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## A STUDY OF CLINICAL PROFILE OF SNAKE BITE

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### ABSTRACT

Snake bite is an environmental hazard with significant morbidity and mortality. **AIMS AND OBJECTIVES:** 1. To study the clinical profile of snake envenomation of patients admitted in Rajah Muthiah Medical College & Hospital. 2. To analyse the factors which determine the prognosis of the patients, admitted with poisonous envenomation, depending on mode of presentation. **METHODOLOGY:** We conducted our cross-sectional study on 100 patients admitted with symptoms, signs and definite evidence of snake bite, during the period of October 2013 to October 2015, patients are from nearby rural area surrounding Chidambaram Town. We considered following observations as definite evidences of snake bite with presence of fang marks. **RESULTS:** Males showed a higher incidence 65% compared to females, most of them are farmers working in the field belong to the age group 18-45 years. Most of our patients were from rural areas surrounding Chidambaram Town. Most of our snake bite cases (55%) occur during the period of May to September mainly in day time between 6.00am to 6.00pm. Most of the snake bites occurred on toes and foets in lower limb. 20 minutes whole blood clotting time (WBCT) increased in 59 patients and prothrombin time increased in 23 patients. Antisnake venom (ASV) have administered to all the patients whose WBCT were increased more than 20 minutes with clinical manifestations suggests to of swelling and cellulitis. **CONCLUSION:** The incidence of snakebite is significantly high specially in rural population for whom this can be called an occupational hazard. Though there seems to be an increasing awareness amongst the rural population about the first aid measures, the importance of early hospitalization and the usefulness of antisnake venom in the management, there is still a lot to be proved as we had 82% patient came within 6 hour of snakebite. Topical infiltration of antisnake venom seems to be of no use. Prevention is better than cure. So protective measures should be taken to prevent the snakebite itself instead of killing the snake which alters the ecological balance.

**Keywords:** Snake Bite, Clinical Profile

## 1. INTRODUCTION

Snake bite is a common medical emergency and an occupational hazard in most parts of India, with farming as a major source of employment.

Early in 2009, snake-bite was finally included in the WHO's list of neglected tropical diseases confirming the experience in many parts of this region that snakebite is a common occupational hazard of farmers, plantation workers and others, resulting in tens of thousands of deaths each year and many cases of chronic physical handicap. Much is now known about the species of venomous snakes responsible for these bites, the nature of their venoms and the clinical effects of envenoming in human patients.

Various studies have shown that nearly 15,000 to 25,000 people die annually in India due to snake envenomation<sup>2</sup>, whereas the world mortality is estimated to be 30,000 to 40,000 per annum. Snakebite is responsible for 2.8 to 5.3% of the mortality of the total hospital admissions in different states of India as compared to 20 Death per year in USA or even lower mortality of one death every 3-5 years in Europe. The mortality in India is due to climatic factors, rural predominance of the population and their agricultural dependence. For this reason India is known as land of Exotic Snakebites<sup>2</sup>. Delayed presentation to hospitals frequently contributes to increase morbidity and mortality from snake bites.

Snake-bite is an environmental, occupational and climatic hazard in rural area and attention to the following recommendations for community education might reduce the

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risk of bites. Snakes have adapted to a wide range of habitats and prey species. All snakes are predatory carnivores, none is vegetarian although some eat eggs. Since snakes are preyed upon by other animals, they tend to be secretive and have evolved many survival strategies. By understanding something about the habits of snakes, simple precautions can be adopted to reduce the chance of encounters and consequently bites<sup>9</sup>. Many species are mainly nocturnal (night hunters) e.g. kraits, but other species are mainly diurnal (daytime hunters). Be specially vigilant about snake-bites after rains, during flooding, at harvest time and at night. Snakes prefer not to confront large animals such as humans so give them the chance to slither away. In India there are about 216 species of snakes of which about 52 are venomous and of these only 5 varieties of snakes are commonly encountered as the cause of snakebite poisoning<sup>2</sup>. They are<sup>1,2</sup>,

1. Russell's viper - *Doboaia russelli*
2. Cobras - (Common cobra) - *Naja Naja*
3. Krait - *Bungarus Caeruleus*
4. Saw scaled viper - *Echis Carinatus* and Pit viper.
- 5.

## 2. MATERIALS AND METHODS

This prospective cross sectional study conducted on 100 patients, for analysis of clinical feature with evaluation of coagulation disorder in patients presented themselves to emergency ward with symptoms, signs and definite evidences of snakebite, during the period October 2013 to October 2015. Patients are from the nearby rural area surrounding villages of Chidambaram Town, Cuddalore District. All patients were studied at the time of admission, before and after administration of ASV and were treated and followed up in the hospital until recovery or death.

