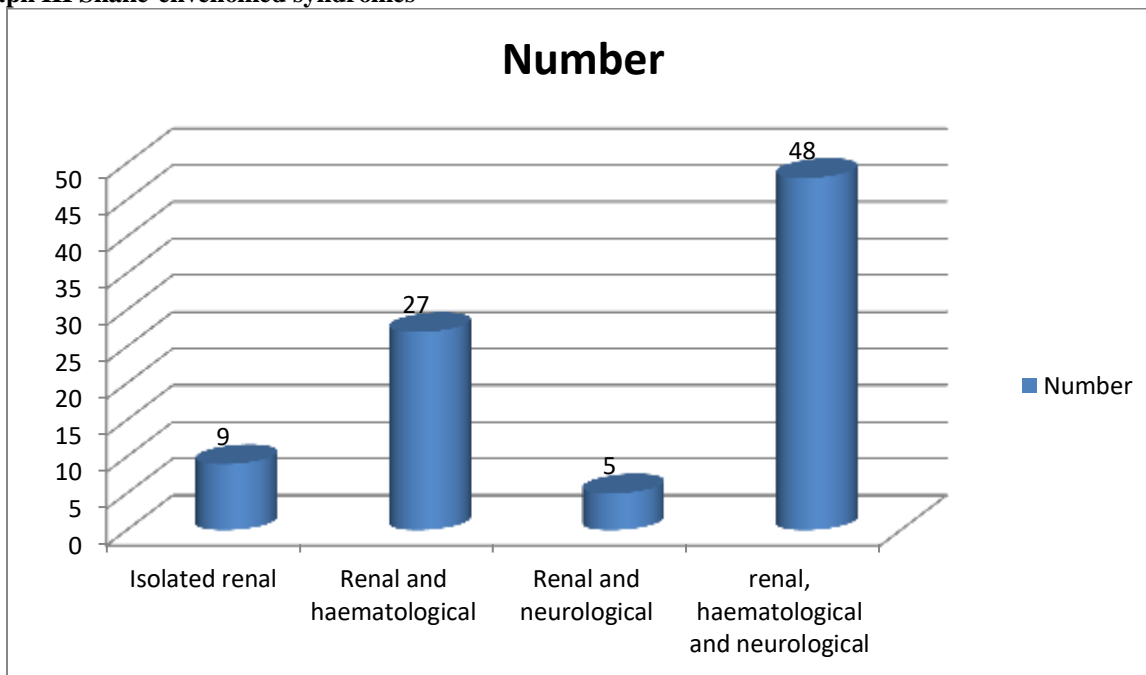
Graph II Occupation of patients

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Table III Assessment of parameters

Parameters	Mean
Prothrombin time (sec)	30.7
INR	2.7
Partial thromboplastin time	50.4
Maximum creatine kinase	6578
ICU stay (Days)	3.4
Patients on ventilator	65

Table III shows that in patients mean Prothrombin time was 30.7 seconds, INR was 2.7 and partial thromboplastin time was 50.4 seconds. Maximum creatine kinase was 6578 IU/L. Mean ICU stay was 3.4 days and patients on ventilator were 65.

Graph III Snake-envenomed syndromes

Graph III shows that the snake-envenomed syndromes were as isolated renal in 9, renal and haematological in 27, renal and neurological in 5 and renal, hematological and neurological in 48 patients. The difference was significant (P< 0.05).

Discussion

Snake bite is a significant public health problem causing considerable morbidity and mortality worldwide, particularly in tropics. Snakebite is now recognized as a Neglected Tropical Disease by the World Health Organization.[5] According to WHO estimates about 5 million people are bitten each year by poisonous snakes which results in 2.5 million envenomations, at least 100000

deaths, and 300000 amputations and other permanent disabilities. Majority of snakebite induced deaths occur in Asia and Sub-Saharan Africa.[6] The mortality due to venomous snakebite in India is estimated between 35000-50000 per annum, which is the highest in the world. The mortality due to venomous snakebite in

India continuous to be high due to various social, economic and cultural reasons.[7] The present study was conducted to determine cases of AKI in snake venomic patients.

In present study, out of 89 patients, males were 57 and females were 32. Ariaratnam et al[8] found that AKI was observed in 140 patients (54.3%), the majority of whom were AKI stage III (110 patients, 78.6%). AKI occurred at presentation and developed during hospitalization in 88 (62.9%) and 52 patients (37.1%), respectively. Twenty-seven patients died (19.3%), and 69 patients (49.3%) required dialysis. On multivariate logistic regression analysis, snakebites from the Viperidae family, WBC >10 × 103 cells/µL overt disseminated intravascular coagulation serum creatine kinase >500 IU/L, serum sodium <135 mmol/L, presence of microscopic hematuria, and (7) duration from snakebite to receiving antivenom ≥2 h were independently associated with AKI. Patients bitten by Viperidae with normal renal function who had serum sodium <135 mmol/L had a significantly higher urine sodium-to-creatinine ratio than those with serum sodium ≥135 mmol/L (p < 0.001).

We found that 56 patients were farmer, 28 were labourer and 5 were home makers. The mean Prothrombin time was 30.7 seconds, INR was 2.7 and partial thromboplastin time was 50.4 seconds. Maximum creatine kinase was 6578 IU/L. Mean ICU stay was 3.4 days and patients on ventilator were 65. Waikhom et al[9] found that One hundred and twenty-one patients were diagnosed with snake bite-induced AKI. Mean age was 42.2 ± 15.1 years and majority (58%) were women. Clinical details were available in 88 patients. The mean duration of arrival at hospital was 3.4 ± 3.7 d with a range of 1 to 30 d. Eighty percent had oliguria and 55% had history of having passed red or brown colored urine. Coagulation defect was seen in 89% patients. The hematological and biochemical laboratory abnormalities were: Anemia (80.7%), leukocytosis (75%), thrombocytopenia (47.7%), hyperkalemia (25%), severe metabolic acidosis (39.8%), hepatic dysfunction (40.9%), hemolysis (85.2%) and rhabdomyolysis (68.2%).

Herath et al[10] conducted a cohort study in patients >15 years of age with snake envenomation and serum creatinine >1.5 mg/dl over the past 10 years were identified through their discharge summaries. These patients were prospectively contacted, interviewed telephonically and requested to come for a hospital review. Of the 866 patients screened, 184 developed AKI (21.2%). Among these, 53% had combined renal, haematological and neurological manifestations; 33.6% required admission to the intensive care unit and 38% were dialysed. On follow-up of hospital records the creatinine of 49% of patients had normalized. Of those admitted, 36% were contacted and none had a known renal disease or were on dialysis. Among these, 16 patients came to the hospital for review and only 2 had an elevated creatinine. The total mortality was 14.

Conclusion
Authors found that Snake bite is a significant public health problem causing considerable morbidity and mortality. In present study, renal outcomes were relatively good.

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