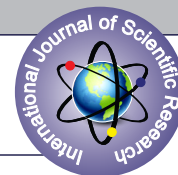


STUDY OF HAEMATOLOGICAL AND COAGULATION PROFILE IN SNAKE BITE AND ITS OUTCOME IN TERTIARY CARE HOSPITAL.



Pathology

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ABSTRACT

Introduction: Snake bite is an important health problem in the tropical world including India. Snake venom contains many toxins which interact with clotting mechanism and fibrinolytic system causing coagulopathy. Awareness and educating the farmers and laborers who walks in barefoot in fields while walking in night is needed to prevent the snake bites. Hence this study was conducted to evaluate the clinical and laboratory parameters of coagulopathy. **Aim of the study:** To study the coagulation profile and hematological parameters for detection of snake bite and aid in early treatment. **Materials And Methods:** Total of 50 Patients with history of snake bite were considered in this study from January 2021 – June 2022. Detailed history, physical examination and following investigations were performed. Complete haemogram, whole blood clotting time, prothrombin time and a partial thromboplastin time were done. **Results:** Out of 50 patients, 30 (58%) patients showed anemia with Hemoglobin <10 gm%, Leukocytosis (Total count >11,000) in 12 (18%) patients and thrombocytopenia (platelet count <1.5 lakh) in 26 (52%) patients. Also 70% of the patients had prolonged whole blood clotting time that is more than 20 minutes. PT-INR was prolonged (>1.2 seconds) in 45 (95%) patients and APTT was prolonged (>28 seconds) in 48 (96%) patients respectively. **Conclusion:** Snake bite is a major public health problem. Combined clinical and laboratory parameters evaluation needed to identify the coagulopathy very early to reduce the hospital stay and mortality.

KEYWORDS

Snake bite, venom, coagulopathy

INTRODUCTION :

Snake bite is an important health problem in the tropical world including India¹. The incidence of snakebites are approximately 1.2 million and 5.5 million snakebites worldwide each year with 4, 21,000-1,841,000 envenomations and 20,000-94,000 deaths. The true incidence is often difficult to assess and underreported^{1,2}.

In India more than 60 species of venomous snakes are found. The most common are spectacled cobra (*Naja naja*), Com-mon krait (*Bungarus caeruleus*), Saw scaled viper (*Echis carinatus*) and Russell's viper (*Daboia russelii*)².

Snake venom contain complex substances. They have proteins and non-protein fractions which produces local changes such as acute inflammatory activity, edema, ecchymosis, blisters, necrosis, and systemic changes, such as hemorrhage, blood pressure alteration, neurotoxicity, hemolysis, rhabdomyolysis and acute kidney injury (AKI). Many toxins in snake venom interact with clotting mechanism and fibrinolytic system causing coagulopathy^{3,4}.

Common symptoms of snake bite are local pain, edema, systemic complications. Disseminated intravascular coagulation is a life threatening systemic complication of snake bite which can result in death if the treatment is delayed⁵.

Snake bites are common in people working barefoot in the fields or while walking at night. It is a common occupational hazard of farmers, plantation workers, construction workers, snake charmers and hunters. With urbanization and deforestation, snake bite has become an important public health problem⁶.

Awareness and educating the farmers and laborers is needed to prevent the snake bites. Hence this study was conducted to evaluate the clinical and laboratory parameters of coagulopathy and evaluation of morbidity and mortality in them.

OBJECTIVES & AIM:

To study the coagulation profile and hematological parameters for detection of snake bite and aid in early treatment.

MATERIALS AND METHODS:

Patients with history of snake bite who fulfill the inclusion and exclusion criteria who are admitted to Sri Siddhartha Medical College, Tumkur during the period of January 2021 – June 2022. Sample size was 50 and was collected with simple random sampling technique.

Inclusion criteria:

History of snake bite with local signs of envenomation

Exclusion criteria:

- Patients with history of snake bite without signs of envenomation
- Patients with snake bite who already had bleeding disorders and liver disease

Detailed history, physical examination and necessary investigation were undertaken. The purpose of the study was explained to the patient and informed consent was taken. Following investigations were performed. Complete haemogram, whole blood clotting time, bleeding time, prothrombin time and partial thromboplastin time were done to assess the coagulation profile.

