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Clinical Profile and outcome of Snake bite in patients attending a tertiary care hospital in Bankura, West Bengal

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Abstract:
Background: *Snakebite is a serious medical emergency in Western districts of West Bengal where farming is a major source of employment. The purpose of the study was to determine the clinical profile, complications and outcome of snake bite cases in the tertiary care hospital of Bankura.*
Material and method: *A prospective study was conducted from July 2011 to July 2012on 52 venomous snakebite patients admitted in the Department of General Medicine, BankuraSammilani Medical College,West Bengal. Data on demographic profile, clinical features, laboratory investigations, details of treatment received and outcome of the snakebite victims were recorded and analyzed.*
Results: *Majority of snakebite victims were male(55.77%), farmer (42.31%) by occupation, belonging to rural area (82.69%), bitten outdoor (71.15%), during day time (51.92%) and in the month of July-September. Most of the bitten victims were frightened (82.69%) at time of admission. The signs and symptoms of Viper envenomation (hemotoxic) were pain and tenderness at site of bite, oliguria, hematuria, sub conjunctival hemorrhage, and hypotension. Neurotoxic manifestations were mainly Ptosisfollowed by altered sensorium extensor planter response. Out of 52 cases, 6 had expired [4 cases due to renal failure and 2 cases due to respiratory failure].*
Conclusions: *Snakebite is a common problem, where delay in early treatment is associated with poor prognosis and venomous snakebites may lead to consumptive coagulopathy, renal failure and respiratory failure, ultimately leading to death.*
Keywords:*Snakebite, Clinical profile, Outcome, Medical college, Bankura*

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I. Introduction

Snakebite is an acute life-threatening medical emergency. It is preventable and often seen in the rural population in tropical and subtropical countries with humid conditions and heavy rainfall. It is also an occupational hazard amongst farmers, plantation workers, and other outdoor workers. Snakebite was included as a neglected tropical disease by World Health Organization in the year 2009. [1]

It is worldwide estimated that more than 5 million people were bitten by the snakes annually and 1.8-2.7 million of them developed clinical illness. In India alone, it had been estimated that as many as 2.8 million people were bitten by snakes, and among them 46,900 people die from snakebite every year. [2] Still, actual data of the incidence of snake bite and its morbidity and mortality does not exist.High population density, widespread agricultural activity, numerous venomous snake species, poorly informed rural population often practicing inappropriate first aid measures on snake bite victims and their delay in seeking treatment adds to the burden of snakebite.

West Bengal is found to be one of the highest snakebite prevalent state in India, besides Andhra Pradesh, Kerala, Tamil Nadu, Uttar Pradesh and Maharashtra. [3,4,5] As per the records of Public Health Branch of Govt. of WB, snake bite incidence for the year 2017 was 29,885, while reported deaths were 240. Data from the year 2014-17 suggests an increasing trend of both the cases and deaths in West Bengal. [6]The present study was carried out to determine the clinical profile, complications and outcome of snakebite cases in the tertiary care hospital of Bankura, West Bengal.

II. Material& Methods

2.1 Study type &design: Observational, Prospectivestudy (hospital based).
2.2 Study duration: July 2011 to July 2012

2.3 Study setting: This study was carried out intheDepartment of Medicine, at BankuraSammilani Medical College, Bankura,WestBengal.The hospital provides tertiary care to the surrounding rural and urbancommunities and is the main referral center for snake bite cases in the region.

2.4 Sample population: 52venomous snake bite victims.
2.4.1 Inclusion criteria:
1. Age 12 years to 70 years.
2. Recent history of snake bite (by history or bite mark suggestive) and features of systemic and/or local envenomation.
3. Agreed to participate in the study.
2.4.2 Exclusion criteria:
1. Patients having underlying renal disease (as per history and/or previous medical record).
2. Patients with unknown bite.
3. Patients with coagulopathy, endocrinopathy, malignancy, neuropathy, haematological disease.
5. Patients with co-morbid conditions like diabetes mellitus, hypertension, heart disease, chronic liver diseases, chronic pulmonary diseases, infection and sepsis.
6. Patients who received nephrotoxic drugs before or after admission and drugs affecting CNS, muscular function, platelet function and number and coagulation/fibrinolytic system.

2.5 Sample size& sampling design:
Allsnake bite victims fulfilling inclusion/ exclusion criteria who got admitted in General Medicine ward of BankuraSammilani Medical College and Hospitalduring the study period.

