

**Original article:**

## **Hematological profile of snake bite patients in a Tertiary Care Hospital**

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### **ABSTRACT:**

**Introduction:** Haematological complications are more common than any other complications due to snake bite. Several educational and preventive activities are required to minimise the incidence of snake bite. Early recognition of signs of envenomation and derangement of haematological parameters can prevent many complications.

**Objective of the study:** To study the hematological profile in snake bite patients.

**Methodology:** Patients with history of snake bite who fulfill the inclusion and exclusion criteria, getting admitted at K.R. Hospital, Mysore Medical College during the period of January 2011 to June 2012. Patients who have developed local signs of envenomation due to snake bite are included in the study group. The coagulation profile assessed by doing blood investigations.

**Results:** Among 50 patients with signs of snake bite envenomation, 70% of the patients had prolonged whole blood clotting time that is more than 20 minutes, PT-INR was prolonged (>1.2 seconds) in 33 (66%) patients and APTT was prolonged (>28 seconds) in 44 (88%) of patients and thrombocytopenia (platelet count <1.5 lakh) was found in 13 (26%) patients

**Conclusion:** It is important to recognize the signs of envenomation and monitor the coagulation profile to treat snake bite patients at the earliest and to avoid haematological complications.

Keywords: Snake bite, Signs of Envenomation, Haematological profile, PT, APTT, WBCT

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### **INTRODUCTION**

Snake bite rates are more commonly seen in temperate and tropical countries where most of them are farmers. In India, a large proportion of snake bites occur when people are working barefoot in the fields or while walking at night. Recent estimates indicated that 1.2 million - 5.5 million snakebites worldwide each year, with 0.4 -1.84 million envenomations and 20,000–94,000 deaths.<sup>1</sup> This study is an attempt to study the hematological profile of snake bite patients. Worldwide, only about 15% of the more than 3000 species of snakes are considered dangerous to humans.<sup>2</sup> Venomous snakes belong to the families Viperidae, Elapidae, Hydrophiidae, Atractaspididae, and Colubridae.

Snake venoms are extremely complex substances. They have proteic and non-proteic fractions, and may produce local changes, such as acute inflammatory activity, edema, ecchymosis, blisters and necrosis, and systemic changes, such as hemorrhage, blood pressure alteration, neurotoxicity, hemolysis, rhabdomyolysis and acute kidney injury (AKI).<sup>3</sup> Haematological complications are more common than any other complications due to snake bite. A simple 20 Minute Whole Blood Clotting Test (20WBCT) considered the most reliable test of coagulation and can be carried out at the bedside without special training to diagnose and treat early haematological complications of snake bite.

Several educational and preventive actions should be taken in order to protect farm workers, who are the main victims of such accidents.<sup>4</sup>

### OBJECTIVE OF THE STUDY

To study the haematological profile in snake bite patients

### METHODOLOGY

Patients with history of snake bite who fulfill the inclusion and exclusion criteria, getting admitted at K.R. Hospital, Mysore medical college during the period of January 2011 to June 2012. Sample size was 50. Sample size was selected with simple random sampling.

#### 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 has bleeding disorders and liver diseases

Data was collected using a pretested proforma meeting the objectives of the study. Detailed history, physical examination and necessary investigations were undertaken. Patients who have developed local signs of envenomation due to snake bite like fang mark, swelling of the limb, bleeding from snake bite site are included in the study group. The purpose of the study was explained to the patient and informed consent obtained. Following blood investigations were performed: Complete haemogram, Whole blood clotting time, Bleeding time, Prothrombin time and Partial thromboplastin time to assess the coagulation profile.

### RESULTS:

Out of 50 patients, sixteen patients were in the age group of 41–50 years with mean age of 43.8 years. Thirty-one patients were males (62%) and 19 (38%) were females.

