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Clinical Profile and Outcome of patients with Snake Envenomation at Bharatpur Hospital Nepal

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ABSTRACT

Background: Snake bites are well-known medical emergencies requiring hospital admission. Krait and Cobra are common snakes leading to envenomation in Nepal. Timely identification of the envenomation leads to prompt treatment and decrease the morbidity and mortality. We aimed to study the clinical profile and outcome of patients with snake envenomation at Bharatpur Hospital, Nepal.
Materials and Methods: The Study was a descriptive cross-sectional study conducted in the Department of Medicine in Bharatpur hospital from April 2018 to September 2018. The patients of snake bites admitted with signs of neurological, hematological, local or regional envenomation were enrolled in the study. Clinical profile, duration of hospital stay and outcomes were noted and analyzed in the study.
Results: Out of 63 patients of snake bite, majority of snakes responsible for envenomation was due to Krait (38.1%) followed by Cobra (9.5%) and only 4 cases (6.3%) were due to Viper envenomation. The most common sign of presentation was Ptosis (69%) followed by difficulty in protruding tongue (42.9%). Mean number of Anti Snake Venom (ASV) vials required was 26.03. The mean duration of hospital stay in neuroparalytic cases was 46.8 hours while 60.5 hours in hematotoxic cases. There was a fatality rate of 11.1%.
Conclusion: Snakebite is a common life-threatening emergency in the study area. Majority of the patients were victims of Krait or Cobra bite. Early administration of ASV prevents respiratory paralysis after neuroparalytic snakebite. Timely intubation and mechanical ventilation in respiratory paralysis cases is life saving. The development of new and more effective Antivenom that better targets the species responsible for bites in the region would help in improving future patients' outcome.

Keywords: *Envenomation, snakebites, emergency, Clinical profile*

INTRODUCTION

Snakebites are well-known medical emergencies and a cause of hospital admission in many countries.[1] It is estimated that the incidence of snake envenomation in the world can exceed 5 million per year with an associated mortality rate of 125000 persons per year.[2] However, the true scale of this problem is unknown because of inadequate reporting in almost every part of the world.[1]

Out of 300 species of poisonous snake known in the world, 22 poisonous types have been reported so far in Nepal. The most commonly found poisonous snakes include 4 species of krait, 3 species of

cobra, 9 species of viper, 1 species each of coral snake, Himalayan pit viper, mountain pit viper and Russell's viper. The most common poisonous snakes in the terai and inner-terai regions of Nepal are Cobras and Kraits.[2]

Though there are limited studies in different parts of Nepal regarding the clinical profile, amount of ASV used and case fatality rate but no studies regarding the significance between the clinical profile and the duration of the hospital stay. Longer duration of stay is a burden to the patients and hospitals as well, since country like ours, which runs with limited bed and resources.

Thus, this study was aimed to determine the clinical profile and outcome of a venomous snakebite cases along with the duration of the hospital stay. The study would be helpful for the policy makers and the hospital management to formulate plans and policies regarding the management of snake envenomation patients.

MATERIALS & METHODS

This was a descriptive cross-sectional study conducted in Bharatpur hospital from April 2018 to September 2018. The ethical clearance for the research was taken from Institutional Review Board (IRB) of NAMS. Snakebite patients admitted in the Bharatpur hospital's ICU were included in the study. Those snake bite patients managed at other centers and wards were excluded from this study. A standard proforma containing demographic and clinical details was used for data collection. Verbal and written informed consent for the use of clinical and demographic data was taken. Proforma consisted of patient's identification, type of snake, fang mark, signs of envenomation, amount of anti-snake venom in vials used, length of stay in the ICU, ventilator support required and outcome of the treatment.

Signs of envenomation included in the study were: ptosis, loss of frowning of forehead, difficulty in protruding tongue, difficulty in swallowing, paralysis of all the limbs and broken neck sign. Blood samples were taken for the mentioned investigations along with urinalysis. The diagnosis of snake bite was established on the basis of a history of snake bite, examination of killed snakes when available, recognition of the snakes by patients and bystanders and clinical manifestations such as neurotoxic, hematotoxic, local and systemic symptoms.

The patients were managed by trained critical care physicians and healthcare workers. Anti-snake venoms used in these patients was Indian polyvalent antivenom provided by the Ministry of Health of Nepal. Envenomed patients were treated according to the National guidelines recommended by Epidemiology and disease Control Division (EDCD) or international guidelines by WHO. Initial high dose Anti snake venom (ASV) was given in most of the patients. Two vials of polyvalent ASV were given bolus followed by 8 vials of infusion in 100 ml of normal saline over 1 hour. Every hour the patient was re-evaluated and if the condition deteriorated then 5 vials were given and the dose was repeated up to a maximum of 30 vials.