2.6Study tool:
1. Proforma containing history and clinical examination.
2.Laboratory investigations like Random blood sugar,complete blood count, 20 min Whole Blood Clotting Test(includes test tubes),blood CRP levels, Blood Urea &Creatinine levels, P time, serum sodium, serum potassium, blood lactate dehydrogenase levels and other investigations like Ecg-12 leads, Chest X ray PA view.

2.7Study technique: Data collection was done by interviewing and by clinical and laboratory examinations.

2.8Study procedure:
Data collection was started after obtaining permission from Institutional Ethics Committee (IEC) and after written consent obtained from the study subjects/relatives. Patients were enrolled into the study after proper verification of the age and other inclusion and exclusion criteria. In most cases, history was elicited from the patient, except when the patient was severely compromised; history was given by the patients' relatives. Detailed history of age, sex, occupation, locality, outdoor or indoor, season of bite, site of bite, type of snake,time of bite, time window(bite to ASV time) were taken by interviewing. History of present illness, past illness, family history, treatment history, drug history and menstrual history was also taken. Clinical examinations included general survey, local examination, systemic examination like central nervous system, cardiovascular system, respiratory system, gastro-intestinal system, reticuloendothelial system, and Genito-urinary system were done subsequently. Laboratory investigations included 20 minutes Whole Blood Clotting Time,random blood sugar, complete blood count, blood CRP levels, blood urea & creatinine levels, p time, serum sodium, serum potassium, blood lactate dehydrogenase levels, liver function tests.ECG-12 leads and chest X ray PA view were also done.

2.9 Treatment and follow up:
Treatment was started after the laboratory investigations were sent. Intravenous access was established. Airway was secured. Depending upon the results obtained, the management was proceeded accordingly. Anti-snake venom was administered. Those who needed dialysis support was sent for dialysis and those who needed ventilatory support were put on a ventilator. The outcomes and parameters were recorded of every patient.

2.10 Data analysis: The data were compiled in MS Excel and descriptive analysis was done.

III. Result

A total of 52 cases of snakebites admitted in Bankura Medical College from July 2011 to July 2012were included in this study. The detailed demographic profile of snakebite victims has been presented in the Table 1. Majority of them were male (55.77%) and farmer (42.31%) by occupation. The most frequent bitten site was the lower extremity (71.15%). Most of the victims were bitten outdoor (71.15%) and in between

2:00pm-10:00pm (51.92%). Majority of them were from rural area (82.69%), with a rural to urban ratio of 4.8:1. The peak incidence

of snakebite cases occurred during the months of July-September. The type of snake identified was Elapids (46.15%) followed by Viperids (38.46%).

Majority of snake bite victims were of age group 20-40 years (Fig 1).At our hospital, all venomous snakebite victims had received the equine polyvalent Anti-snake venom (ASV). And majority had received ASV within 6 hours (71.15%)(Table 2).

Main clinical features of snakebite victims weretachycardia (86.54%) followed by fright (82.69%),painand tenderness at site of bite (57.69%), oliguria (40.38%) cellulitis (40.38%) and ptosis (40.38%)(Table 3).The Laboratory profile had shown that majority of snakebite victims were having anemia (23.08%) followed by elevated serum bilirubin> 1.5mg/dl (13.46%) andlowered platelet count < 50,000 (11.54%) (Table 4).

As shown in Table 5, majority of snakebite victims (46.15%)had a hospital stay of 3-7 days duration. About 19 (36.53%) of snakebite victims developed some complications, of which (15.38%) developed renal failure, followed by (11.54%) respiratory failure and only (1.92%) developed residual neurological deficit(Table 6).Out of 52 victims, 6had died [4 renal failure and 2 respiratory failure] as shown in Table 7 & Fig2.

Table no 1: Distribution of snakebite victimsaccording to their demographic profile (n=52).

Demographic profile	No. of patients (%)
Gender distribution	
Male	29(55.77)
Female	23(44.23)
Occupation	
Farmer	22(42.31)
Labourer	9(17.31)
Housewife	7(13.46)
Others	14(26.92)
Site of bite	
Upper extremity	12(23.08)
Lower extremity	37(71.15)
Head & face	3(5.77)
Location at time of bite	
Outdoor	37(71.15)
Indoor	15(28.85)
Place of bite	
Urban	9(17.31)
Rural	43(82.69)
Time of bite	
6:00am -2:00 pm	20(38.46)
2:00pm-10:00pm	27(51.92)
10:00pm- 6:00am	5(9.62)
Seasonal variation	
Jan-March	5(9.62)
April-June	9(17.31)
July-Sept	26(50.00)
Oct-Dec	12(23.07)
Type of snake identified	
Elapids	24(46.15)
Viperids	20(38.46)
Unidentified	8(15.39)

