

The Neglected Tropical Disease Envenoming the Society in Telangana

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ABSTRACT

BACKGROUND

Snakebite remains an underestimated cause of accidental death in modern India. Snakebite is an occupational, environmental and domestic health hazard with a significant economic fallout on the individual and the family. We wanted to study the epidemiology and clinical profile of snake envenomation in a tertiary hospital in Telangana.

METHODS

This is a retrospective analysis of all snakebite cases admitted to the acute medical care ward from January 2016 to December 2017.

RESULTS

Of a total of 252 cases of snakebite, 84 patients presented with neuromuscular symptoms, 71 with haemostatic abnormalities and 14 presented with mixed symptomatology. Male to female ratio was 2:1. Highest mortality was 28.57% observed in patients who reported after 20 hours, 6 patients out of 27 died. Respiratory failure was observed in sixty percent cases and 16 percent cases developed renal failure. The average dose of antivenom was 21.2 vials for neurotoxic bites and 19.3 vials for haemotoxic bites. Overall mortality rate was 9.9%.

CONCLUSIONS

There is a need to educate the public about the prevention of snakebites, early hospital referral and early treatment is the need of hour. The currently recommended first-aid may be remembered by the mnemonic "CARRY NO R.I.G.H.T." also might pay substantial dividends.

KEYWORDS

Snake Bite, Anti-Snake Venom, Neglected Tropical Disease, Neurotoxic, Haemotoxic

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BACKGROUND

WHO has listed venomous snake bite as "Neglected Tropical Disease"-NTD in 2009.¹ The estimated number of snakebites worldwide has been put as 5.4 million per year and resulting in 1.8 to 2.7 million envenomation.^{1,2} The deaths between 81410 and 137880, around three times as many amputations and other permanent disabilities each year attributed to snake bite.^{1,3} In India alone annually over 1,000,000 snakebites leading to between 45,000 and 50,000 deaths are happening due to snakebite which mounts to half of the world-wide.⁴ The bites are most common in the active, productive bread winners of the family. Seventy percent snakebites are in young males between 20 and 50 years with a huge economic implication on the rest of the family in turn on most villages in India.⁵

Following the bite of a venomous snake, injection of a mixture of different toxins in to the systemic circulation results into potentially life-threatening disease.⁶ The identification of snake bite depends on the presence of fang marks and local signs of toxicity which includes presence of swelling, cellulitis, bleeding, blister formation at bite site.⁷ Systemic toxicity can cause acute medical emergencies involving severe paralysis that may prevent breathing due to respiratory muscle involvement, ptosis, oculo-bulbar weakness, and limb weakness in case of neurotoxic bite.^{8,9} Whereas bleeding from mucocutaneous sites and fatal haemorrhage with intravascular haemolysis, cause irreversible kidney failure and severe local tissue destruction that can cause permanent disability and limb amputation in case of haemotoxic bite.^{10,11}

The highly effective treatment to prevent most deaths and serious consequences from snake bites is high quality snake antivenoms.¹² These antivenoms should be more widely available and accessible as a part of any primary health care package, and raising awareness on primary prevention among communities and health workers plays a vital role in decreasing this NTD where snake bites are predominant problem.¹³

This study aims at summarizing and discussing the epidemiology, clinical features, diagnosis, and treatment of snake bite envenoming.

METHODS

This record based retrospective study was carried out at Gandhi Medical College, Secunderabad, Telangana, India. This institution is referred government hospital in Telangana, where patients come from all Telangana districts. The records of snake bite victims who attended hospital from January 2016 to December 2017 are obtained from medical records section. The data on sex, age group, time from bite to hospital admission, clinical features, Anti snake venom vials used, complications, outcome of snake bite victims are recorded and analysed. The mortality was defined on basis of death certificates.

Ethics Statement

Ethical approval for the study was obtained on 30/12/2017 vide Rc. No. IEC/GMC/2017 from ethical committee Gandhi Medical College, Secunderabad.

Statistical Analysis

All the data was retrieved from case records and managed in Microsoft ware SPSS for windows version 22.0. Data was summarized as number (%) or mean \pm SD as appropriate.

