

Pattern of Snake Bite Cases at Tertiary Health Care Centre and First Aid Treatment

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Abstract

Introduction and Objectives: Snake bite is one of the public health problem often neglected, especially in tropical and developing countries of the world. Demographic and clinical parameters changes in different parts of the world. In India it is more prevalent in Kerala, Karnataka, Maharashtra, Tamilnadu, etc. This study was conducted in a tertiary health care centre in Maharashtra to demonstrate the epidemiology, management and severity of snake bite as an acute medical emergency situation to create awareness regarding the first aid treatment and to formulate policies for ASV availability.

Materials and Method: Tertiary health care based retrospective study was conducted from June 2017 to July 2018 and data was collected, analyzed and presented as percentage.

Results: In this present retrospective study a total of 131 cases of snake bites were observed in a tertiary health care centre and the mortality rate was found to be 1.53%. More than 50% bites were of Vasculotoxic Snake leading to severe systemic complications in 15% of the victims and death of 2 patients, ASV was required in 68% cases of snake bites.

Conclusion: To lower the incidences of Snake bites, awareness and preventive measures such as avoiding tall grassy areas, keeping storage areas clear of rodents, removing rubbish, raise beds above floor level and avoiding areas known to harbor dangerous snakes. Use of gumboots and long pants for working outdoors is advised. First aid treatment and assurance to patients are the most important primary management of Snake bites.

Keywords: Snake bite, Tertiary care hospital, Retrospective study, Anti-snake venom (ASV), secondary manifestations.

Introduction

Snake envenoming is a critical health issue¹, in terms of incidence and severity at global level. According to

WHO records there are 5.4 million snake bites worldwide each year, out of which 1.8-2.7 million are venomous leading to death of 81,000-1,28,000 people (14.58-37.26%) and permanent disability in more than 400,000 and other severe health consequences, and psychological sequelae². Nearly 2.8 million people suffer from bitten by snake bite in India, of which, 46,900 deaths have been reported every year (WHO) accounting for about 2.85-5.3% of mortality of total hospital admission in India³.

There are more than 3500 species⁴ of snakes out of which 600 are venomous², but only 250 are of medical important. There are 216 species of Snake in India, out

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of which only 52 are poisonous, and the most venomous five species are- common cobra, king cobra, krait, Russell's viper and saw-scaled viper⁵.

This study of the pattern of Snake bite is essential to provide information to the concerned authorities in order to manage it appropriately. As Snake bite is a neglected, life-threatening emergency and demands immediate anti-venom therapy, hospital studies provide a key source of information⁶. But people in country like India prefer traditional healers rather than trained doctors, as a result of whom 80% of snake bite victims in rural areas die outside the health care set up. The victims can die at home rendering their deaths unrecorded. Hence, a reliable epidemiological data is not present related to morbidity and mortality, as there is no proper reporting system related to snake bites⁷.

The outcome of Snake bite depends on numerous factors including the species of snake and type of venom, the site of bite on the body, amount of venom injected, health condition of the victim. Venomous Snake bites can cause paralysis that may prevent breathing (in neurotoxic bites), bleeding disorders (in vasculotoxic bites) which can progress to fatal hemorrhage, tissue damage which can progress to permanent disability and require limb amputation, irreversible kidney failure⁸. Disseminated intravascular coagulation can result in serious life threatening systemic complications like hemorrhage, infarction and even death if the treatment is delayed.

Snake antivenom immunoglobulins are the only specific treatment for envenoming by Snake bite⁹. The unavailability of effective ASV to treat the snakebite envenomings are encountered in various regions of the world. The first challenge in unavailability of antivenom is less specification about the requirements for antivenom at an operational, local level. The second challenge is education of the 'at-risk' population. As most of snakebite victims go to traditional healers, rather than to health centers, to receive treatment, because of the cost of medical care is out of proportion to the average income of a family of farmers. The third challenge is to improve the accessibility of antivenoms. The fourth and

final challenge is training of health personnel, including physicians, nurses, and public health professionals¹⁰.

So, awareness, early diagnosis, assurance of patient, safe, affordable and effective treatment of Snakebite envenoming is essential to reduce the suffering and death due to Snake bite.

Aims and Objectives:

1. To find out various factors influencing snake bite cases.
2. To assess the mortality and morbidity due to snakebite with respect to species of snake, type of venom, site of bite and treatment with anti-venom.

