

CLINICAL PROFILE OF SNAKE BITE AT A RURAL TERTIARY CENTRE, KOLARAnitha Aswathanarayana¹, Srinivasa S. V², Prabhakar Kamarth³¹Assistant Professor, Department of General Medicine, SDUMC, SDUAHER, Tamaka, Kolar, Karnataka.²Associate Professor, Department of General Medicine, SDUMC, SDUAHER, Tamaka, Kolar, Karnataka.³Professor, Department of General Medicine, SDUMC, SDUAHER, Tamaka, Kolar, Karnataka.**ABSTRACT****BACKGROUND**

One of the medical emergencies in our country among rural population is snake-bite particularly where agriculture is the main occupation of many people. Most houses are made of mud in rural India. Snakes enter the houses in search of food. More than 2,700 species of snakes are recognized world over, but only about 450 of these have front fangs that make them capable of injecting venom during the bite. Fortunately, only a few of them are known to be of medical importance.

METHODS

Complete history was elicited from the patients and patients' attenders. General physical examination was done in each case. Investigations done were- complete haemogram, bleeding time, clotting time, coagulation profile, blood sugar, renal function tests, serum electrolytes, ECG, chest x-ray, urine albumin and microscopy.

RESULTS

A total of 237 snake bite cases were reported and analysed in our study. Snake bite was common in age group of 18-30 years (51%). Males (63.3%) were affected more than Females (36.7%). Snake bite was more common between 12 PM to 6 PM. Snakebite occurred more in indoor (56.3%) than outdoor (43.9%). Among 237 snake bite patients, 78 (33%) patients showed signs of systemic envenomation, out of which 45 (19%) showed neurotoxicity, 21 (8%) had haematotoxicity and 12 (5.1%) had both neuro and haematotoxicity.

CONCLUSIONS

Snake bite is a major health problem in our country in rural areas. It requires early identification of envenomation. It requires early treatment to prevent complications, and reduction in mortality. Our study gives knowledge about snake bite envenomation, prevalence, at tertiary centre in rural area which helps us to understand and predict complications due to snake bite at an early stage and helps in its management.

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BACKGROUND

Snakebite is one of the common medical emergencies among rural population. Increase in mortality and morbidity due to its complications is one of the important concerns. Snakes easily harbour in Firewood and dried cow dung stored near houses in villages.^{1,2}

In India, mortality due to snakebite is estimated to be 35,000–50,000 per year.³

There is delay in seeking medical attention by villagers due to unawareness about the complications associated with snakebite or ignorance about the correct treatment which is responsible for increase in morbidity and mortality.¹

Our study aims to analyse the clinical presentation and outcome of patients with snake-bite among rural population.

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

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

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 Fortunately, only a few of them are known to be of medical importance

The venomous snakes belong to four families: Elapidae, Viperidae, Hydrophiidae, and Colubridae. Elapids are land snakes, the venom of which contains a high concentration of neurotoxins. The elapids, encountered in Africa and Asia,⁸ include cobras, kraits, mambas, and coral snakes. Renal

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Corresponding Author:

Dr. Anitha Aswathanarayana,

Assistant Professor,

Department of General Medicine,

SDUMC, SDUAHER, Tamaka, Kolar.

E-mail: anithasdumc@gmail.com

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involvement is uncommon in victims of bites from members of this family.

Vipers include the Russell's viper, *Echis carinatus* (saw scaled viper), puff adder, pit vipers, and rattlesnakes. The vipers are the most widely distributed species. Russell's viper is found in India, Burma, Pakistan, Thailand, and other areas of Asia; *Echis carinatus* in Africa, India, Pakistan, Sri Lanka, and the middle east.

The two important classes of venomous snakes in Southeast Asia are:

- a. Elapidae family that includes cobras, king cobra, kraits and coral snakes
- b. Viperidae family having two subgroups- Typical vipers (Viperinae) and the pit vipers (Crotalinae).⁹

Snakes of medical importance in India are the Indian cobra (*Naja naja*), the common krait, the Russell's viper and the saw-scaled viper.^{10,11}

Acute kidney injury due to Tubular necrosis and cortical necrosis, as a complication due to snakebite is mainly seen in Viperidae group, sea snakes and the Colubridae group.¹²

The oral flora of snake comprises a wide range of aerobic and anaerobic micro-organisms, especially the faecal 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 envenomation due to the proteolytic enzymes present in snake venom which causes destruction of tissue and predispose wound to bacterial infection.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

Aims and Objectives

1. To study the clinical profile of snake bite at a rural tertiary care centre.
2. To analyse the local and systemic manifestations and response to anti snake venom, neostigmine, atropine, antibiotics and management of complications.
3. To assess the outcome of snakebite.

METHODS

Inclusion Criteria

- 1) Patients presenting to our EMD with history of snake bite
- 2) Clinical manifestations suggestive of snake bite like fang marks or cellulitis or coagulopathy or neuroparalysis.

Complete history was elicited from the patient and patient's attenders, General physical examination was done in each case. Investigations done: Complete haemogram,

bleeding time, Clotting time, Coagulation profile, Blood sugar, renal function tests, serum electrolytes, ECG, Chest X-ray, Urine albumin and microscopy.

All Patients were subdivided into 3 Groups-

1. No symptoms or signs of poisoning.
2. Local envenomation only like cellulitis.
3. Presence of local symptoms and signs along with systemic manifestations like neurotoxicity and haematotoxicity.

