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Original Research Article

A study to assess the clinical profile of patients with snake bites in a tertiary care hospital

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ABSTRACT

Background: Snakebite is a life-threatening medical emergency. It occurs frequently among rural people, especially those working in the fields. Most houses in rural areas of India are made of mud and have many crevices where rodents flourish. Delay in seeking medical aid or ignorance among primary care physicians about the correct treatment of snakebite is responsible for the high morbidity and mortality. Authors objective was to study the clinical profile of snake bite at a rural tertiary care centre.
Methods: A hospital based cross sectional study was conducted at M S Rammaih Medical College Bangalore from June 2017 to June 2018. The incidence of Snake bite in Karnataka is 0.5% and at 95% confidence interval with Margin of error at 1% the estimated sample size was 197, but in this study author were able to collect data of 237 cases, hence all the cases were included in the study and analyzed.
Results: Majority of the respondents were middle aged between 21-50 years. Around 63.3% of the respondents were male and nearly 56.2% were farmers. The incidence of snake bite of Cobra was seen in 8.9%, Krait 5.1% and viper 4.2%. Around 70% patients had no significant complications following hospitalization in our study. Around 20% had hematotoxic like ARF, DIC and local gangrene.
Conclusions: Snakebite is one of the common hazards especially in rural setup as agriculture being the main occupation. Snake bite can present with various manifestations at bite sites, neurotoxicity, hematotoxicity.

Keywords: Cobra, Emergency, Krait, Mortality, Poison, Snake bite

INTRODUCTION

Snakebite is a life-threatening medical emergency. It occurs frequently among rural people, especially those working in the fields. Most houses in rural areas of India are made of mud and have many crevices where rodents flourish.

Snakes have easy access to the interiors of such houses and often enter them in search of food.[1] Firewood and dried cow dung, stored in or near the house, provide easy shelter for snakes and rodents.[1,2]

In India, an estimated 35000-50000 lives are lost per year due to snakebite.[3]

Delay in seeking medical aid or ignorance among primary care physicians about the correct treatment of snakebite is responsible for the high morbidity and mortality.[1]

Snake bite is predominantly an occupational hazard in the rural tropics. Worldwide, the published statistics on the incidence, morbidity, and mortality from snake bite, largely based on hospitalized patients, are grossly inadequate.[4,5]

In developing countries where this condition is most common, the majority of victims initially are treated by professional snakebite healers, snake charmers, and religious men, who use herbal remedies, chant divine "mantras," and apply "snake stone, "all of which are supposed magically to draw out the venom from the victim.[6]

More than 2,700 species of snakes are recognized the world over, but only about 450 of these have front fangs that make them capable of injecting venom during the bite.[7] Death often occurs even before the patient can be brought to the hospital. According to most conservative estimates, the global annual mortality from snake bite is around 40,000. Of these, approximately 10,000 deaths occur in India due to various systemic disorders complication.[8]

The venomous snakes belong to four families: elapidae, viperidae, hydrophiidae, and colubridae. There are two important groups (families) of venomous snakes in Southeast Asia -Elapidae have short permanently erect fangs. This family includes the cobras, king cobra, kraits, coral snakes and the sea snakes. Viperidae have long fangs which are normally folded up against the upper jaw but, when the snake strikes, are erected. There are two subgroups, the typical vipers (Viperinae) and the pit vipers (Crotalinae).[9] The concept of the "Big 4" Snakes of medical Importance in India are- the Indian cobra (Naja naja), the common krait (Bungarus caeruleus), the Russell's viper (Daboia russelii) and the saw-scaled viper (Echis carinatus).[10,11]

Acute renal failure is mainly observed following bites by the viperidae group, sea snakes and the colubridae group, but the substantial number of cases result from viper bites. Tubular necrosis and cortical necrosis are the main causes of ARF.[12]

The oral flora of snake comprises a wide range of aerobic and anaerobic micro-organisms, especially the fecal Gram-negative rods, because their prey usually defecates while being ingested.[13]