Materials and Method

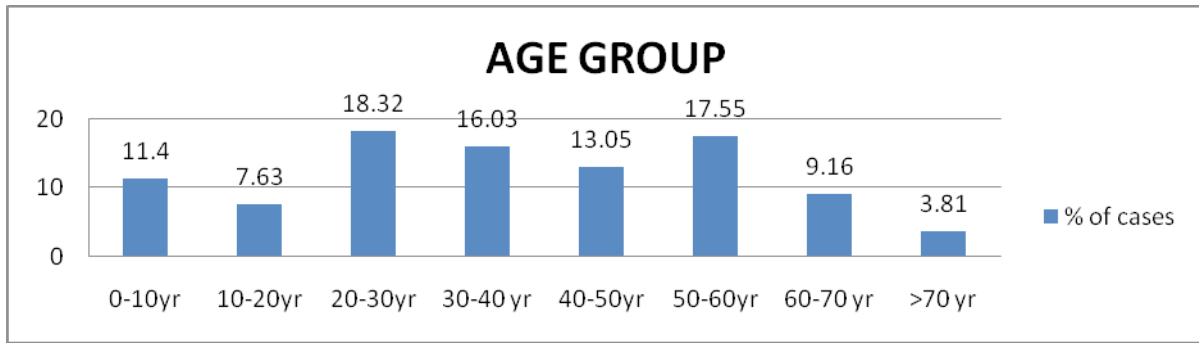
A tertiary health care centre based Retrospective study of snake bite was conducted from June 2017 to July 2018 and a total of 131 cases were analyzed. A detailed information was obtained regarding the factors influencing the snakebite related mortality and morbidity with reference to type of snake if identified, type of envenomation, victim's age, sex, residence, occupation, site of bite, place of bite, clinical manifestations of snakebite, first aid and management of snakebite, antivenom treatment from the hospital records they were investigated during the study.

Methodology: The record of retrospective data was collected from the institutional admission and death register. The data was collected from the hospital records using pretested proforma and analyzed using descriptive statistics and all results were expressed as percentage.

Findings: In this retrospective study of snake bite 131 cases were analyzed and death was observed only in 2 cases. Mortality rate was 1.53%.

The incidence of snake bite was reported in more in the season of monsoons -64.2% (June –September), followed by summer-18.2% (February-May) and less in winter-17.6% (October-January).

In this study 61.2% patients were male and 38.8% were female with the ratio of MALE: FEMALE -1.57:1.



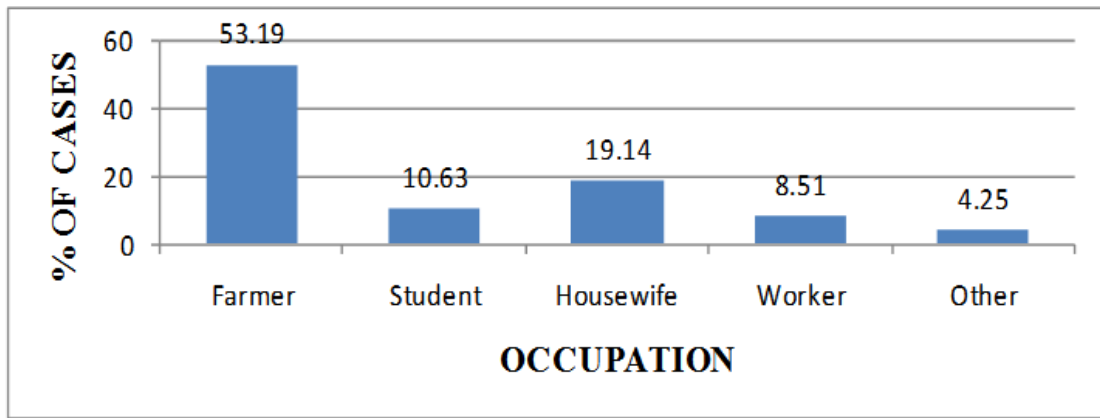
Graph 1: Age wise distribution of case’s related to snake bites.

Maximum incidences of bites were in the afternoon (44%- during day time), followed by morning (31%) accounting for 75.55% bites in the daytime followed by 24.45% bites in the night.

63% of victims arrived to the tertiary care centre within 6 hours, and most (70.21%) of them were referred either from primary health care centre/private hospital/

clinics. 75% of the victims were conscious at the time of hospitalization and majority of the patients were admitted in the hospital for 3-5 days (54.19%) followed by 6-10 days (29%) for observation, improvement and recovery.

In this study 67.93% of victims belong to rural population and rest 32% from urban area.



Graph 2: Distribution of snake bite cases related to occupation.

The snake bites were more in lower limbs (52.57%), followed by upper limbs (44.81%) and trunk (2.58%), in 56.88% cases both upper and lower limbs of left side were involved followed by right limbs in 40.5%.

48.93% of the victims were aware of first aid treatment, and in 10.63% of cases, patients were totally involved in either other traditional healing practices.