Anti-Snake venom was given to patients with signs of envenomation (Local and/or Systemic).

The Anti-snake Venom (ASV) was given Intravenous after test dose (1 ml of 1:100 diluted ASV) and patient was seen for any reaction. ASV was diluted in 500 ml of NS/ 5% dextrose.

For patients with no symptoms or signs of envenomation only symptomatic treatment given without ASV. All were kept under observation in medical ICU for monitoring of signs of envenomation

Patients with symptoms and signs suggestive of local envenomation were admitted and applied tourniquets were removed after starting IV fluids and were administered 5-10 vials of ASV. Patients with progressive oedema involving more than one joint, any evidence of cellulitis, or systemic envenomation appearing later, were given additional ASV every 6 hours until the signs of envenomation resolved.

Patients with neurotoxicity like ptosis, respiratory paralysis were administered ASV, atropine, neostigmine and put on ventilator support if required.

Antibiotics administered in presence of local and systemic envenomation. Surgeon's opinion taken in presence of cellulitis of bite site and fasciotomy was done if indicated. Blood/Blood Products transfusions were given to indicate patients. Renal replacement therapy (Haemodialysis) was done to patients with progressive increase in renal function tests secondary to acute kidney injury.

RESULTS

A total of 237 snake bite cases were reported and analysed in our study.

		Count	%
Age	18 to 30 Years	121	51%
	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

Table 1. Socio Demographic Profile of Subjects

In our 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% labourers. Nearly 74% were residents of rural area.

		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	<6 hrs	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 2. Snake Bite History

In our study 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.

		Frequency	Percentage
Local Manifestation	Pain & 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

Table 3. Clinical Features Among Snake Bite Subjects

Nearly 84.4% of the respondents in our 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 haematotoxic manifestation seen in our study and was mostly seen in the viper snake bites. Ptosis& 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 our study. Around 20% had haematotoxicity like ARF, DIC & local gangrene

		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%

Table 4. First Aid and ASV Received Among Snake Bite Subjects

The first aid technique of the tourniquet application above the site of the bite was practised 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.

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.

DISCUSSION

Snakebite is an important public health issue in India especially in rural areas. Following findings of our study will help in providing effective treatment to patients with snake bite and prevent complications.

In our study of snakebite, total of 237 patients with history of snakebite were included.

Among 237 patients, Snake bite was common in age group of 18-30 years about 51% which was similar to studies done by Brunda et al¹⁷ and Lima ACSF et al.¹⁸

Males (63.3%) were affected more than Females (36.7%), findings were similar to studies done by Sharma SK et al.¹⁹

Type of snake was unknown in 81.9% patients and among remaining patients Cobra was common followed by Krait and then Viper.

Snake bite was more common between 12 PM to 6 PM accounting for activity of agriculturists working in fields, findings were comparable to studies done by Chattopadhyay et al²⁰ and Harbi NA et al.²¹

Snakebite occurred more in indoor (56.3%) than outdoor (43.9%) and was similar to studies done by Tan HH et al²² and Rahman R et al²³ and differed from studies done by Sharma SK et al¹⁹ and Chattopadhyay et al.²⁰

Lower limb was the commonest bite of site about 62.4% and it was similar to study done by Rahman et al.²³

84.8% patients were brought to hospital within 6 hours of bite.

Tourniquet application was seen in 10% patients, incision done over bite site outside hospital in 9.3% patients and 0.8% patients received ayurvedic treatment outside hospital.

Bleeding from bite site was present in 14.8% and 63.3% patients had local inflammation of the bite site.

Among 237 snake bite patients, 78 (33%) patients showed signs of systemic envenomation, out of which 45(19%) showed neurotoxicity, 21(8%) had haematotoxicity and 12(5.1%) had both neuro and haematotoxicity.

Among 57 neurotoxic snakebite patients, ptosis was present in all patients and neck muscle weakness was present in 28% patients.

Treatment given-47 patients with no signs of envenomation received only symptomatic management. 190 patients (80.2%) received anti snake venom (ASV).

Patients with local envenomation were given antibiotics, glycerine magnesium sulphate dressing (141 patients) and 8 patients needed fasciotomy in addition.

Out of 57, 33 patients with neurotoxicity were given neostigmine in addition to ASV and ventilatory support was required by 17 patients (7.2%).

Out of 33 patients with haematotoxicity, 20 patients needed fresh frozen plasma and 7 needed platelet transfusions.

Complications following snakebite seen in our study are Acute respiratory distress syndrome in 8(3.4%) patients, Disseminated intravascular coagulation in 1(0.4%) patient, thrombocytopenia in 13(5.5%), Acute kidney injury(AKI) in 7(3%) and cardiotoxicity in 1(0.4%) patients.

Among 7 patients with AKI, 2 patients needed haemodialysis.

Mortality seen only in 1 patient with cardiotoxicity and both neuro and haematotoxic snakebite patient with AKI. Other patients recovered and were discharged from hospital.

Duration of hospital stay was less than 7 days in 82.3% patients.

CONCLUSIONS

Snake bite is a major health problem in our country in rural areas which requires early identification of envenomation and early treatment to prevent complications and reduction

in mortality. Our study gives knowledge about snake bite envenomation prevalence at a tertiary centre in rural area which helps us to understand and predict complications due to snake bite at an early stage and helps in its management.

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