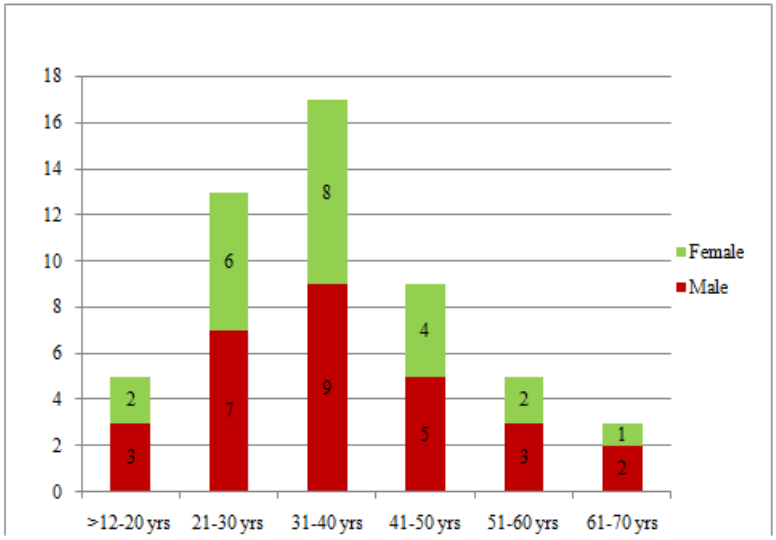

Fig 1:distribution of snakebite victims according to their age(n=52).

Table no 2: Distribution of snake bite victims accordingtotheir time delay between snakebite and ASV administration(n=52).

Interval between snakebite and ASV administration (hours)	No. of patients (%)
0-6	37(71.15)
>6-12	7(13.46)
>12-24	5(9.62)
>24	3(5.77)
Total	50(100)

Table no 3: Distribution of snakebite victims accordingtotheir clinical features(n=52) *

Clinical features	No. of patients (%)
Fright	43(82.69)
Pain & tenderness	30(57.69)
Local swelling	14(26.92)
Fever	10(19.23)
Tachycardia	45(86.54)
Hypotension	9(17.30)
Sub conjunctival bleeding	5(9.62)
Haematuria	6(11.54)
Oliguria	21(40.38)
Nausea/Vomiting	6(11.54)
Abdominal pain	20(38.46)
Generalised swelling/Anasarca	8(15.38)
Dyspnea	10(19.23)
Regional lymphadenopathy	15(28.85)
Rash	3(5.77)
Cellulitis	21(40.38)
Pericardial rub	2(3.85)
Crepitation	8(15.38)
Altered sensorium	10(19.23)
Extensor plantar response	10(19.23)
Diplopia	13(25.00)
Ptosis	21(40.38)
Head lag	12(23.08)

*multiple responses

Table no 4: Distribution of snakebite victims accordingto their Laboratory profile(n=52) *

Laboratoryprofile	No. of patients (%)
Anaemia	12(23.08)
Platelet count <50,000/ml	6(11.54)
DIC	4(7.69)
Prolonged BT > 9 mins	4(7.69)
Prolonged CT > 11 mins	4(7.69)

Prolonged PT >15 secs	4(7.69)
Serum bilirubin >1.5mg/dl	7(13.46)

*multiple responses

Table no 5: Distribution of snakebite victims accordingtotheir length of hospital stay(n=52).

Length of hospital stay (in days)	No. of patients (%)
<3	13(25.00)
3-7	24(46.15)
>7	15(28.85)
Total	52(100)

Table no 6: Distribution of snakebite victims accordingto their complications(n=52).

Complication	No. of patients (%)
Respiratory failure	6(11.54)
Renal failure	8(15.38)
Compartment syndrome	4(7.69)
Residual neurological deficit	1(1.92)
No complication	33(63.47)
Total	52(100)

Table no 7: Distribution of snakebite victims according to their outcome(n=52).