Local findings such as pain, swelling at the site, bleeding, tingling sensation and numbness, blackish

discolouration of skin were observed in 95.74% cases.

Severe secondary manifestations like kidney damage, necrosis, intracerebralhaemorrhage, retinopathy, cellulitis, respiratory failure, disseminated vascular coagulopathy were observed. In USG Findings in 6% of total cases there was acute kidney damage requiring for dialysis. With the available records it was found in this study that 13% of victims required blood transfusion in snake bite cases.

Table 1: Laboratory Findings

Lab parameters (Variation)	% of total cases
Increased urine albumin	46
Increased urine sugar	14
Increased Clotting Time	17
Leucocytosis	31
Thrombocytopenia	24
Increased Prothrombin time	57
INR	55
Decresed Hb	29
Hypokalemia & hyponatraemia	35
Increased Random Blood sugar level (No H/o of DM)	41

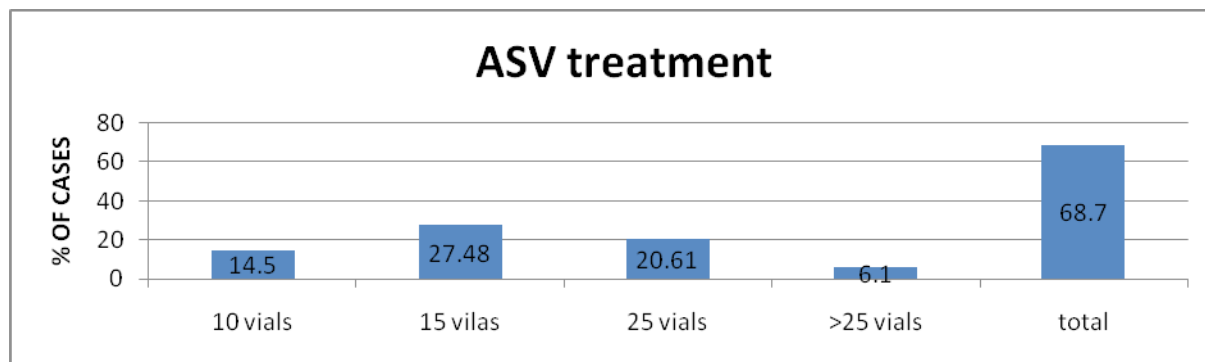
In 56.48% cases the snake were identified as venomous and russell’s viper was the major cause in 13.41% cases of vasculotoxic snake bites.

The 2 Deaths (both female patient) observed in the study were due to disseminated intravascular coagulopathy and respiratory failure due to vasculotoxic bite.

In patients treated with ASV only 7% showed hypersensitivity reaction and side effects like nausea, excessive sweating, and vomiting, itching, discomfort was noted in 21% cases.

Table 2: Distribution of cases related to type of bite

Type of Bite	% of Total Bites	% of Secondary Manifestations/Severe systemic complications	% of Deaths	% Of ASV Treatment
Unknown Snake Bite	38.93	4.58	0	22.13
Non Poisonous Snake Bite	4.58	0	0	0
Vasculotoxic Snake Bite	54.19	15.26	1.52	44.27
Neuroparalytic Snake Bite	2.29	1.52	0	2.29
Total	100	21.37	1.52	68.7



Graph 3: Distribution of cases based on amount of ASV treatment given.

Discussion

The higher incidences of Snakebite and its fatalities were at the peak during the monsoon season (64.2%), probably due to increased agricultural work, flooding caused, increased snake activity along with abundance of their natural targets. Similar finding were seen in studies conducted at Chitradurga, Karnataka¹² with 71.42 %, South Indian Study⁹ with 68.8%, and in contrast to the result of study conducted at hospitals of Kenya¹⁵, where

bites were more in dry season.

From this study it can be seen that higher incidences were in patients of middle age group i.e. 20-50 years (64.95%) and in males (61.2%) due to their active involvement in outdoor occupation, agriculture, and other labor works .Similar findings of incidences in middle age group were observed in studies conducted at Haldia¹¹ with 45.23%, Chitradurga, Karnataka¹² with 54.15%, South Indian study⁹ with 52.6%.The

findings of more incidences in males were observed in the international studies conducted at Srilanka¹⁴ with 59%. In Indian studies similar findings were observed in studies conducted at chitradurga Karnataka¹² with 58%, Haldia¹¹ with 64.29%, South Indian study⁹ with 74.4%, Malabar, North kerala¹³ with 65%.