RESULTS :

Out of 50 patients, 18 patients were in the age group of 41–50 years with mean age of 43.8 years. 31 patients were males (62%) and 19 (38%) were females. The most common site of snake bite was lower extremities (64%)

Age distribution of patients:

Age in years	Number of patients	Percentage
18-30	10	23.0
31-40	08	14.0
41-50	18	34.0
51-60	12	25.0
60-70	02	04.0
Total	50	100.0

Haematological parameters:

Hematological parameters	Number of patients	Percentage	Mean SD
Haemoglobin (Hb in gms)			
10.0%	30	58.0	9.802.05
10.0%	20	42.0	
Total leucocyte count			
4,000	05	08.0	8018.005214.13
4,000 – 11,000	33	74.0	
11,000	12	18.0	
Platelet count			

1.5 lakh	26	52.0	1.950.84
1.5 lakh	24	48.0	

Laboratory data in this study showed anemia with Hemoglobin <10 gm% in 30 (58%) patients, Leukocytosis (Total count >11,000) in 12 (18%) patients and thrombocytopenia (platelet count <1.5 lakh) in 26 (52%) patients.

Whole blood clotting time in minutes:

WBCT in minutes	Number of patients	Percentage
20	15	30.0
20	35	70.0
Total	50	100.0

In the present study 70% of the patients had prolonged whole blood clotting time that is more than 20 minutes.

Comparison of PT at the time of admission and after 12 hrs of admission

Prothrombin time	At admission		After 12hrs	
Prolonged Normal	No of cases	percentage	No of cases	percentage
Total	35	75.2	45	95.3
	15	25.8	05	04.7
	50	100	50	100

PT-INR was prolonged (>1.2 seconds) in 45 (95%) patients and APTT was prolonged (>28 seconds) in 48 (96%) patients.

Comparison of APTT at the time of admission and after 12 hrs of admission

APTT	At admission		After 12hrs	
Abnormal	No of cases	percentage	No of cases	percentage
Normal	38	78.6	48	96.30
Total	12	22.4	02	03.79
	50	100	50	100

DISCUSSION:

Snake venom consist of enzymes like zinc metalloproteinase, haemorrhagins and procoagulant enzymes. Zinc metalloproteinase and haemorrhagins lead to vascular endothelium damage. Procoagulant enzymes activate factor X and prothrombin. The toxins in snake venom interact with clotting and fibrinolytic system causing consumption coagulopathy⁷.

The mean age of present study population was 43.8 years which was comparable to study done by Paul J Dasgupta et al⁶ (37.45 years). Most of these patients are middle aged working in the fields.

In the present study, males account for 62% and 38% females which was similar to studies by Athappan G et al⁷ (62.6%) and Mittal et al⁸ (53%). This propensity is because more male population work in the field, construction sites and walk barefoot at night.

In this study most common site of snake bite was lower extremities which was in accordance with the study done by Pramila D et al⁹ who found it to be 80% .Most of the patients were from rural areas and commonly snake bite occurred in our study was during night time when the person is sleeping or walking around the fields in dark.

30 patients had haemoglobin less than 10 g/dl and approximately hospitalized for 25 days. 26 patients had platelets less than 1 lakh and approximately hospitalized for 28 days and they received 114 platelet units. INR was more than 1.5 in patients and hospitalized for 25 days and they received 136 fresh frozen plasma.

In present study, low platelet count (52%) was comparable with Ishfaq et al¹⁰ (20.7%) and 93% in Mohapatra et al¹¹ and 92% in Reid et al¹². This is due to the direct effect of vasculotoxin (haemorrhagin) present in venom.

In most of the cases PT and APTT are raised, indicating defect in both extrinsic and intrinsic pathway. In this study prolonged PT was seen in 75% of the patients which is comparable with the studies conducted by Harshavardhana et al¹³ (56%). Prolonged APTT was observed in 78% of cases. APTT was also prolonged in study done by Biradar MV et al¹⁴ (68.75%) and Harshavardhana et al¹⁵ (64%)

In our study 35 patients showed prolonged WBCT (70%) was

comparable with the study of Paul J Dasgupta et al⁶ (74%) and Harshavardhana et al¹³ (60%). Twenty Minute Whole Blood Clotting Test (20WBCT) is carried out to rule out whether it is haemotoxic or neurotoxic snake bite.

Prolonged WBCT is seen in only haemotoxic so most of the snake bites were vipers in our study. It is considered the most reliable test of coagulation which can be carried out at the bedside without specialist training. This test should be carried out every 30 minutes from admission for every three hours and then hourly. If incoagulable blood is discovered, the 6 hourly cycles will then be adopted to test for the requirement for repeat doses of ASV.

CONCLUSION:

Snake bite is a major public health problem with very few tests readily available to the treating physicians. It is important to recognize these signs of envenomation and monitor the coagulation profile to treat these patients and avoid complications. Combined clinical and laboratory parameters evaluation needed to identify the coagulopathy very early to reduce the hospital stay and mortality.

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Declaration of conflicting interests

There are no conflicting interests

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