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Original Article

Crawling Danger: As Rains Subsides, Snakes Bounce Grave Menace to Ryots

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Abstract *- India houses a plethora of snake species—both venomous and non-venomous. Snakebite is an important occupational and agricultural menace because India has always been a land of fascinating snakes. In India, common poisonous snakes are Cobra, Russell's Viper, Saw Scaled Viper, and Krait. Concerning venomous snakes, it is estimated that more than 1.2 million people in India have died from Snakebite in the past two decades. Snakebite is an acute dangerous, time-limiting medical emergency. Rural populations often face a preventable public health hazard in tropical and subtropical countries with ponderous rainfall and humid climate. Though Snakebite is a life-threatening century's old condition, it was included in the list of neglected tropical diseases by the World Health Organization in 2009. The high fatality due to Krait bite is attributed to the non-availability of anti-snake venom (ASV), delayed and incorrect administration of ASV, lack of standard protocol for management and inexperienced doctors, and non-availability of ventilators. "Every Snake bite death should matter to us because every person's life is worth saving."*

Keywords *- Bungaruscaeruleus, Najanaja, Echiscarinatus, Daboiarusselii, Monovalent anti-venom therapy.*

1. Introduction

Venomous Snakebite is a significant cause of morbidity and mortality in India and other South-East Asia and sub-Saharan Africa, especially in the rural hinterlands where medical facilities are lacking (1). Snakebite is most often an occupational, domestic, or environmental hazard affecting mostly males between 20 and 55 yr of age (2). Of the four medically important poisonous families of snakes (*Elapidae, Viperidae, Atractaspidinae, Colubridae*), the *Viperidae* (viper) and the *Elapidae* (Cobra and common Krait) remain the most common species of snakes responsible for most of the envenomation in the Indian subcontinent. (3,4) Mostly, snake bite cases occur in the rural areas and during monsoon months from June to September. (5,6) Krait and viper were the most frequent alleged snake species. Foot and hand accounted for nearly three-fourths of the sites of snake bites. (7) Often, during medical management, identification of the species is not paid much attention to, and the current practice is to prescribe equine polyvalent anti-snake venom serum (ASV) to be administered intravenously, which neutralizes all the four types of snake venom (8). However, the ideal treatment is with mono-specific/mono-valent anti-venom since this involves administering a lower dose of anti-venom protein than poly-specific/polyvalent anti-venom (9). Unlike in cobra envenomation, local signs are absent, and neostigmine is ineffective in improving neuro-paralytic features caused by krait envenomation (10). Studies of definitive krait bites have documented severe respiratory paralysis and the need for prolonged ventilatory support (11).

1.1. Aim

To study the prevalence of poisonous and non-poisonous snake bites in part of Avanigadda, Krishna district, AP, India, concerning sex, occupation, part of the body bitten, time of the bite and seasonal variation, and the types of poisonous snakes common in Avanigadda, Krishna district, AP, India, and the clinical manifestations along with the systemic envenomation from various types of poisonous snakes and their effective management in reducing the mortality rate.

1.2. Background

Considering the data associated with Snakebite, nearly 22 farmers were wounded with Snakebite in Krishna District's Avanigadda in a single day when they went farming. They were admitted to hospitals and received treatment; Snakebite wounded 44 people in August. 400 Farmers were wounded With Snakebite within 4 Months, and all the hospital wards were filled with snakebite victims; 22 farmers were wounded with Snakebite in Krishna District's Avanigadda in a single day when they went for farming and were admitted to hospitals, and 85 were wounded by the snake bite. (12) Many snakebite victims in developing countries suffer from long-term complications such as deformities, contractures, amputations, visual impairment, renal complications, and psychological distress. (13) Venomous snakebite is one of the leading preventable causes of mortality and morbidity with tremendous socio-economic impact on the family and nation. Venomous Snakebite has been relisted as a neglected tropical disease after having been removed from the list in 2013. (14) A five-year-old girl undergoing treatment after being bitten by a snake at her house near Kattakada died (15). The Wildlife and Nature Conservation Trust appealed to the Tamil Nadu government to institute a new protocol to treat snakebite victims after doctors in the Coimbatore Medical College, and Hospital (CMCH) and the Theni Government Hospital allegedly administered anti-venom to patients bitten by less venomous snakes. Patients then developed rashes and swelling. The Patient, Seeranjeevi, working at a resort at Masinagudi in Nilgiris district, was bitten by a Malabar pit viper on Tuesday. He was shifted to the CMCH after getting first aid at Masinagudi's PHC. (16) In T S state, 773 snakebite cases were reported from January to May in 2017; it increased to 973 cases during the corresponding period in 2018. However, it plunged to 324 cases from January to May 5, which is 55% to 60% less than the numbers from the last two years. India has the highest number of snakebite cases and accounts for nearly 50% of the global snakebite deaths. Farmers, laborers, hunters, shepherds, snake rescuers, tribal and migrant populations, and those with limited access to education and healthcare are high-risk groups for snakebites. Many snakebite victims, mostly in developing countries, suffer from long-term complications such as deformities, contractures, amputations, visual impairment, renal complications, and psychological distress (17).

