Journal of Cardiovascular Disease Research

ISSN: 0975-3583, 0976-2833 VOL 13, ISSUE 05, 2022

Original Research Article

Haematological And Coagulation Profile In Snake Bite Patients, In Tertiary Care Centre

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Abstract

Background: It is estimated that annually there are more than 400 000 snake envenoming's and 20,000 deaths worldwide. Coagulopathy is a common manifestation in cases of snake bite and its abnormality can be detected by blood coagulation tests. No clear guidelines exist for use coagulation markers in patients with minimal or moderate envenomation.

Aim and Objectives: Study to know haematological and coagulation profile in snake bite patients.

Material and Methods: This is an observational descriptive study was conducted in the department of pathology, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar, included 50 samples who followed inclusion and exclusion criteria. A detailed clinical history was obtained from the patient regarding the species of snake, site and time of bite, time of admission to the hospital, application of tourniquet, history of any chronic illness, bleeding or thrombotic tendency, history of drug intake, symptoms, signs relevant to snake bite.

Results: 74% of the patients were males and 26% of the patients were females. 74% of the patients were from the age group of 21 years to 60 years of age. Combination of Prothrombin time, APTT, Thrombin Time and fibrinogen levels for a period of 12 hours can be considered as reliable indicators to exclude envenomation.

Conclusion: Overall we can conclude thatafter snake envenomation, prothrombin time and APTT were first abnormal results but after 12 hrs of time, observation were safe to rule out any complication following envenomation if it comes to normal after retest.

Keywords: Enovomation, Prothrombin Time, Thrombin Time, APTT, Coagulation.

Introduction

It is estimated that annually there are more than 400 000 snake envenoming's and 20,000 deaths worldwide [1]. In India, around 35,000-50,000 people die of snake bite annually [2].

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India is inhabited by more than 60 species of venomous snakes. Some of the most common species found in India are spectacled cobra (Naja naja), Com-mon krait (Bungarus caeruleus), Saw scaled viper (Echis carinatus) and Russell's viper (Daboia russelii) [3].After being bitten by a poisonous snake, individuals may develop local pain, edema, systemic complications, acute renal failure, neurologic abnormalities, haemorrhage, infarctions and ultimately resulting in death[4].

Snake venom contains various types of enzymatic and non-enzymatic toxins. Few toxins damage blood vessels and cause bleeding while others cause activation of coagulation factors and results in coagulation. Another type of venom causes sedation and neurotoxicity. Few types of snake venoms are cardiotoxic and one of the most common and clinically significant complications of snake envenoming is coagulopathy, which can be observed by using Blood test, results in life threatening haemorrhage and death [5].Venom-induced consumption coagulopathy (VICC) is the most frequent type of coagulopathy associated with snake envenoming globally, but less clinically significant coagulopathies are also recognized with certain snakes.

No clear guidelines exist for use coagulation markers in patients with minimal or moderate envenomation, nor in those who do not receive antivenom, and also there are very few references in the literature related to coagulation parameter abnormalities after snake bite, evaluation of their seriousness and the length of the follow up period. Thus, we have undertaken this study to know haematological and coagulation profile in snake bite patients.

Materials and Methodology

This is an observational descriptive study was conducted in the department of pathology, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar for the duration of one year. We have taken total 50 samples who have admitted in the hospital under the department of general medicine for snake bite with bleeding and neurological signs and symptoms and also followed exclusion and inclusion criteria.

Inclusion Criteria : Patients, both male and female, with history of snake bite with signs of envenomation are included in the study.

Exclusion Criteria :

- Patients with history of snake bite treated outside with ASV.
- Patients both male and female with pre-existing coagulopathy.
- Patients on anticoagulants, antiplatelet drugs.
- Patients with history of renal disease.
- Patient with chronic diseases like diabetes, hypertension, connective tissue diseases.

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Methodology :

A detailed clinical history was obtained from the patient regarding the species of snake, site and time of bite, time of admission to the hospital, application of tourniquet, history of any chronic illness, bleeding or thrombotic tendency, history of drug intake, symptoms, signs relevant to snake bite.After obtaining informed consent from the patient, samples were collected under aseptic precautions. Bleeding time was done using a bloating paper , lancet and a stop watch. Whole blood clotting time was done using. Venous blood sample were collected using 23 gauge needle and syringe and were transferred to blue colour capped vaccutainers containing 3.2% citrate. The sample is then centrifuged at 2500 rpm for 15 minutes.