RESULT

Total cases included in the study were 63. Age of the patient ranged from 4 to 75 years with male to female ratio of 1.25:1. Maximum patients were from Nawalparasi and Chitwan district which included 53% of patients followed by from various districts like Kapilvastu, Rupandehi, Butwal, Lamjung, Makwanpur, Gorkha and Dang. About 34 cases (54%) presented to our hospital before 6 hours of snake bite while 29 cases (46%) presented after 6 hours. The site of bite was mostly in the upper limb 27 cases (42.9%), 21 cases (33.3%) in the lower limb while 6 cases (9.5%) in the other parts of body like trunk, face, ear etc. Nine patients couldn't mention the site of the bite. Fang marks were present in 37 cases (58.7%).

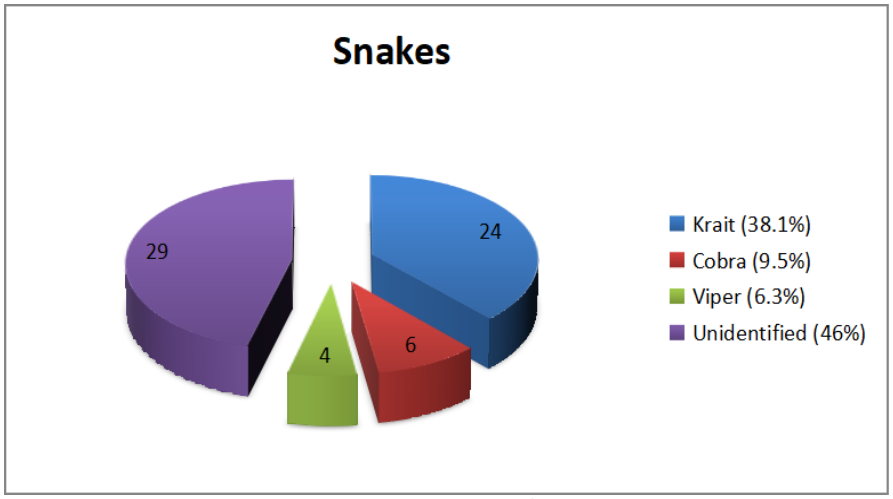

Fig. 1. Snakes responsible for bites.

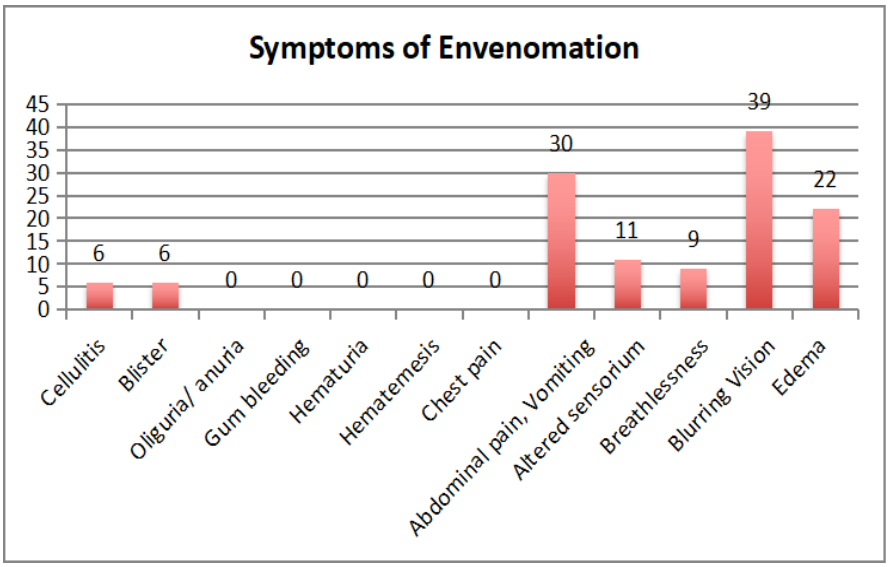

Fig 2. Symptoms of snake envenomation.

Cellulitis and blisters were found in 9.5% of patients. Edema was noted in 34.9% of patients. Total 61.9% had blurring vision, 47.6% patients had abdominal pain/ vomiting as a presenting feature amongst neuroparalytic snakebite.