1.3. Case Reports

The study presents seven different case reports of snake bites. These listed case reports are from Avanigadda, Andhra Pradesh, primarily rural. Both male and female individuals accidentally got involved in snakebites at their workplace. The examination and preliminary treatment were carried out at the local PHC, and an antidote of snake venoms was administrated along with other recommended therapeutics, including Augmentin, pantop, etc. Among the listed case report, a complete recovery was reported after treatment. However, the duration of treatment and combination of therapeutic was reported slight variation. The physical and clinical examination is shown in different figures for each case report and marked. The clinical examination also demonstrated altered testing parameters in each case, where bleeding time, clotting time, general symptoms, and post-treatment conditions are elaborated here.

Case 1

Case Detail	
Patient name	V. Santha Kumari
Age	35 Years
Address	Avanigadda, Andhra Pradesh 35 years old male patient presented with a snake bite on the palmar aspect of the right index finger
Symptoms	Severe pain over the right index finger
On Examination	
Local findings	Swelling and tenderness around the bite area of the right index finger
Systemic findings	CVS – S1 and S2 present no murmurs or added sounds RS – Normal vesicular breath sounds, no wheeze, no rhonchi GI – normal bowel sounds CNS- no focal neurological deficits
Investigations	Clotting time -10mins Bleeding time – 10 mins Prothrombin time-12 Sec
Treatment	INJ.ANTI SNAKE VENOM 2 VIALS IV after administering a test dose INJ. AUGMENTIN 1.2 GM IV BD for 5 days INJ.PANTOP 40MG IV OD for 5 days INJ.PCM 1GM IV SOS
Post Treatment	The patient recovered well in two days, and all the deranged parameters were set back to normal

Fig. 1 demonstrates an external examination of case 1 of Snakebite.

Case 2

Case Detail	
PATIENT NAME	M. Poorna Chandra Rao
AGE	39 YEARS
ADDRESS	AVANIGADDA, ANDHRA PRADESH 39 years old male patient presented with a snake bite on the left heal below the medial malleolus
Symptoms:	Generalized weakness all over the body and severe pain over the left heel
ON EXAMINATION	
Local findings	Swelling and tenderness around bite area of left heal
Systemic findings	CVS – S1, S2 present, no murmurs or added sounds RS – Normal vesicular breath sounds, no wheeze, no rhonchi GI – normal bowel sounds, Heamaturia – present CNS- no focal neurological deficits
INVESTIGATIONS	Clotting time -16mins Bleeding time – 8mins Prothrombin time-15 sec
TREATMENT	INJ.ANTI SNAKE VENOM 8 VIALS IV after the test dose INJ. AUGMENTIN 1.2 GM IV BD for 5 days INJ.PANTOP 40MG IV OD for 5 days INJ.PCM 1GM IV SOS
POST-TREATMENT:	The patient recovered well in two days, and all the deranged parameters were set back to normal

Fig 2. The figure demonstrates an external examination of case 2 of Snakebite

Case 3

Case Detail	
PATIENT NAME	MUNIPALLI RAJENDRA PRASAD
AGE	52 YEARS
ADDRESS	AVANIGADDA, ANDHRA PRADESH 52 years old male patient presented with a snake bite on the right second toe
Symptoms:	Generalized weakness all over the body and severe pain over the right second toe
ON EXAMINATION:	
Local findings:	swelling and tenderness around the bite area of the right second toe
Systemic findings:	CVS – S1, S2 present, no murmurs or added sounds RS – Normal vesicular breath sounds, no wheeze, no Rhonchi GI – normal bowel sounds, CNS- no focal neurological deficits
INVESTIGATIONS:	Clotting time -17mins Bleeding time – 10 mins Prothrombin time-14 sec
TREATMENT:	INJ.ANTI SNAKE VENOM 8 VIALS IV after the test dose INJ. AUGMENTIN 1.2 GM IV BD for 5 days INJ.PANTOP 40MG IV OD for 5 days INJ.PCM 1GM IV SOS
POST-TREATMENT:	The patient recovered well in two days, and all the deranged parameters were set back to normal