We excluded those patients, who came with history of snakebite, but no definite fang marks and no symptoms, signs or evidence. Those patients were bitten by some other animals, non poisonous snake.

We have studied and analysed clinical features of snakebite in a total of 100 cases. In most of the studies, they observed that haemorrhages in different forms and sites are the major clinical manifestations, following snakebites. Coagulation disorder with or without bleeding manifestations dominates the clinical picture of viper bites. So we analysed cases of snakebite for the evaluation of coagulation disorder, after screening the patients with CT and BT and 20 minutes WBCT even with normal value along with signs of systemic envenomation .

### METHODS OF COLLECTION OF DATA:

conducted our cross sectional study on patients admitted with symptoms, signs and definite evidence of snakebite. We considered following observation as definite evidences of snakebite. The presence of fang marks.

The snake itself which had bitten the victim and was brought along with him after being killed. Reliable unequivocal evidence of either the victim or attendant having seen the snake which bite the patient.

Initial laboratory evaluation by performing clotting time, bleeding time, and 20 minutes WBCT at bedside. If they prolonged, we took it as an evidence of envenomation with coagulation disorder. Also took an evidence of envenomation by observing a local reaction confined to the site of bite with evidence of rapid extension of swelling and cellulites involving more than one joint.

### 20-minute whole blood clotting test (20WBCT)

This very useful and informative bedside test requires very little skill and only one piece of apparatus – a new, clean, dry, glass vessel (tube or bottle). 20-minute whole blood clotting test (20WBCT)

- Place 2 mls of freshly sampled venous blood in a small, new or heat cleaned, dry, glass vessel.
- Leave undisturbed for 20 minutes at ambient temperature.
- Tip the vessel once.
- If the blood is still liquid (unclotted) and runs out, the patient has hypofibrinogenaemia (“incoagulable blood”) as a result of venom-induced consumption coagulopathy.
- In the South-East Asia region, incoagulable blood is diagnostic of a viper bite and rules out an elapid bite\*.
- If the vessel used for the test is not made of ordinary glass, or if it has been cleaned with detergent, its wall may not stimulate clotting of the blood sample (surface activation of factor XI – Hageman factor) and test will be invalid
- If there is any doubt, repeat the test in duplicate, including a “control” (blood from a healthy person such as a relative)

\* Note - in West Papua and the Maluku Islands, envenoming by Australasian elapids can cause incoagulable blood

## 3. RESULTS

A total of 100 cases of alleged snake bites reporting to the hospital from the period of October 2013 to October 2015 were included in this study. We have analysed clinical manifestation following snake bite in a total of 100 patients.

Males showed a higher incidence (65%) compared to females (35%). We conclude that this is because, more males were involved in farming as compared to females. Most of our patients were farmers who were bitten while working in the fields. This finding confirms the fact that most of the snakebites in India are occupational hazards in rural area.

Most of the farmer working in the fields (including females) belong to the age group of 18-45 years. We conclude that for the same reason snakebite is maximum in these age group.

Most of our patients were from rural area. Living conditions in rural area, their living habits, working and walking bare footed and their occupation were to obvious reasons for this high incidence in rural population.

Most of our snakebite (55%) cases occurred during the period of May to September. This is probably because rainy season is the period of activity for the snakes, when busy agricultural work coincidentally doubles the risk.

Most of the snakebite occurred in the day time between 6 am to 6 pm. This is probably because most of the victims couldn't aware of the snake which they stamped on, or accidentally touched the snake while working. We had considerable difficulty in identification of the biting species with nocturnal as well as day time bites.

82% of the patients admitted within first 6 hours after the bite, 15% in between 6 – 24 hours after the bite and only 3% came after 24 hours with severe complication of bleeding manifestation. In a total of 100 patients 20 minutes WBCT initially increased in 59 patients while arriving to RMMC&H, Annamalai University, Annamalaiagar, after administering ASV patient was monitored until the test becomes <20 min WBCT and resolving in cellulitis.

**FIRST AID MEASUREMENTS GIVEN:**

The first aid treatment in only some of the patient is given before admission consisted of application of tight tourniquet proximal to the site of bite and incision at the site of bite. But most of them visited nearby primary health centre and given injection tetanus toxoid and referred here for further management. This may be because of increased awareness and health education in rural area.

Some patient who were taken first aid measure by local incision and tight tourniquet, had considerable local swelling extending to greater part of the limb both in upper limb as well as lowerlimb.