Culture of fangs, fang sheaths, and venom of various snakes such as bothrops, vipers, rattlesnakes and naja naja, have shown heavy colonization with many bacteria, including members of Enterobacteriaceae including *Morganella* spp. and *Escherichia coli*, Group D *Streptococci*, *Aeromonas spp*., and anaerobes such as *Clostridium spp*.[13-15] Soft tissue infections are a major complication of snakebite with local envenoming. The proteolytic properties of snake venom cause extensive tissue destruction and devitalization, thus predisposing the wound to bacterial infection from the snake's indigenous oral flora.[13]

Although bacteria are a major cause of wound infection in snakebite patients, the role of prophylactic antibiotics to prevent their formation is debatable.[16] This analysis aims to ascertain the presentation and outcome of patients with snakebite in a rural setting.

Objectives of the author was to study the clinical profile of snake bite at a rural tertiary care center.

METHODS

A Hospital Based Cross Sectional Study was conducted at M S Rammaih Medical College Bangalore from June 2017 to June 2018.

The incidence of snake bite in Karnataka is 0.5% and at 95% confidence interval with Margin of error at 1% the estimated sample size was 197. But in this study authors were able to collect data of 237 cases. So, the analysis was done for the sample of 237 cases.

All the patients with a history of snake bite and reported to the emergency ward or Medicine ward were included in the study.

All the information regarding sociodemographic Data was collected in the predesigned, pretested and Semi structred Questionnaire by interview method by the Investigator.

Inclusion criteria

All cases with History of snake bite and presence of flag Marks with one or more clinical manifestation of snakebite like local swelling, hemorrhages, blister formation, vomiting, abdominal pain, regional lymphadenopathy etc. was included in the study.

Exclusion criteria

Patient with known history of bleeding disorders with acute and chronic liver disease, chronic alcoholics and on anticoagulation therapy were excluded from the study.

Clinical history taking and complete physical examination were done in each case. Laboratory investigations: Complete hemogram, bleeding time, Clotting time, Coagulation profile, Blood sugar, renal function tests, serum electrolytes, ECG, Chest X ray, Urine albumin and microscopy.

All patients received tetanus toxoid. Anti-Snake venom was given to patients with signs of envenomation (Local and/or Systemic). The anti-snake venom (ASV) was administered by the intravenous route.

Statistical analysis

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 21 version software. Categorical data was represented in the form of Frequencies and proportions. Continuous data was represented as mean and standard deviation.

RESULTS

A total of 237 snake bite cases were reported and analyzed in this study. Majority of the respondents were middle aged between 21-50 years. Around 63.3% of the respondents were male and nearly 56.2% were farmers followed by 26% laborers. Nearly 74% were residents of rural area (Table 1).

Table 1: Socio demographic profile of subjects.

Social Profile		Count	%
Age	<10 Years	11	4.6%
	11 to 20 Years	43	18.1%
	21 to 30 Years	67	28.3%
	31 to 40 Years	54	22.8%
	41 to 50 Years	35	14.8%
	51 to 60 Years	18	7.6%
	61 to 70 Years	6	2.5%
	>70 years	3	1.3%
Gender	Male	150	63.3%
	Female	87	36.7%
Occupation	Farmer	134	56.5
	Labourer	62	26
	Others	47	17.5
Residence	Rural	175	74
	Urban	62	26

The incidence of snake bite of Cobra was seen in 8.9%, Krait 5.1% and viper 4.2%. Nearly 81.9% of the subjects could not identify the species of snake which had bitten them. The timing of the snake bite was more in the afternoon and evening in our study, the time is peak hours of agriculture work and darkness in the evening.

Nearly 56.1% the bite was seen among the people who were residing in the indoor region and more often the bite is seen in lower limb (62.4%). The time lag between the time of the bite and the treatment availed was less than 6 hrs in 84.8%. Only 1.3% of the subjects took more than 24 hrs for the available of treatment. Nearly 24.5% of the study subjects in our study had visited for traditional or other methods of cure before coming to the hospital (Table 2).