Fig. 3 The figure demonstrates an external examination of case 3 of Snakebite

Case 4

Case Detail	
PATIENT NAME	PENUMALA MADHU
AGE	32 YEARS
ADDRESS	AVANIGADDA, ANDHRA PRADESH 32 years old male patient presented with a snake bite on their right index finger
Symptoms:	severe pain over the right index finger
ON EXAMINATION	
Local findings:	swelling and tenderness around the bite area of the f right index finger
Systemic findings:	CVS – S 1, S2 present, no murmurs or added sounds RS – Normal vesicular breath sounds, no wheeze, no rhonchi GI – normal bowel sounds, Heamaturia – present CNS- no focal neurological deficits
INVESTIGATIONS:	Clotting time -19mins Bleeding time – 10 mins Prothrombin time-16 sec
TREATMENT:	INJ.ANTI SNAKE VENOM 10 VIALS IV after administering a test dose INJ. AUGMENTIN 1.2 GM IV BD for 5 days INJ.PANTOP 40MG IV OD for 5 days INJ.PCM 1GM IV SOS INJ.DECADRON 8MG IV stat
POST-TREATMENT	The patient recovered well in two days, and all the deranged parameters were set back to normal

Fig. 4 The figure demonstrates an external examination of case 4 of Snakebite

Case 5

Case Detail	
PATIENT NAME	UPPALA SRINIVASA RAO
AGE	47 YEARS
ADDRESS	AVANIGADDA, ANDHRA PRADESH 47 years old male patient presented with a snake bite on the dorsum of the right foot
Symptoms:	Generalized weakness all over the body and severe pain in his right foot
ON EXAMINATION:	
Local findings:	swelling and tenderness around the bite area of the right foot
Systemic findings:	CVS – S1, S2 present, no murmurs or added sounds RS – Normal vesicular breath sounds, no wheeze, no rhonchi GI – normal bowel sounds, Hematemesis- present [3 episodes] CNS- no focal neurological deficits
INVESTIGATIONS:	Clotting time -15 mins Bleeding time – 10 mins Prothrombin time-14 sec
TREATMENT:	INJ.ANTI SNAKE VENOM 8 VIALS IV after administering a test dose INJ. AUGMENTIN 1.2 GM IV BD for 5 days INJ.PANTOP 40MG IV OD for 5 days INJ.PCM 1GM IV SOS
POST-TREATMENT:	The patient recovered well in two days, and all the deranged parameters

Fig. 5 The figure demonstrates an external examination of case 5 of Snakebite

Case 6

Case Detail	
PATIENT NAME	L. NARASIMHA RAO
AGE	40 YEARS
ADDRESS	AVANIGADDA, ANDHRA PRADESH 40 years old male patient presented with a snake bite on the medial aspect of the left ankle
Symptoms:	Severe pain over the left ankle
ON EXAMINATION	
Local findings	swelling and tenderness around the bite area on the dorsum of his left ankle and foot
Systemic findings	CVS – S1, S2 present, no murmurs or added sounds RS – Normal vesicular breath sounds, no wheeze, no rhonchi GI – normal bowel sounds, Hematochezia – present CNS- no focal neurological deficits
INVESTIGATIONS	Clotting time -18mins Bleeding time – 10mins Prothrombin time-20 sec
TREATMENT	INJ.ANTI SNAKE VENOM 8 VIALS IV after administering a test dose INJ. AUGMENTIN 1.2 GM IV BD for 5 days INJ.PANTOP 40MG IV OD for 5 days INJ.PCM 1GM IV SOS
POST-TREATMENT	The patient recovered well in two days, and all the deranged parameters were set back to normal

