

Snake Bite Induced Coagulopathy: A Study of Clinical Profile and Predictors of Poor Outcome

H S Harshavardhana¹,
Imtiaz Pasha²,
N C Srinivasa Prabhu³
Amira⁴,
Preethika Ravi⁵

¹Assistant Professor of Anesthesiology, Kempegowda Institute of Medical Sciences (KIMS), Bangalore,
²Assistant Professor of Emergency Medicine, Kempegowda Institute of Medical Sciences (KIMS), Bangalore,
³Professor of Emergency Medicine, Kempegowda Institute of Medical Sciences (KIMS), Bangalore,
⁴Junior Resident, Department of Emergency Medicine, Kempegowda Institute of Medical Sciences (KIMS), Bangalore,
⁵Junior Resident, Department of Emergency Medicine, Kempegowda Institute of Medical Sciences (KIMS), Bangalore

Corresponding Author: Dr. H S Harshavardhana, #78, 1st Floor, 1st C Main Road, Manjunatha Nagar, Ittamedu, BSK 3rd Stage, Bangalore 560085, Phone: 9916247725.
E-mail: harsha.hs624@gmail.com

Abstract

Background: Snake bite poisoning is known to man since antiquity. Snake bite can result in local and systemic complications. Major systemic complications include acute renal failure, neurologic abnormalities requiring ventilator support and disseminated intravascular coagulation. Disseminated intravascular coagulation can result in serious life threatening systemic complications like hemorrhage, infarction and even death if the treatment is delayed. In tropical countries where snake bite is a serious problem there is very little reliable data on hematological problems of snake envenomation because of inadequate documentation.

Aims: The present study was undertaken to study the clinical profile of the snake bite patients who develop coagulopathy and to study the role of coagulation markers to evaluate the morbidity and mortality of snake bite victims.

Material and Methods: Fifty patients consecutively admitted with history of snakebite were studied from May 2012 to November 2013 in a Kempegowda institute of medical sciences (KIMS), Bangalore, Karnataka, India. The patients were classified into the normal and coagulopathy group based on clinical symptoms and the hematological parameters.

Results: In our study patients who had coagulopathy had prolonged hospital stay and requirement of more blood products transfusion causing increased morbidity. 24 patients had platelets less than 1 lakh and approximately hospitalized for 28 days and they received 102 platelet units. INR was more than 1.5 in 24 patients and hospitalized for 25 days and they received 136 fresh frozen plasma. The case-fatality rate in our study was 4%.

Conclusion: Combined clinical and laboratory parameter evaluation needed to identify the coagulopathy very early to reduce the hospital stay and mortality.

Keywords: Coagulopathy, Snake bite

INTRODUCTION

Bites by snakes represent an important health problem in the tropical world including India. The true incidence of snakebites is difficult to assess and often is underreported. There are approximately 1.2 million and 5.5 million snakebites worldwide each year, with 421,000-1,841,000 envenomations and 20,000-94,000 deaths.¹ Awareness and educating the farmers and labourers is needed to prevent the snake bites.²

In tropical countries where snake bite is a serious problem there is very little reliable data because of

inadequate documentation. At present very few clinical studies are available on snake envenomation especially on haematological problems of snake envenomation.³ Many of the toxins in snake venom interact with clotting mechanism and fibrinolytic system and causes coagulopathy. The occurrence of local and systemic snake bite related symptoms is linked to toxins in snake venom.

Snake bite can result in local and systemic complications. Major systemic complications include acute renal failure, neurologic abnormalities requiring ventilator support and disseminated intravascular coagulation.^{4,5}

Disseminated intravascular coagulation can result in serious life threatening systemic complications like hemorrhage, infarction and even death if the treatment is delayed.⁶

This study was conducted to evaluate the clinical and laboratory parameters of coagulopathy and evaluation of morbidity and mortality in them.

OBJECTIVES

The primary objective of this study was to describe the clinical profile of the snake bite patients who develop coagulopathy.

The secondary objective is to study the role of coagulation markers to evaluate the morbidity and mortality of snake bite victims

METHODOLOGY

Study population

Fifty patients consecutively admitted with history of snakebite were included in the study after obtaining ethical committee clearance as well as informed consent from all patients. All patients were evaluated with a detailed history and clinical examination. This study was done between May 2012 to November 2013 in a Kempegowda institute of medical sciences (KIMS), Bangalore, Karnataka, India.

Inclusion Criteria

Patients with history of snake bite with signs of envenomation were included in the study after obtaining ethical committee clearance as well as informed consent from all patients.

Exclusion Criteria

Patients with pre-existing coagulopathy, on anticoagulants and antiplatelet drugs, with history of renal diseases. Patients with risk factors like diabetes, hypertension, connective tissue diseases, chronic infection.

Data Collection

Data was collected in a proforma which includes detailed history, clinical examination and appropriate investigations.

Following history and clinical features were found out:

- Snake bite site and snake bite time
- Lapse of time (in hours) after snake bite
- Weather tourniquet applied or not
- Identification of snake and fang marks
- Local swelling at the site of bite and increasing the swelling with time
- Bleeding from the bite sites and bleeding from gums
- History of passing black or brown urine to rule out intravascular hemolysis

- Symptoms like nausea, vomiting, fever, breathlessness and decreased urine output
- Investigations include Haemoglobin (Hb), Total count, Platelet count, Bleeding time, Clotting time, Whole blood clotting test (WBCT), Prothrombin time (PT), Activated partial thromboplastin time (APTT), International normalized ratio (INR), Fibrin degradation products (FDP), Creatine kinase, Blood urea, Serum creatinine, Serum bilirubin, Serum potassium levels
- Number of anti-snake venom serum (AVS) given.