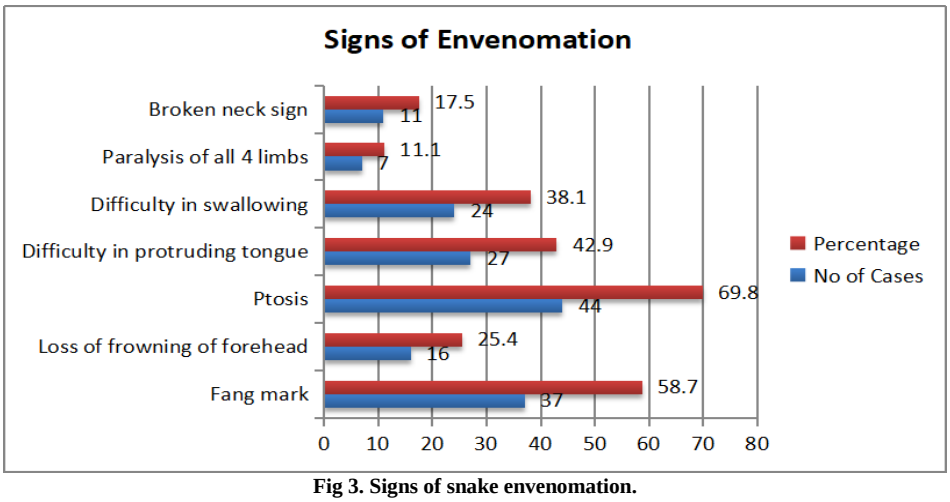

Fig 3. Signs of snake envenomation.

As seen in the Fig 3, Ptosis (69%) was the most common signs presented by the patients followed by difficulty in protruding tongue (42.9%), dysphagia (38.1%), loss of frowning of head (25.4%), broken neck sign (17.5%) and paralysis of all the limbs (11.1%).

Table 1. Laboratory profile in envenomous snake bite

Variables	Mean	Standard Deviation
Males	32.71	16.718
Females	35.93	17.455
Hb (gm%)	12.140	1.7453
Blood Urea (mg)	34.160	20.665
Sr. Creatinine (mg)	1.06	.848
BT (min) (hematotoxic)	4.38	2.829
CT (min) (hematotoxic)	22.67	19.479
PT (sec) (hematotoxic)	45.72	22.201
Platelet count	235865	73627
Dose of ASV for neuro-paralytic snake bite (units)	26.03	7.664

Table 1. shows the mean and SD of common variables evaluated. The mean ages for males were 32.71 year (±16.7) and for females were 35.93 years (±17). The mean hemoglobin was 12.1 gm% (±1.7).

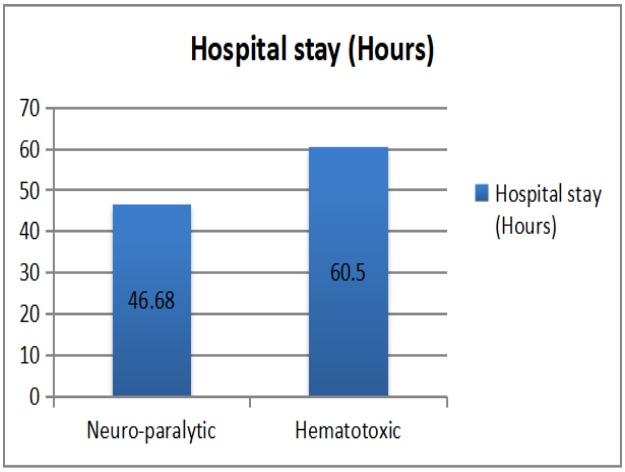

Fig 4. Mean duration of hospital stay.

Mean number of ASV vials required was 26.03. The mean duration of hospital stay in neuroparalytic cases was 46.8 hours while 60.5 hours in hematotoxic cases in this study.

Table 2. Clinical profile of the patient and outcomes

Variables	Outcomes		
	Cured		Expired
	Full Recovery	Residual Deformity/ Disability	
Neurotoxic			
Male	29	1	2
Female	20	0	5
Admission <6 hours of bite	28	0	3
Admission >6 hours of bite	21	1	4
Lower limb bite	20	1	2
Upper limb bite	17	0	2
Hematotoxic			
Male (n= 3)	3	0	0
Female (n=3)	3	0	0
Admission <6 hours of bite n=3	3	0	0
Admission >6 hours of bite n=3	3	0	0
Lower limb bite n=4	4	0	0
Upper limb bite Local n=2	2	0	0

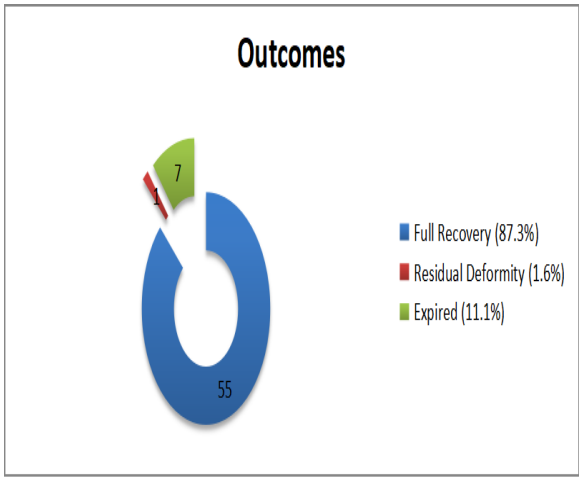

Fig 5. Clinical Outcomes following snake envenomation.

