Clinical Profile and Amount of Antisnake Venom Used in Admitted Cases of Snake Bite Envenomation in Bharatpur Hospital ICU

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ABSTRACT

INTRODUCTION: Snakebite remains a neglected medical problem of the developing world with up to 125,000 deaths each year despite more than century of calls to improve snakebite prevention and care. It is more prevalent in Terai and Inner Terai regions of Nepal especially during monsoon season. Snakebite can result in life-threatening envenoming and correct identification of the biting species is crucial for doctors to choose appropriate treatment and anticipate complications. The aim of this study was to address this gap in snakebite patients that presented to Bharatpur hospital and admitted to ICU.

METHOD: A descriptive cross-sectional study in snakebite patients that were admitted in Bharatpur hospital ICU from February 2016 to February 2017 was taken into consideration. A Standard criterion such as fang mark, ptosis and loss of frowning of forehead was used to identify snake bite patients using relevant history and examination. Amount of antisnake venom used and length of hospital stay was prioritized.

RESULT: A total of 54 patients admitted in Bharatpur hospital ICU with snake bite envenomation were studied. Most common snake envenomation was by Krait which accounted for 55.56% followed by Cobra with 40.74% and Viper with 3.7%. Fang marks were present in 24 cases (44.4%). Amount of anti snake venom (ASV) used in vials were in between 30-40 vials in 40.74%. Total number of ASV vials used was 381 while mean number of ASV used was 22 vials. Length of hospital stay was less than 5 days in 68.52%. Among the patients, 27.78% required ventilator support. Case fatality rate was 9.26% despite ICU treatment.

CONCLUSION: Majority of snake bite poisoning was by Krait and Cobra, which are neurotoxic and may cause respiratory paralysis requiring ventilatory support and ICU admission. However the study shows that maximum patients required shorter hospital stay and few patients only required ventilator support. Nonetheless, case fatality rate was still higher than expected. Hence this calls for well designed large scale assessment and revised protocols for better management of snake bite envenomation in the days to come.

KEY WORDS: Case fatality rate, Envenomation, Management, Snakebite, Treatment.

INTRODUCTION

Snakebite is an important medical emergency in tropical regions[1], including in Nepal where tens of thousands of people are bitten every year. Snakebite envenoming can result in life threatening complications like respiratory paralysis and correct identification of the biting species is crucial for appropriate treatment and to anticipate complications. The incidence of snake bites is high in warm regions, where snakes are abundant and economic activities are mainly agricultural.[2] It is estimated that the incidence of snake envenomation in the world may exceed 5 million per year with associated mortality rate of 125000 persons per year.[2] South Asian, Southeast Asian and Sub-Sahara African countries are the places with highest burden

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of snake bite.[3]Around 3000 known species of snakes have been identified in the world, 300 of them are poisonous to humans.[4]

In Nepal, a total of 77 species of snakes including 22 poisonous types have been reported so far[5]. Most commonly found species are Krait, Cobra, Viper, Coral snake, pit viper and Russell's viper. The commonest poisonous snakes in the terai and inner terai regions of Nepal are Kraits and Cobras[5]. In Nepal it is estimated that more than 20,000 snake bites occur every year with 1000 deaths occur in the hospital, mainly in the Terai region.[6] Snakebite is a disease of poverty. Farmers, plantation workers and herders are the main victims[7]. Elapid snakes –cobra (Naja naja) and common krait (Bungarus caeruleus), cause most of the snakebite envenoming in Nepal[8, 9]. Since 1998, Indian Polyvalent antivenom has been provided free of charge to all hospitals of Nepal by Ministry of Health. The treatment of envenoming varies widely, with antivenom total doses ranging from 2 to 115 vials[10]. Case fatality rates (CFR) also vary widely, from 3% to 58%[10].

This study was conducted to find out the case scenario of snake bite envenomation, amount of antisnake venom used, duration of ICU stay and case fatality rate at Bharatpur hospital ICU.

METHOD

A descriptive cross-sectional study was designed. The subjects were snake bite patients that were admitted in Bharatpur hospital ICU from February 2016 to February 2017. Snakebite patients admitted in the Bharatpur hospital ICU were included while those snakebite patients managed in emergency department, observation ward and medical ward were excluded from this study. A standard proforma containing demographic and clinical details were used. Verbal and written 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. Timing of onset of symptoms varied from 1 hour to 24 hours.