**Table 1: Age distribution of patients studied**

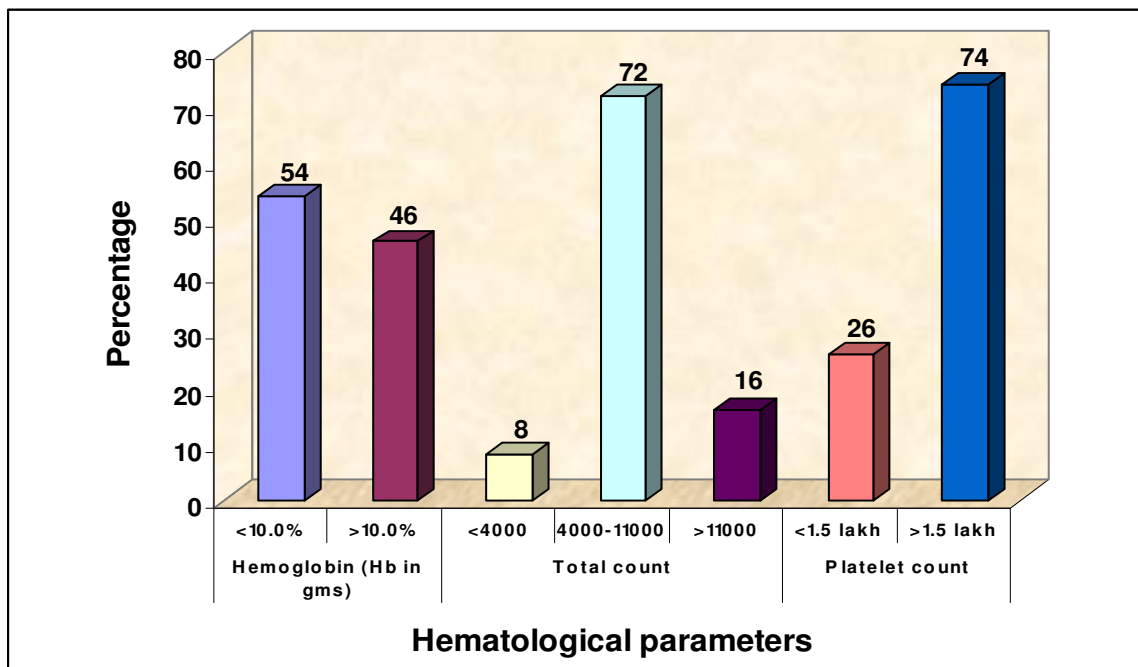
Age in years	Number of patients	Percentage
18-30	12	24.0
31-40	7	14.0
41-50	16	32.0
51-60	13	26.0
>60	2	4.0
Total	50	100.0

**Table 2: Hematological parameters of patients studied**

Hematological parameters	Number of patients (n=50)	Percentage	Mean ± SD
Hemoglobin (Hb in gms)			9.40±2.08
• <10.0%	27	54.0	
• >10.0%	23	46.0	
Total Leukocyte count			8013.00±5214.13
• <4,000	4	8.0	
• 4,000-11,000	38	72.0	
• >11,000	8	16.0	
Platelet count			1.95±0.83
• <1.5 lakh	13	26.0	
• >1.5 lakh	37	74.0	

Laboratory data in this study showed anemia with Hemoglobin <10 gm% in 27 (54%), Leukocytosis (Total count >11,000) in 8 (16%) and thrombocytopenia (platelet count <1.5 lakh) in 13 (26%) patients.

**Figure:1 Haematological Parameters**

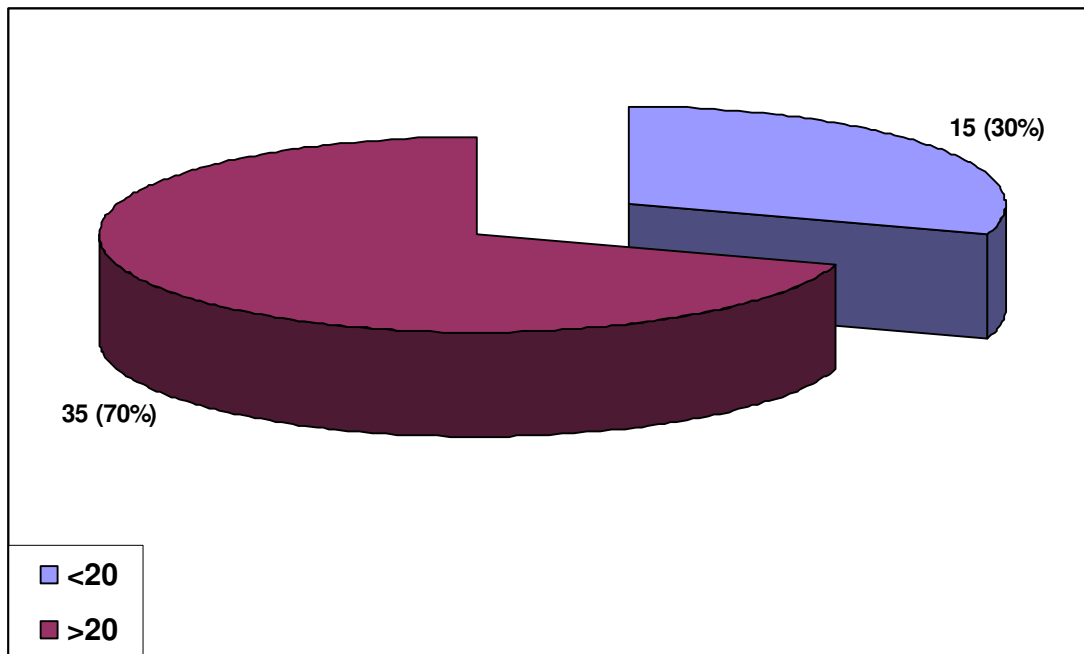


**Table 3: WBCT in minutes of patients studied**

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.