The incidences of snakebites were more in the bites in the daytime i.e. 75.55% followed by 24.45% bites in the night due to occupational necessities. The studies with similar findings were seen at Chitradurga, Karnataka¹² with 51.42% and contrast to the observed results at Malabar, North Kerala¹³ with more bites were in evening, South Indian⁹ study with 64.44% bites in evening and night time. In this study the incidence of snakebites were more in rural population (68.2%) and in farmers(53.19%) as snakes hide near the fields and farms due to which their accidental contact occur while working in field barefooted, which is common phenomenon in India. Similar observations were seen with studies conducted at South Indian study⁹ with 79.25% rural population with 56.66%farmer, Haldia¹¹ with 69.04%farmers. The snake bites were more in lower limbs (52.57%), followed by upper limbs (44.81%) due to working without proper shoes. Similar results were observed at Malabar, North kerala¹³ with 77% bites in lower limbs, Chitradurga, Karnataka¹² with 59.32%, South Indian study⁹ with 65.17%, Haldia¹¹ with 64.28%.

Laboratory Analysis: Showed leucocytosis, thrombocytopenia, increased Prothrombin time & INR in 31%, 24%, 57%, 55% cases respectively, which suggest bleeding tendencies and clotting disorders in snake bites. Hb value was below normal (12.5 gm/dl) in 29% cases. Similar lab findings were observed in the study conducted at Malabar, North kerala¹³ with Leucocytosis in 36%, Thrombocytopenia in 29%, PT prolongation in 26.58%, Decreased Hb in 23% cases.

In the study, the victims who received first AID treatment before coming to the tertiary health care centre and those who didn't received first aid and had no Secondary manifestations were 40.42%, and 34.04% respectively. The findings were significant (Calculated $X^2=0.00366$, $df=1$, $p<0.05$). No ASV treatment was required in patients who received first AID treatment before coming to hospital was 14.89%, to those who didn't received First AID was 10.63%. These findings were also significant (Calculated $X^2=0.0083$, $df=1$, $p<0.05$). Out of the 131 cases, in 74 cases the snake venom was identified as vasculotoxic or neurotoxic. Mortality was

observed in 2.70 % vasculotoxic bites, whereas no deaths were recorded with neurotoxic bites. The findings were significant (Calculated $X^2=0.0144$, $df=1$, $p<0.05$).

Envenomations were observed in 56.48% cases consisting of 2.29% neurotoxic and rest vasculotoxic snake bites, most common with Russell's viper. Similar observations of vasculotoxic bites were seen in studies conducted at Malabar, North Kerala¹³ with 61%. In Srilankan¹⁴ study 44% of snakes were identified and Russell's viper as major cause of vasculotoxic bites in 70% cases was seen in the study conducted at Malabar, North Kerala¹³. Local findings were observed in 95.74% cases with similar findings in studies conducted at chitradurga, Karnataka¹² with 80%, srilanka¹⁴ with 89%.

Monovalent or polyvalent ASV is the ideal treatment in case of envenomation by snake bites. In India polyvalent ASV vials are available which are used according to manifestations of signs & symptoms and severity of the patient. In the study ASV was given to the 68% patients with usual dose of 15-25 vials in 48.09% cases. Similar results were found in studies conducted at South Indian Hospital Study⁹ with 52.22% ASV and usual dose of 11-20 vials.

Conclusion

This study emphasizes the importance of Snake bite as a medical emergency and significant threat to the community in the developing & tropical countries. In the present study Vasculotoxic Snakebites were more common leading to Severe Acute kidney injury, HTN retinopathy, Potential to cause renal necrosis, and even death. Disseminated Intravascular Coagulopathy in Vasculotoxic bites were the leading cause of mortality.

Lack of awareness, delay in coming to hospital and treatment by unqualified people addsup to increase the risk of mortality. Under-reporting of Snake bite occurrences have contributed to the variations in observed incidences of it, so Surveillance of envenomations is essential for establishing guidelines, planning therapeutic supplies, and training medical staff on Snakebite treatment. Also it is observed that Snake bite still remains as a major occupational (farming) hazard affecting productive age group and predominantly males in rural area.

To lower the incidences of Snake bite, awareness and preventive measures such as avoiding tall grassy areas, keeping storage areas clear of rodents, removing rubbish, raise beds above floor level and avoiding

areas known to be inhabited by dangerous snakes, use of gumboots and long pants for working outdoors, can be advised to the people. First AID treatment and assurance to the patient are the most important primary management of Snake bite.

In most of the cases, bite marks are non identifiable as they are small and due to which the victim develops either neuroparalysis/hypovolemic shock or other severe systemic symptoms within hours. So, efforts should be done for identification of venomous Snake.

Conflicts of Interests: None

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from the Institutional Ethical Clearance Committee of Krishna Institute of Medical Sciences, Karad.

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