Signs of envenomation included in the study were: loss of frowning of forehead, ptosis, difficulty in protruding tongue, difficulty in swallowing, paralysis of all the limbs and broken neck sign.

The patients were managed by consultant physicians and well trained medical officers. ICU was facilitated with all the necessary equipments including ventilator support. Anti-snake venom used in these patients was Indian polyvalent antivenom provided by Ministry of Health of Nepal.

The diagnosis of snake-bite was established on the basis of a history of snake-bite with examination of killed snake when available, recognition of the snakes by patients and bystanders and clinical manifestations such as ptosis and loss of frowning of forehead.

Envenomed patients were treated according to the national guidelines recommended by epidemiology and disease control division (EDCD) in 2003 or international guideline by WHO. Initial high dose Antisnake venom (ASV) was given in most of the patient. Two vials of polyvalent ASV were given bolus followed by 8 vials infusion in 100 ml of normal saline over 1 hour. Every hour patient was re-evaluated and if the condition deteriorated then 5 vials was given and dose was repeated up to maximum of 30 vials.

RESULT

Total cases included in the study were 54. Age of the patient ranged from 8 to 76 years with male to female ratio of 1: 1.35. Maximum patients were from Nawalparasi district which included 51.85% of patients followed by Chitwan with 25.93%. Rest of them was from various districts like Kapilvastu, Rupandehi, Lamjung, Makwanpur, Gorkha and Dang. Fang marks was present in 24 cases (44.4 %) Types of snake have been depicted in the figure given below.

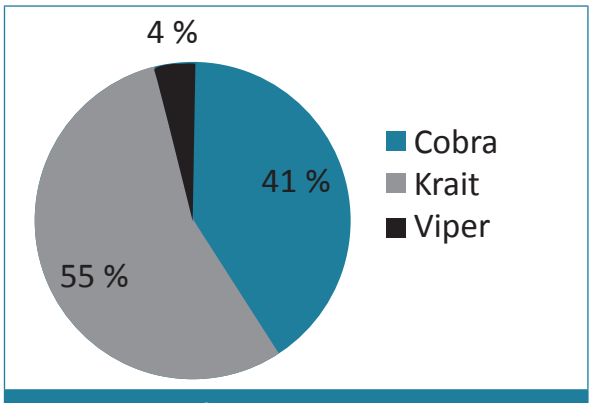

Figure 1: Types of snake

Majority of snakes responsible for bites in the study was due to Krait followed by Cobra and only 2 case of

Viper envenomation was present. Fang marks were present in 24 cases (44.4%)

Table1. Clinical presentation of cases (n=54)

Signs and Symptoms	Number of cases	Percentage
Loss of frowning of forehead	50	92.59
Ptosis	50	92.59
Difficulty in protruding tongue	39	72.22
Difficulty in swallowing	39	72.22
Paralysis of all 4 limbs	21	38.89
Broken neck sign	20	37.04

As seen in the table above Ptosis and loss of frowning of forehead was the most common signs presented by the patients followed by difficulty in protruding tongue, dysphagia, paralysis of all the limbs and broken neck sign.

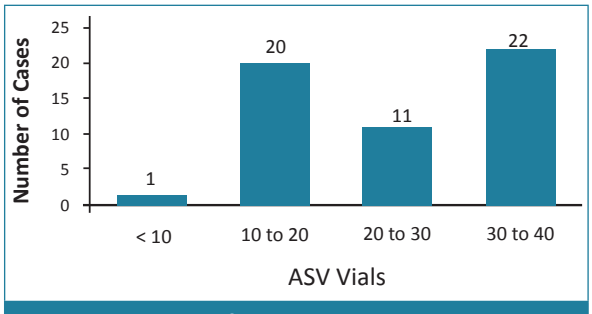

Figure 2: Amount of anti snake venom used in Vials

Mean number of ASV vials required was 22 while total number ASV vials used were 381. Length of hospital stay was less than 5 days in 37 cases (68.52%) and ≥ 5 days in 17 cases (31.48%).

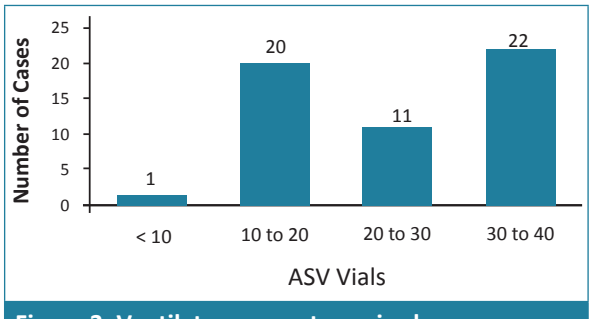

Figure 3: Ventilator support required

As seen in the figure above, maximum patients 39 (72%) recovered without the need of ventilator. Few of them needed ventilator support 15 (28%).