The subjects who were classified into the normal and coagulopathy groups based on clinical symptoms and the hematological parameters like prothrombin time (PT), INR, the fibrin degradation products (FDPs), platelet count tests and whole blood clotting time.^{7,8}

RESULTS

Age, gender, the site of bite, tourniquet application, identification snake

58% of the patients aged above 40 years whereas 38% between 18 to 40 years. There were 36 males (72%) and 14 females (28%) out of 50 patients studied. Majority of the snake bites were in lower limbs: Right leg 17 patients (34%), left leg 19 patients (38%) and each right and left upper limb has 7 patients (14%). Tourniquet was applied in just 5 patients (10%). Out of 50 patients studied 35 patients had Viper bite, 6 patients had Cobra bite, 2 patients had Krait bite and in 7 patients snake was not identified.

Symptoms of snake bite patients, Number of ASV vials given and Haemodynamic parameters of the patients

33 patients (66%) had fang marks, 20 patients had bleeding from the bite site (40%), 7 patients had bleeding gums (14%), 20 patients had hematuria (40%), swelling and inflammation of the bite area was present in 45 patients (90%), 17 patients had breathlessness (34%). More than 20 ASV vials were given in 26 patients (52%), less than 10 were given in 11 patients (22%) and 10 to 20 vials were given in 13 patients. 31 patients (62%) had tachycardia (>100 bpm) and 18 patients (36%) had systolic blood pressure less than 100 mmHg at the time of presentation. 13 patients (26%) had Hemoglobin less than 10 gm% and 32 patients (64%) had total leucocyte count more than 11,000. 24 patients (48%) had platelet count less than 1,00,000. 28 patients (56%) had prothrombin time more than 15 seconds. 31 patients (62%) had activated partial thromboplastin time more than 30 seconds. 24 patients (48%) had INR more than 1.5. FDP was positive in 22 patients (44%). WBCT was more than 20 minutes in 30 patients.

Table 1: Hematological parameters in patients with coagulopathy

Hematological parameters	Number of patients	%	Number of hospitalization days	Supportive treatment
Hemoglobin (Hb in gms) <10.0%	13	26	22	Number of packed red cells 38
Total count >11000	32	64	20	
Platelet count <100000	24	48	28	Number of platelets transfusion 102
Prothrombin time (in secs) >15 sec	28	56	25	Number of FFP transfusion 136
Activated partial thromboplastin time (APTT in secs) >30 sec	31	62	22	
WBCT (Whole blood clotting time) in minutes of patients studied >20 min	30	60	27	Number of ASV vials 488

Table 2: INR vs number of hospitalization days

INR	Number of patients	Mean±SD	Number of hospitalization days	P value
<1.5	26	9.58±6.319	12	0.01
>1.5	24	14.75±7.285	25	0.01

Table 3: End results of snake bite patients studied

End results	No of patients	%
Discharged	47	94
Death	2	4
Chronic kidney disease	1	2

DISCUSSION

Snake venom consist of various enzymes like zinc metalloproteinase haemorrhagins and procoagulant enzymes. Zinc metalloproteinase haemorrhagins lead to vascular endothelium damage. Procoagulant enzymes activate factor X and prothrombin. The toxins in snake venom interact with clotting mechanism and fibrinolytic system and causes "consumption coagulopathy".³

In our study vipers constituted for 70% of the total snake bites. We have noticed viper bite causes rapid progression of swelling at the bite site and systemically causes coagulopathy. In our study 6 patients had Cobra bite and 2 patients had Krait bite associated with neurotoxicity manifesting as breathlessness which were managed conservatively without ventilator support.

In the present study, maximum incidence of snake bite was found above the age of 40 years (58%).72% of the snake bite occurred in males attributed mainly to their outdoor activity compared to females.⁹ Most of the snake bites were haematotoxic (Viper bite), constituting to 70%. Cobra in 12%, Krait in 4% and snake was not able to identify in 14% of the bites. Snake bite victims had various clinical

manifestations; 66% of the victims had fang marks, 90% had swelling of the bite area, 60% had muscle pain, 40% had bleeding from the site and hematuria, 50% had reduced urine output, 34% had breathlessness, 26% had vomiting.¹⁰

In our study patients who had coagulopathy had prolonged hospital stay and requirement of more blood products transfusion causing increased morbidity. 13 patients had haemoglobin less than 10 g/dl and approximately hospitalized for 22 days and they received 38 packed red cells. 24 patients had platelets less than 1 lakh and approximately hospitalized for 28 days and they received 102 platelet units. INR was more than 1.5 in 24 patients and hospitalized for 25 days and they received 136 fresh frozen plasma. Whole blood clotting time was prolonged more than 20 minutes in 30 patients and approximately hospitalized for 27 days and they received 488 ASV vials.

The case-fatality rate in our study was 4%. Death rate due to snake bites in developing countries like India is more than the developed countries.¹⁰

Mortality in viper bites commonly secondary to hypovolemia, intravascular haemolysis, a syndrome resembling disseminated intravascular coagulation or venom-induced nephrotoxicity.¹¹

The combined clinical manifestations (like gum bleeding and hematuria) and laboratory parameters (like low hemoglobin, thrombocytopenia, raised INR, prolonged WBCT) should be evaluated to identify the coagulopathy very early as it prolongs the hospital stay leading increased morbidity and mortality. These manifestations require prompt treatment to reduce the morbidity and mortality.

CONCLUSION

Haematological manifestations are very common in snake bite. Combined clinical and laboratory parameter evaluation

needed to identify the coagulopathy very early to reduce the hospital stay and mortality.

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