Nearly 84.4% of the respondents in this study had pain and tenderness at the site of the bite, 67.5% had swelling. The Bleeding from the site of bite was most common hematotoxic manifestation seen in our study and was mostly seen in the viper snake bites. Ptosis and respiratory paralysis was seen in as the neurotoxic Manifestation and was mostly seen in krait and cobra bites.

Around 70% patients had no significant complications following hospitalization in the study. Around 20% had hematotoxic like ARF,DIC and local gangrene (Table 3).

Table 2: Snake bite history.

History of snake bite		Count	%
Type of snake	Cobra	21	8.9%
	Krait	12	5.1%
	Unknown	194	81.9%
	Viper	10	4.2%
Time of bite	6 am to 12 pm	66	27.8%
	12 pm to 6 pm	82	34.6%
	6 pm to 12 am	72	30.4%
	12 am to 6 am	17	7.2%
Place of bite	Indoor	133	56.1%
	Outdoor	104	43.9%
Site of bite	Upper limb	83	35.0%
	Lower limb	148	62.4%
	Other	6	2.5%
Time lag	<6hrs	201	84.8%
	6 to 24 hrs	33	13.9%
	>24 hrs	3	1.3%
Outside hospital	Yes	58	24.5%
	No	179	75.5%

Table 3: Clinical features among snake bite subjects.

Clinical features		Frequency	Percentage
Local Manifestation	Pain and tenderness	200	84.4
	Swelling	160	67.5
	Multiple manifestations	46	19.4
Haematotoxic manifestation	Yes	30	12.7
	No	207	87.3
Neuroparalytic manifestation	Yes	68	28.7
	No	169	71.3

The first aid technique of the tourniquet application above the site of the bite was practiced in only 10.1% of the subjects, 9.3% of them had Incision near the site of the bite and only 0.8% had applied from herbal or other system of medicine (Table 4).

The administration of ASV was done along with TT administration. Average number of vials of ASV used in treatment of poisonous snake bites in this study was 6.8 vials. Out of 237 cases of snake bite 23 cases died during the course of the treatment.

Table 4: First aid and ASV received among snake bite subjects.

Treatment of snake bite		Count	%
Tourniquet application	Yes	24	10.1%
	No	213	89.9%
Incision or bleeding	Yes	22	9.3%
	No	215	90.7%
Allopathic or herbal	No	235	99.2%
	Yes	2	0.8%

DISCUSSION

In this study 46 cases of snake bite was reported in study period. The snake bite was seen among all the age groups in our study which is comparable to the study findings of Sawai and Nigam P.[11,17]

The incidence of snake bite was more among males in the study it can be attributed to occupation and working of the male in the field more than female and more in the rural areas as see in the findings of Bhat R N.[18] The same study also found that the incidence of snake bite was more in outdoor than indoor like our study.

The timing of the snake bite was more in the evening and night when the natural light was dim or in the dark. This is due to less visibility of snake in dark and accidental interaction with snakes. These responses in our study was seen similar to the findings of Sawai et al.[11] Afternoon bites correspond to peak agricultural activity, while evening bites are combination of activity and poor lighting.

The site of the snake bite was more in the lower limb as seen in the study done by Sawai and Bhat R N.[11,18]

The haemorrhagic manifestation was seen in 12.7% of the subjects and neurological manifestation was seen in 28.5% of the subjects. The Hemorrhagic symptoms was more common when compared to neurological which is similar to the findings of the Nigam P, Sarangi A.[17,19] There was no Cardiotoxicity symptoms was seen in any of the patients this can be attributed to the non-prevalence of such toxic snakes in this geographical area.

All the patients who printed with neurotoxic manifestations had ptosis which was commonest manifestation of neurotoxic bites. Frequency of ptosis was 80% in study by Sarangi A and 85% in Nigam P study.[17,19] It was also noted to be the earliest manifestation.

CONCLUSION

Snakebite is one of the common hazards especially in rural setup as agriculture being the main occupation. Snake bite can present with various manifestations at bite sites, neurotoxicity, hematotoxicity. Complication like acute kidney injury, respiratory failure, shock and lack of health education, patients knowledge regarding snakebite and its complications, leading to delayed presentation to the hospital.

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