RESULTS

In the present study 252 cases of snake bite are studied in Gandhi medical college, Secunderabad from January 1st 2016-December 31st 2017. In our study, out of total 252 cases, 170 are male patients consists of 67.4% of total patients, whereas 82 are female patients equals to 32.5% and male female ratio was 2:1. Males are more commonly affected than females. Most of the bites are seen in month of July to September. Maximum number of patients (41.2%) are in the age group of 14-31 years followed by 95 in the age group between 32 and 49 then 53 patients in the age group more than 50 (Table-1). 138 bites on the lower limbs are more common (55%) in our study when compared to 68 of upper limb bites (26%). Most of the snake bite patients, 167 are reported to hospital within 6 hours, whereas 42 patients reported within 7-13 hours, sixteen patients reported from 14 to 20 hour and twenty-seven patients reported after 20 hours. The mortality rate based on the time lapse from the time of bite is 6.36%, 16.66%, 23.07% and 28.57% respectively. Out of 27 patients who reported after 20 hours, 6 patients died (Figure-1).

Out of total 252 patients, 104 patients presented with neurotoxicity, 81 patients with haemotoxic, 21 patients presented with features of both neurotoxic and haemotoxic, 46 are dry bites with no symptoms & signs of envenomation (Figure-2). Out of 46 dry bites 30 patients received antivenom at primary health center and out of total 252 patients 236 patients received anti-snake venom whereas 16 patients were not given due to dry bites and kept under observation. Mean anti-snake venom given for neuroparalytic snake bites was 21.5 vials, 19.3 vials for haemotoxic bites, and 20.8 for both features of neurotoxic and haemotoxic bites (Figure-3). In our study less than 20 vials of ASV are administered to 64 patients (27.1%), 20 vials in 161 patients (68%), 21-30 vials in 10 patients (4.2%), more than 30 vials in 1 patient (0.4%).

The reconstituted venom is then diluted in 500 ml of isotonic saline and infused at a constant rate over a period of about one hour. Polyvalent ASV infusion is continued until bleeding tendency is controlled. If there are allergic reactions in the form of fever, itching or urticaria, polyvalent ASV administration is withheld and continued after the administration of corticosteroids and antihistaminic. Incidence of local toxicity more in haemotoxic bites is 45 when compared to neurotoxic bites (n=16). Out of 81

haemotoxic bites, 19 patients developed acute renal failure, 1 patient was treated conservatively, and 18 patients needed dialysis. Out of 18 patients, 14 underwent haemodialysis and 2 patients underwent peritoneal dialysis and 2 patients not willing for dialysis. In all cases of renal failure, direct nephrotoxicity was the cause except one where the cause is Rhabdomyolysis.