Outcome	No. of patients (%)
Cured(Uncomplicated)	33(63.47)
Cured(Complicated)	13(25.00)
Death	6(11.54)
Total	52(100)

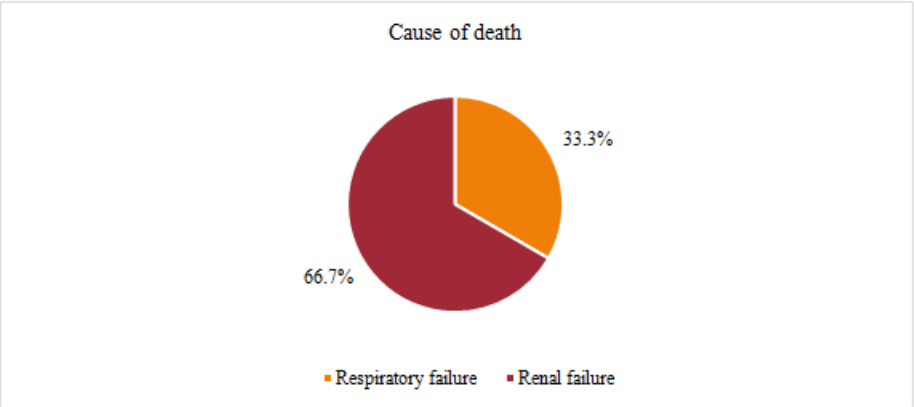

Fig 2: distribution of snakebite victims accordingtotheir cause of death(n=6).

IV. Discussion

Males are affected more than females, as seen in our study as they constitute the working majority, engaged in farming and working outdoors, supported by similar findings from studies done in Karnataka [7], Andhra Pradesh[8]

In this study, snakebite victims were predominantly younger, probably due to their ambulant nature similar to studies conducted in Karnataka [7], Andhra Pradesh[8.] And were agricultural worker since farming was their main source of income as seen in a similar study conducted in West Bengal[9]. As snakes have natural habitats in rural areas, more than 97% snakebites happen in there only. Snakes are usually elusive and reclusive. Snakebites occur when human move to their habitat like paddy fields. tea, rubber and coffee plantations, bushes, waterbodies during fishing. In recent years, few cases of snakebite casualties were recorded in unscientific and casual handlers of venomous snakes like snake rescuers and snake charmers.[10]Most of victims belonged to rural areas, bitten predominantly in lower extremity and during the day time, similar to findings in Karnataka [7], Andhra Pradesh[8] and Maharashtra [11]. Majority of the cases were also seen during monsoon season due to flooding of the habitat of snakes and their prey, similar findings was seen in studies from Karnataka [7] and Nellore in Andhra Pradesh[12]

In this present study, type of snake identified was mainly Elapids, followed by Viperids, while around 15% remained unidentified. In India, four species are responsible for 99% of the venomous bites; they are called 'Big Fours'. Big Fours are poisonous snakes belonged to the family of Elapids (cobra & krait) and Vipers

(Russell's viper & saw scaled viper). The envenomation that is attributable to Elapids bite causes neuroparalysis and Viper bites causes hematotoxic features.[9]

As seen in this present study, majority of the snakebite victims were frightened (82.69%) at the time of admission. The signs and symptoms of Viper envenomation (hemotoxic) were pain and tenderness at site of bite, oliguria, hematuria, sub conjunctival hemorrhage, and hypotension. One study conducted in Karnataka[6] had bleeding from site of bite as main manifestation in hemotoxic snakebite patients, followed by cellulitis hematuria and echymosis. However, studies from Jammu[13] and Orissa[14] had hematuria as main presentation. Such is noted due to subtle difference among subspecies of Viper[15].Neurotoxic manifestations were mainly Ptosis (40.38%) followed by altered sensorium (hypoxia due to inadequate ventilation) and extensor planter response. Similar findings were seen in studies conducted in Nellore[12] and Andhra Pradesh[8].Laboratory profile of snakebite victims was suggestive of anemia, followed by deranged LFT and lowered platelet count (<50,000).About 63% patients had uneventful recovery, and remaining developed some complications. Renal failure developed in about 15.38% cases, as a consequence of hemotoxic manifestation, while respiratory failure developed in 11.54% cases as a result of

neurotoxic features. Compartment syndrome, most commonly occurs in Russel viper bite was seen in 7.69% cases. Out of 52 cases, 6 had expired [4 cases due to renal failure and 2 cases due to respiratory failure].

V. Conclusion

Bankura, a district of West Bengal where, snakebite is a common life-threatening problem. "Do it R.I.G.H.T" isthe first aid recommendation, that includes reassurance of snakebite victim, immobilizing the affected limb, immediatehospital referral and informing the doctor regarding the symptoms.Proper availability and appropriateuse of AVS,ventilatory support, hemodialysis of AKI cases, treatment of complications and close monitoring of all snakebite cases will ultimately help to reduce the morbidity and mortality. There is an urgent need to educate people and increase their awareness about prevention, first-aid and early treatment.

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