Statistical Analysis : Collected data were entered in the Microsoft Excel 2016 for further analysis, qualitative data were presented by frequency and proportions and association were assessed by McNemar chi square test. Statistical analysis was done by using statistical software SPSS version 25. P-value < 0.05 were considered as statistically significant at 5% level of significance.

Results and Observation:

We have observed total 50 patients with snake bites, among them 74% of the patients were males and 26% of the patients were females. 74% of the patients were from the age group of 21 years to 60 years of age. Snake bites were observed for different types snakes among them 36% of the patients were bitten by Viper, followed by 34% krait, 14% with Kobra and for 18% of the patient's snake bite was unknown. 64% of the patients had snake bite in the region of lower extremity. Because of bleeding and coagulation platelets counts were decreased and 54% of the patients had platelets count in the interval of 5000 to 1 Lakhs, there were 6 patients had platelets counts was < 5000.

Table 1 : Distribution of Basic parameters in the study

Parameters	Frequency	Percent
Gender		
Male	37	74
Female	13	26
Age		
< 20 Years	8	16
21 - 40 Years	18	36
41 - 60 Years	19	38
>60 Years	5	10
Type of Snake		
Kobra	7	14
Krait	16	32
Unknown	9	18
Viper	18	36

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Site of Bite		
Lower Extremity	31	62
Upper Extremity	11	22
others	8	16
Platelets Count		
< 50000	6	12
50001 - 100000	27	54
100000 - 1500000	17	34

Table 2 : Distribution of PT, APTT, TT, and Fibrinogen Index in the study

Parameter	Group		Total	P-value
	Before	After		
Prothrombin Time				
< 14	3(6%)	39(78%)	42(42%)	<0.001
> 14	47(94%)	11(22%)	58(58%)	
APTT				
< 28	4(8%)	3(6%)	7(7%)	<0.001
> 28	46(92%)	47(94%)	93(58%)	
Thrombin Time				
< 15	32(64%)	48(96%)	7(7%)	<0.001
> 15	18(36%)	2(4%)	93(58%)	
Fibrinogen Index				
< 150	15(30%)	7(14%)	22(7%)	<0.001
> 150	35(70%)	43(86%)	78(78%)	

Above tables showed different parameters that affects coagulopathy, among the patients 94% of the patients had Prothrombin time was more than 14 Sec before administration of the patients but after administration, it reduced to 22% and this difference was statistically significant. Before administration of the patients among all 36% of the patients had thrombin time was > 15 second but after administration of the patients it was observed that only 2 patients had thrombin time was more than 15 seconds, and also that difference was statistically significant.

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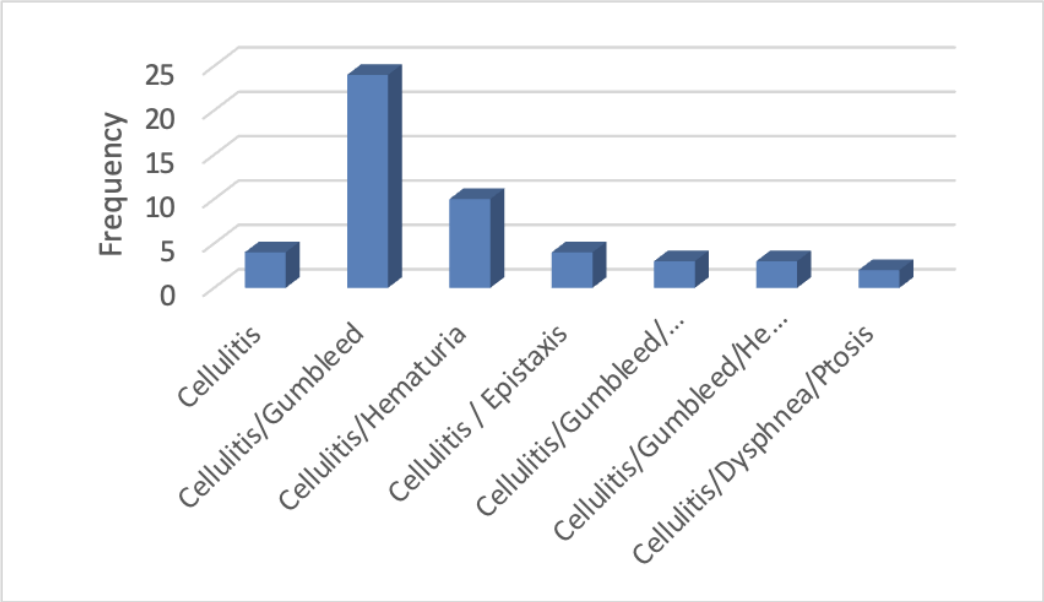