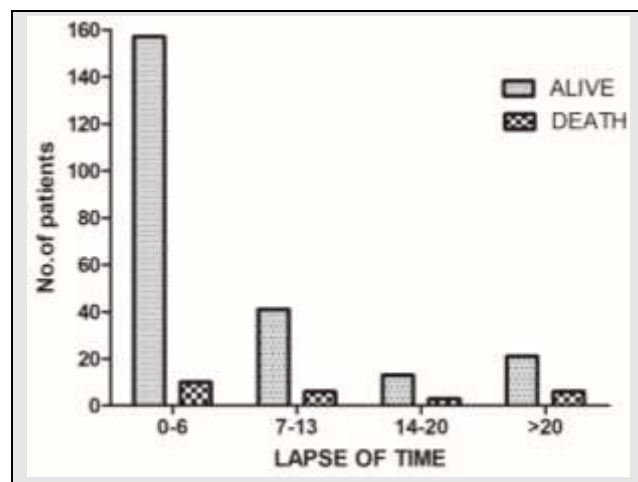


Figure 1. Pattern of Survival According to Time Lapse

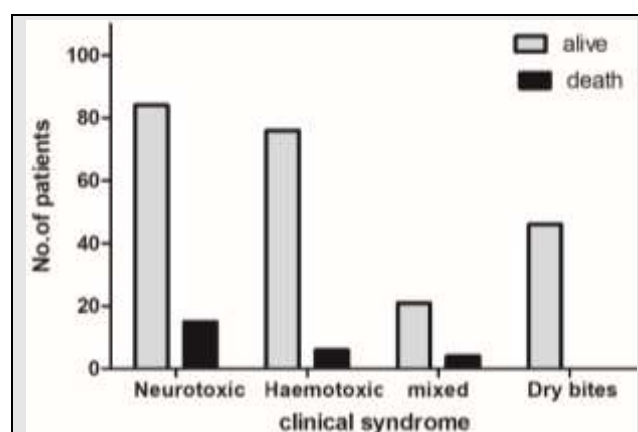


Figure 2. Survival of Cases According to Toxicity

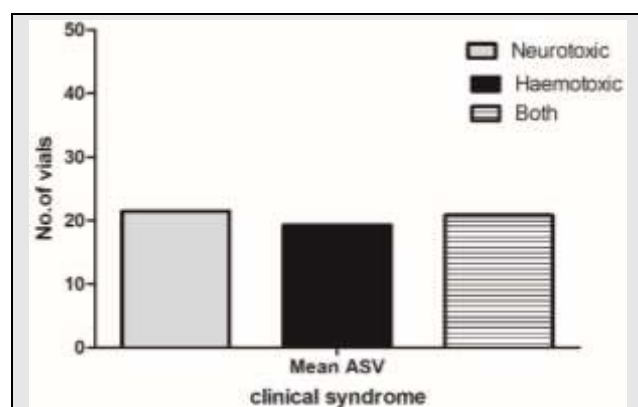


Figure 3. Mean Usage of ASV According to Toxicity

Out of 104 neurotoxic bites, 26 patients developed respiratory paralysis which needed mechanical ventilation. Mean duration of neuroparalytic bites on mechanical ventilator is 2.7 days. Five patients who presented with mixed symptomology required mechanical ventilation. In our

study 9.9% mortality was observed, out of 252 patients 25 are died, 19 patients died of respiratory failure due to neurotoxicity. Out of 19 patients who developed acute renal failure, 7 patients died.

		Alive	Death	P-Value
Sex	Males	153	17	<0.05
	Females	74	8	
Age Group	14-31	92	12	<0.05
	32-49	87	8	
	>50	51	2	
	0-6	157	10	
Bite to Hospital Admission	7-13	36	6	<0.05
	14-20	13	3	
	>20	21	6	
Clinical Presentation	Neurotoxic	89	15	<0.05
	Haemotoxic	75	6	
	Neuro+ haemotoxic	17	4	
	Dry bites	46	0	

Table 1. Clinical Characteristics

DISCUSSION

Most snakebites 67.4% in our study are in male patients, whereas female patients were 32.5%, and male female ratio is 2:1 with a statistical significance ($P < 0.005$). All the previous reports mention the same findings. Study conducted by Gaurav Bhalla et al in 2014 reported the same finding. The 41.2% bites were in the age group of 14-31 years. The economic implication is tremendous as in most villages as males are the sole earning member on whom depend the rest of the family. These observations go more in favour of study conducted by Anubha Srivastava et al in 2017. Lower extremity as the most common site for snake bite has been observed in similar other studies which correlates with our study with 55% bites on lower limb and 26% on upper limb. This study showed a distinct seasonal variability, most of the bites are seen in month of July to September, the high incidence corresponds to the month of rainy season when rain water compels the snake to come out of dwellings, this also coincides with the season of busy agricultural activity. A similar conclusion has been reached in studies conducted earlier.¹⁴

In our study 66.27% patients arrived to the hospital within 6 hours and received the treatment where as 28.57% mortality seen in patients who arrived after 20 hours. The lack of awareness of the hazards of snakebite and insistent belief in the traditional medicines might have contributed to the delay in arrival.¹⁵ Most snakebites in our study are with neuroparalytic features a hallmark of cobra and krait bites, are seen in 41.26%, and haemostatic abnormalities attributable to viper bites in 32.14%. There are 21 patients who had symptoms of both neuroparalytic and haemostatic dysfunction. Local symptoms and signs in the form of pain and swelling at bite site were most common (63%) in haemotoxic bites. Antivenom was withheld in 16 cases in the absence of systemic envenomation. The mean dose antivenom given for neuroparalytic snakebite was 21.5 vials, 19.3 vials for haemotoxic bites and 20.8 vials for dual toxicity bites.¹⁶ The most common cause of death in haemotoxic bites was renal failure required dialysis.¹⁷ whereas in neurotoxic bites was respiratory failure treated with

mechanical ventilation.¹⁸ In the present study, the most common cause of death is respiratory failure (60%) followed by renal failure (28%).