Fig. 6 The figure demonstrates an external examination of case 6 of Snakebite

Case 7

Case Details	
PATIENT NAME	T NAGESWARA RAO
AGE	39 YEARS
ADDRESS	AVANIGADDA, ANDHRA PRADESH 39 years old male patient presented with a snake bite on the right shin
Symptoms	severe pain around the bite area on the right shins, and presented with nausea
ON EXAMINATION	
Local findings	swelling and tenderness around the bite area over the right
Systemic findings	CVS – S1, S2 present, no murmurs or added sounds RS – Normal vesicular breath sounds, no wheeze, no rhonchi GI – normal bowel sounds, Hematochezia – present CNS- no focal neurological deficits
INVESTIGATIONS	Clotting time -19mins Bleeding time – 10 mins Prothrombin time-14 sec
TREATMENT	INJ.ANTI SNAKE VENOM 8 VIALS IV after administering a test dose Clotting time is still 12minutes; hence 2 more vials were administered INJ. AUGMENTIN 1.2 GM IV BD for 5 days INJ.PANTOP 40MG IV OD for 5 days INJ.PCM 1GM IV SOS
POST-TREATMENT	The patient recovered well in two days, and all the deranged parameters

Fig. 7 The figure demonstrates an external examination of case 7 of Snakebite

2. Discussion

The biggest poisonous snakes in India are Russell's viper, *Daboiarusselii,* Common Krait, *Bungaruscaeruleus*, Indian cobra, *Najanaja, and* Indian saw-scaled viper. Twelve to thirty percent of patients bitten by venomous snakes, primarily vipers, develop (Acute kidney injury) AKI. Hemorrhage, hypotension, disseminated intravascular coagulation, intravascular hemolysis, and rhabdomyolysis contribute to the development of AKI. Enzymatic activities of snake venoms account for direct nephrotoxicity. Immunologic mechanisms play a minor role. Mortality in snake bite–induced AKI is 1–20%. The basic therapeutic approach for AKI in patients bitten by snakes is the same as for AKI due to any other cause. Early administration of ASV is a vital therapeutic measure (18). At Least 50% of the population bitten by snakes suffers few or no toxic effects as little, or no venom has been injected. On the other hand, in serious poisoning, the mortality is high if adequate medical care is not given. The natural mortality without effective treatment is 10% in Elapidae poisoning within 5-20 hours of the bites. In the early stage, snake bite is very unpredictable, and all patients must be carefully monitored for at least 12 hours. Snake venom can cause various clinical conditions according to the type and amount of toxin, the type of snake, and the patient's susceptibility. Patients are treated and monitored according to clinical grading. (19).

Snake venom has various toxic effects on the region of the bite and on the entire body, including local complications such as pain and swelling at the site, edema, erythema, necrosis, and cellulitis, as well as systemic complications such as fever, nausea, and vomiting, compartment syndrome, heart failure, arrhythmias, acute renal failure, shock, coma, or death. (20,21) Patients are treated according to recommended protocols. Dry bites without envenomation are scored as grade 0, and bites that lack systemic signs or symptoms are scored as grade I. Biotherapy, tetanus vaccine, and symptomatic therapy are administered in these cases. Anti-venom is the main treatment option in cases of venomous Snakebite. (22)Snake venom includes a variety of toxins. Consists of 70% water and 30% protein substances, including leukotrienes, phospholipases, acetylcholinesterase, hyaluronidase, collagenase, antibactericides, neurotoxins, hemotoxins, anticoagulants, cardiotoxins, hemolytic factors, fibrinolytic enzymes, quinine, and histamine(23) Toxins can cause diverse its systemic effects, such as leukocytosis, thrombocytopenia, hypofibrinogenemia, bleeding disorders, proteinuria, and azotemia. (24,25) However, leukocytosis has been primarily reported as a laboratory finding. (26).

3. Summary

Snakebite is a common medical emergency and an occupational hazard, especially in tropical countries like India. Poisonous snakes have become a major concern for farmers in the Kharif season. The sight of a cobra, Russell's viper, saw-scaled viper, and other venomous snakes has become quite prevalent in Avanigadda, Diviseema, Gannavaram, and other delta regions in the district, and the number of snake bite cases is worrying localities. Farmers in the Avanigadda region are getting scared of stepping inside agriculture fields. Around 53 snake bites were registered in six mandals of the Avanigadda constituency, and the district administration has confirmed that 253 snake bite cases were registered in Avanigadda Area Hospital, which was alarming. (27)

4. Conclusion

These studies best spot that Snakebite is an occupational hazard, and the time between bite and treatment resolves the prognosis. The low mortality observed in our study is probably due to early admission to the hospital, provided with early and adequate ASV administration, with better management of complications. Therefore, improving the transport facility, etc., required for the timely admission to hospital in golden time is crucial. And management after arrival is also imperative.

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