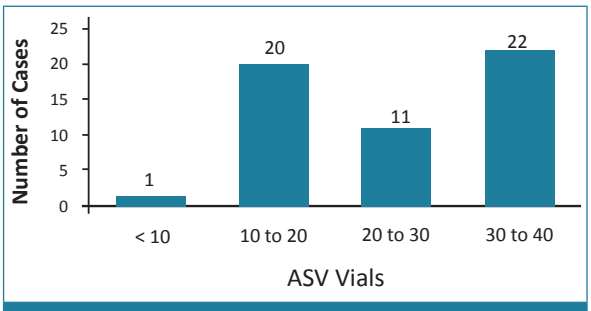

Figure 4. Outcome of the treatment

As shown in the figure above case fatality rate was 9%. Total numbers of death was 5 among 54 cases. Majority of them died due to respiratory failure.

DISCUSSION

This study revealed that snakebite is an important public health problem especially in Terai belt of Nepal. Unlike other studies[10, 11, 12] most of the snakebites occurred in younger age group of 10 – 30 years. This could be due to the fact that people of that age group, especially in rural communities are busy in outdoor activities like playing outdoor, firewood collecting, grass cutting, looking after the cattles and going to school exposing them to snakebites.

The study showed that females were more common victims of snakebite contrary to previous studies[13] which showed almost equal prevalence in both the sexes. This observation could be due to the fact that female populations are more involved in household chores and field works while male counterparts of younger age group are in cities or abroad earning for their living.

Snakebites was more common in Nawalparasi (51.58%) and Chitwan district (25.93%) while only few cases were recorded from Kapilvastu, Rupandehi, Lamjung, Dang, Makwanpur and Gorkha district. This might be because Nawalparasi and Chitwan district have more hot and humid climate suitable for wide varieties of snakes.

The commonest clinical finding in the present study was ptosis and loss of frowning of forehead as it was taken as important tool for the confirmation of poisonous neurotoxic bite and start of antisnake venom. Difficulty in protruding tongue and dysphagia was seen in more than 2/3rd of the patients while paralysis of all the limbs and broken neck sign was seen less frequently. Less

than 1/3rd of the patients presented with respiratory distress requiring ventilator support.

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. According to a study more than 25 vials of ASV[17] is not required for management of neurotoxic poisoning. Similar protocol is being practiced in our hospital setting too. ASV is most effective when delivered within first 4 hours of the bite while of little value when administered after 12 hours of snakebite[4].

The total case fatality rate observed in this study was 9.26%. It falls in the range of mortality of 3 to 58% found in previous studies[10] of Nepal but it contrasts with other studies which had less than 7% of case fatalities[14, 15, 16]. This could be due to the fact that in those studies ASV were used in high doses (>10 vials) in first hour along with better ICU facility and manpower. This could be because of early presentation of snake bite patients to hospital leading to early diagnosis and management of the cases.

In India, in 2007, a new protocol[17] was developed with the concept of aggressive use of antisnake venom within 3 hours of the development of first sign of envenomation, ptosis. It is stated that the use of ASV after the development of respiratory paralysis is not so beneficial. The use of new protocol resulted in a 66% decline in the amount of ASV administered to victims and the CFR were found to be decreased by 24%[18].

Although this was a hospital based cross-sectional study, this study is hoped to yield epidemiological statistics and information regarding clinical manifestation and ICU based management of the snakebite patients and serve to generate hypothesis for large scale studies to be conducted in the days to come.

CONCLUSION

Majority of the patients in this study were victim of Krait or Cobra bite. As both the snakes are neurotoxic, which may cause respiratory paralysis hence all the patients included were treated in ICU setting. Case fatality rate was comparatively low due to well equipped ICU setting and trained manpower but still there is room for improvement. The development of new and more effective antivenoms that better target the species responsible for bites in the region will help improve future patients' outcomes. Lastly, further study is recommended in our part of the region to evaluate the protocol recommended by both EDCD and WHO which considers the aggressive antisnake venom use within the first few hours of envenomation.

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