CONCLUSIONS

Snake bite remains to be one of the neglected tropical diseases seen more frequently in rural India. Various preventive measures can be adopted in reducing the incidence of snake bites in rural communities. First-aid currently recommended may be remembered by mnemonic "CARRY NO R.I.G.H.T.". It has to be meticulously followed and no time should be wasted in starting first aid. Traditional methods may dangerously delay effective treatment. Morbidity rates are proportional to the time elapsed in administration of ASV. Anti-snake venom is a boon for the snakebite patient if it is given within the appropriate time. Therefore, there is an urgent need to make sure that guidelines are followed at each level of health care.

REFERENCES

- [1] MDUETOS Envenoming. Global snakebite burden. *Bull Soc Pathol Exot* 2012;105(3):175-178.
- [2] Gutiérrez JM, Williams D, Fan HW, et al. Snakebite envenoming from a global perspective: towards an integrated approach. *Toxicon*, 2010;56(7):1223-1235.
- [3] Gutiérrez JM, Calvete JJ, Habib AG, et al. Snakebite envenoming. *Nat Rev Dis Primers* 2017;3:17063.
- [4] Menon JC, Joseph JK, Whitaker RE. Venomous snake bite in India-Why do 50,000 Indians die every year? *J Assoc Physicians India* 2017;65(8):78-81.
- [5] Vaiyapuri S, Vaiyapuri R, Ashokan R, et al. Snakebite and its socio-economic impact on the rural population of Tamil Nadu, India. *PloS One* 2013;8(11):e80090.
- [6] Isbister GK. Procoagulant snake toxins: laboratory studies, diagnosis, and understanding snakebite coagulopathy. *Semin Thromb haemost* 2009;35(1):93-103.
- [7] Inamdar K, Parhate SM, Randad RD. Pharmacotherapeutic study of efficacy, safety and prognostic analysis of anti-snake venom serum in snake bite patients. *Int J Basic Clin Pharmacol* 2017;6(4):906-912.
- [8] Bhattacharya P, Chakraborty A. Neurotoxic snake bite with respiratory failure. *Indian J Crit Care Med* 2007;11(3):161-164.
- [9] Thatoi P, Acharya R, Malla A. Acute respiratory failure following neurotoxic snake bite-a study of 101 cases of neurotoxic snake bite from eastern India. *Eur Respiratory Soc* 2016;48:PA2140.
- [10] Menon JC, Joseph K. Complications of haemotoxic snakebite in India. In: Gopalakrishnakone P, Faiz MA, Fernando R, et al, eds. *Clinical toxinology in Asia Pacific and Africa*. Netherlands: Springer 2015:209-232.
- [11] Chugh KS, Aikat BK, Sharma BK, et al. Acute renal failure following snakebite. *Am J Trop Med Hyg* 1975;24(4):692-697.
- [12] Agarwal R, Aggarwal A, Gupta D, et al. Low dose of snake antivenom is as effective as high dose in patients with severe neurotoxic snake envenoming. *Emerg Med J* 2005;22(6):397-399.
- [13] Williams DJ, Faiz MA, Abela-Ridder B, et al. Strategy for a globally coordinated response to a priority neglected tropical disease: snakebite envenoming. *PLoS Negl Trop Dis* 2019;13(2):e0007059.
- [14] Bhalla G, Mhaskar D, Agarwal A. A study of clinical profile of snake bite at a tertiary care centre. *Toxicol Int* 2014;21(2):203-208.
- [15] Narvencar K. Correlation between timing of ASV administration and complications in snake bites. *J Assoc Physicians India* 2006;54:717-719.
- [16] Saravu K, Somavarapu V, Shastry AB, et al. Clinical profile, species-specific severity grading, and outcome determinants of snake envenomation: an Indian tertiary care hospital-based prospective study. *Indian J Crit Care Med* 2012;16(4):187-192.
- [17] Harshavardhan L, Lokesh AJ, Tejeshwari HL, et al. A study on the acute kidney injury in snake bite victims in a tertiary care centre. *J Clin Diagn Res* 2013;7(5):853-856.
- [18] David S, Matathia S, Christopher S. Mortality predictors of snake bite envenomation in southern India-a ten-year retrospective audit of 533 patients. *J Med Toxicol* 2012;8(2):118-123.