**Figure 2: WBCT in minutes of patients studied**



**Table 4: Bleeding time of patients studied**

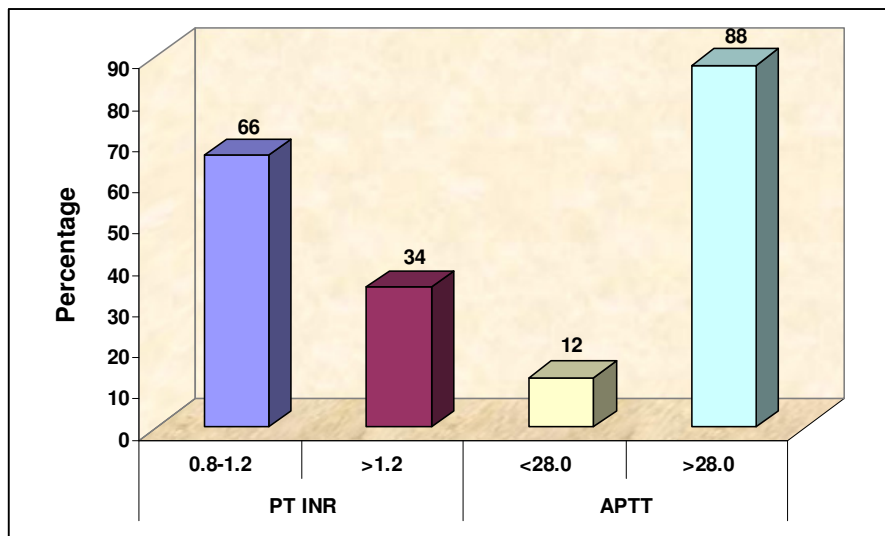
Bleeding time	Number of patients (n=50)	Percentage
Normal	42	84.0
Abnormal	8	16.0
• Increased	8	16.0

Bleeding time was prolonged in 8 (16%) patients.

**Table 5: PT INR and APTT of patients studied**

Coagulation profile	Number of patients (n=50)	%
PT INR		
0.8-1.2	17	34.0
>1.2	33	66.0
APTT		
<28.0	6	12.0
>28.0	44	88.0

**Figure 3: PT INR and APTT of patients studied**



PT-INR was prolonged (>1.2 seconds) in 33 (66%) patients and APTT was prolonged (>28 seconds) in 44 (88%) of patients.

## DISCUSSION

In the present study, 50 cases were selected on the basis of simple random sampling method from the OPD and medical wards, K.R. Hospital, Mysore Medical College who had developed signs of snake bite envenomation from January 2011 to August 2012. The mean age of present study population was  $43.8 \pm 12.63$  years which was comparable to Paul J Dasgupta et al (37.45 years).<sup>5</sup> Most of these patients are middle aged working in the agricultural lands. In the present study, males account for 62% which was comparable with Athappan G et al (62.6%), Mittal B V et al (58.53%) and R Pramiladevi et al (56%).<sup>6, 7 and 8</sup> This male propensity is because of more male population working in the field and walking barefoot at night.

There are two coagulation pathways extrinsic and intrinsic. Any problem in extrinsic pathway lead to prolonged PT and problem with the intrinsic pathway lead to prolonged APTT. Snake venom contains various proteins (like prothrombin activators, thrombin like enzymes, phospholipases, factor X activating proteins etc.) which block different levels of coagulation or it may cause excessive clot formation leading to consumption coagulopathy. In most of the cases PT and APTT both are raised, indicating defect in common pathway or

consumption coagulopathy. In this study prolonged PT was seen in 66% of the patients which is comparable with the studies conducted by Harshavardhana et al (56%). Prolonged APTT was observed in 88% in this present study. APTT was prolonged in study by Biradar MV and others (68.75%) and Harshavardhana et al (64%).<sup>9 and 10</sup>

Twenty Minute Whole Blood Clotting Test (20WBCT) considered the most reliable test of coagulation and can be carried out at the bedside without specialist training. The test should be carried out every 30 minutes from admission for three hours and then hourly after that. If incoagulable blood is discovered, the 6 hourly cycles will then be adopted to test for the requirement for repeat doses of ASV. In present study, low platelet count (26%) was comparable with Ishfaq et al (20.7%).<sup>11</sup> Prolonged WBCT in present study (70%) was comparable with the study of Paul J Dasgupta et al (74%) and Harshavardhana et al (60%).<sup>5 and 9</sup>

## Conclusion:

Most of the patients with local signs of snake bite envenomation exhibit abnormal coagulation profile. It is important to recognize these signs of envenomation and monitor the coagulation profile to treat these patients and to avoid complications.

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