As shown in the figure 5, the case fatality rate was 11.1%. Total numbers of deaths were 7 among 63 cases mostly due to respiratory failure.

DISCUSSION

The common age group in this study was between 20-40 years with male: female ratio of 1.25:1 closely responding to the study of DP pandey[3] while 2.18:1 was observed in the other study.[4] Most of the poisonings were seen during June, July, August and some in September corresponding to the

monsoon season in Nepal.[3,5] This could be due to a larger number of these people being farmers and few doing outdoor works like cutting grass, looking cattles and few due to no access to light due to load shedding. Majority of snakes responsible for bites in the study was similar to that of the study by Poudyal et al.[5]

About 34 cases (54%) presented to our hospital before 6 hours of snake bite while 29 cases (46%) presented after 6 hours while other studies showed 78.64% patients before 6 hours and 21.35% after 6 hours of bite[6,7] while other studies observed about half of the patient presenting before 6 hours[4,8,9] and the bite in 27 cases (42.9%) was mostly in the lower limb, 21 cases (33.3%) in the upper limb while 6 cases (9.5%) in the other parts of body like trunk, face, ear etc which was observed to be similar to other studies.[4,8,10] About 9 cases, patients couldn't mention the site of the bite contradictory to other studies.[7] Similarly another study by Sarin et al shows that half of the bites occurred in the early morning hours between 2400h and 0600 h (50.9%) where ptosis was the most common symptom at admission occurring in 48 of 51 patients (94.1%).[11]

Ptosis (69%) was the most common signs presented by the patients followed by difficulty in protruding tongue (42.9%), dysphagia (38.1%), loss of frowning of head (25.4%), broken neck sign (17.5%) and paralysis of all the limbs (11.1%). Cellulitis and blisters were found in 6 (9.5%) patients. Oedema was noted in 22 (34.9%) patients. Oliguria/ anuria, gum bleeding, hematuria, hematemesis and chest pain were not noted in this study. 11 (17.5%) patients had altered sensorium, and 9 (14.3%) patients had breathlessness. Total 39(61.9%) had blurring vision, 30 patients (47.6%) had abdominal pain/ vomiting as presenting feature amongst neuroparalytic snake bite whereas 6 (25%) had neuroparalytic symptoms with pain abdomen, 5 (20.8%) had local signs (swelling, bleeding etc.) with systemic bleeding and one case (4.1%) had local signs, systemic bleeding and renal failure.[7] Similarly 8.33% of cases had mild local symptoms and signs, 29.17% had moderate severity with pronounced or prolonged symptoms or signs and 50% had severe or life threatening symptoms or signs. Significant cellulitis at the site of bite was noted only in a minority of patients (8 of 51; 15.7%).[11]

Venom produced by Elapids is neurotoxic, which results in a progressive, descending neuromuscular paralysis, leading to respiratory failure and death. Venoms should be neutralized as soon as possible before they are fixed to neuromuscular junction causing respiratory paralysis.[12] According to a study more than 25 vials of ASV[13] are not required for management of neurotoxic poisoning. The same protocol is being practiced in my study center too. ASV is most effective when delivered within the first 4 hours of the bite while of little value when administered after 12 hours of snakebite.[14]

Mean number of ASV vials required was 26.03 in our study while an average of 32 ASVS serum vials were consumed by envenomed victims.[3] The mean duration of hospital stay in neuroparalytic cases was 46.8 hours while 60.5 hours in hematotoxic cases in this study which is comparatively lower than that of the study done by Arshad et al.[4]

The Case Fatality Rate (CFR) was 11.1% which is mostly due to respiratory failure , near to the rate of that study by Pandey et al and Poudyal et al.[3,5] while a little higher than other studies.[12,5,15,16] This could be due to early presentation, availability of anti snake venoms, and the common use of protocol.[13]

CONCLUSION

Snake bite is a common life-threatening emergency. Krait and Cobra bite are the most common snakes leading to envenomation. Awareness regarding quick transport, correct first aid measures and training of primary level health workers can drastically bring down the mortality of this neglected tropical disease. Early

administration of ASV prevents respiratory paralysis after neuroparalytic snakebite. Patients with evidence of respiratory insufficiency after neurotoxic venom poisoning require timely intubation and mechanical ventilation. Case fatality rate can be brought down if well-equipped ICU settings and trained manpowers are available. The development of new and more effective antivenom that better targets the species responsible for bites in the region will help in improving future patients' outcomes.

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