Figure 1: Distribution of Symptoms among the patients

Table 3 : Distribution of ASV in the study

ASV	Frequency	Percent
≤ 10 Vials	16	32
11 - 20 Vials	15	30
> 20 Vials	19	38
Total	50	100

Discussion:

In the present study,50 cases of snake bite were selected based on the inclusion and exclusion criteria. Clinical details were collected regarding the bite site, type of snake, and symptoms. Coagulation profile like bleeding time, clotting time, prothrombin time, activated partial thromboplastin time, thrombin time, fibrinogen assay were carried out on admission and after 12 hours of ASV administration using semiautomated ERBA Coagulation Analyser, with commercially available reagents.

In the present study we have observed that middle aged group (21 – 60 Years) people were affected with snake bites, 74% of the patients were more affected with snake bites. Study Conducted by Shubham Agarwal[6] and Suma Dasaraju [7] were accordance with our results. In another study done by sagar biradar et al , 27.8 % were in the age group of 30 -39 years.[8]

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Study done by Shubham Agarwal [6] in which males (64 %) showed higher incidence than females (36%) and also in the study done by Harsha vardhan [9]in which 72 % male and 28 % female were affected, these results were more likely to results observed in our study, we have observed male dominance in the study because most of the patients were labourer and farmers, and also most of the incidence were happened during the working time in the field.

Our study observed Viper was very dangerous and dominating snake in the study than the cobra and krait. Study by Shubham Agrawal et al[6] also found viper snake bite was more common in their study. 62% of the patients in our study snake bite were observed at lower extremity, which was in accordance with the study done by Hayat AS [10] who found it to be 80% and also with Shubham Agrawal et al [6] who found it to be 64.1%.

Study showed all the patients had cellulitis invariable of the type of snake. Among patients with features of hemotoxic manifestation, 60 % had gum bleeding along with cellulitis. In the study done by Sagar Biradar gum bleeding was seen in only 16 % of patients , while 41 % presented with bleed at the bite site[8]. Our study also found normal bleeding time among the patients, most of the studies showed normal bleeding time. We had all the patients with clotting time was more than 20 minutes. Our study found that due to the bleeding platelet counts were decreased among most of the patients, nearly 54% of the patients had platelet counts were between 50K to 1 Lakhs but 12% of the patients were with platelets counts < 50K.

Prothrombin time was observed prolonged among 94% of the patients before administration but that proportion was decreased after administration and came to 22% which was statistically significant (P-value<0.01). Our results are in accordance with the study done by Shubham Agarwal in which 96.3% had normal prothrombin time and 3.7 % had prolonged prothrombin time which was repeated after 12 hours. Also among 92% of the patients before administration of the patients APTT was prolonged and after administration also it was nearly similar which is a measure of intrinsic coagulation pathway, which again confirms the effects of envenomation, after 12 hours of administration it was nearly similar to before administration which is accordance with the study conducted by Shubham Agrawal et al.

Thrombin time among the patients was prolonged among 36% of the patients before administration but it was reduced to only 4% after administration which was statistically significant also these results were accordance with Shubham Agrawal et al study. Our study showed 14 % had decreased levels of fibrinogen which signifies the prolonged action of the venom which contrasts with the study done by Shubham Agarwal in which ,Fibrinogen Assay which was repeated after 12 hours showed 94.4 % had normal levels of fibrinogen and 5.6 % had decreased levels of fibrinogen.

From overall observation we have found that combination of Prothombin time, APTT, Thrombin Time and fibrinogen levels for a period of 12 hours can be considered as as reliable

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indicators to exclude envenomation. In a study done by Dempfle et al [11] he concluded that intra venous administration of anti snake venom resulted in normalized coagulation parameters within 48 hrs whereas in the present study we saw that 43 out of 50 cases showed normalization of coagulation markers 12 hrs after administration of anti snake venom.

Conclusion:

Study results and observation are saying that, first line coagulation markers like prothrombin time APTT, Thrombin time and Fibrinogen should be consider for the primary instigation to suspected coagulation abnormality in snake bites, though 20 minute whole blood clotting test is simple, rapid and reliable test of coagulopathy. Because these parameters helps to asses the severity of the venom. After snake envenomation, prothrombin time and APTT were first abnormal results but after 12 hrs of time, observation were safe to rule out any complication following envenomation if it comes to normal after retest.

Conflict of Interest: None

Acknowledgement: None

Funding: None

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