There was no significant difference in the incidence of severity of systemic poisoning and haemorrhagic syndrome in the patients who had received first aid treatment before admission and those were not. Because most of them came early seeking medical intervention to hospital.

Haemorrhagic syndrome is a very serious and potentially dangerous and lethal clinical manifestation of viperine snakebite poisoning. Neurological symptoms were observed in a total of 5 patients. Among these 2 patient had combined features of haematotoxicity and neurotoxicity. These patient had continuous bleeding from the site of bite with ecchymoses and ptosis. 2 patients had only neurological symptoms with respiratory paralysis. Remaining one patient developed ptosis and difficulty in speaking and swallowing.

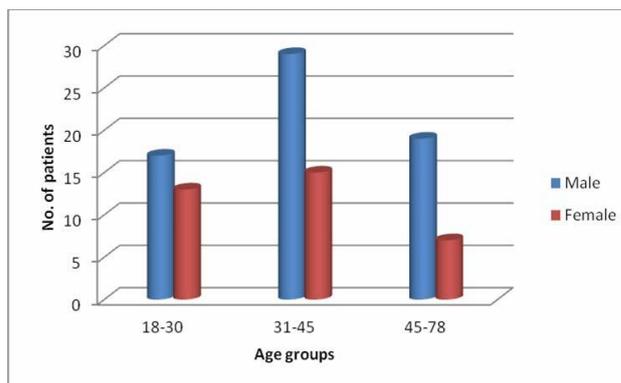
In our study 2 patient developed respiratory paralysis and they recovered after treatment with ASV, neostigmine, atropine and mechanical ventilation in ICU. They were successfully extubated after 3 days. The remaining 3 patient recovered with injection Neostigmine, atropine and ASV. Out of 14 patients who developed renal failure, 10 patients improved following conservative management. 4 patients had severe renal failure. These patients had to undergo haemodialysis thrice in a week for a period of 1 month, after which their renal function recovered fully One patient developed severe swelling of the whole leg upto thigh and on examination clinically and by Doppler found to be suffering from the DVT and treated with heparin prophylaxis and cured by 12<sup>th</sup> day.

Blisters developed around the site of bite in 48 patient. Blisters varied in size from <1 cm to more than few cms in diameter. Small blisters usually shrank. Large blisters usually ruptured leaving large denuded areas.

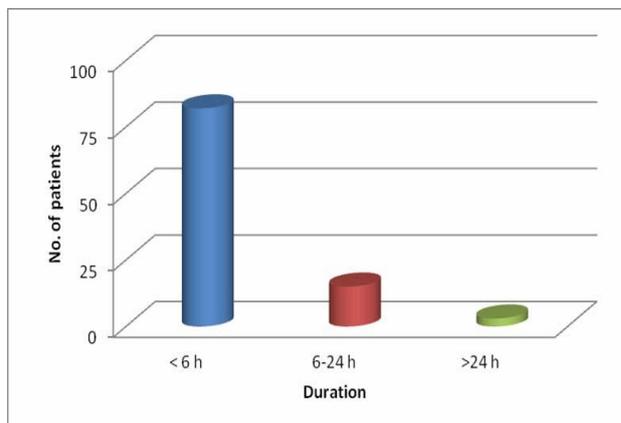
Local pain at the site of bite occurred in 62 patients and pain was mild to moderate and usually subsided within 24 hours.

**Mortality**

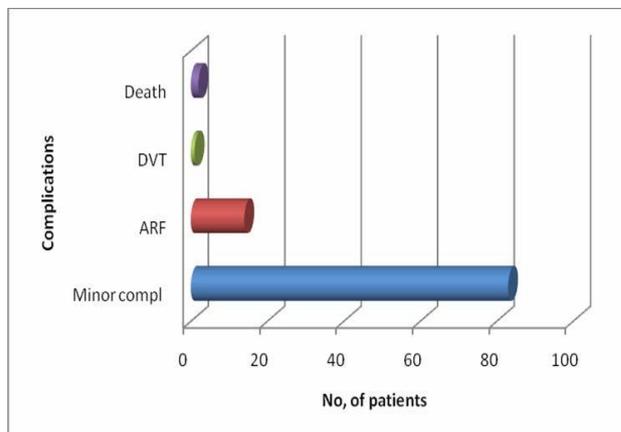
We had 2 mortalities in our study (2%) 10 patient developed reaction following administration of ASV. 6 patient developed only mild reaction and were controlled by hydro-cortisone and anti histaminics. We didn't have difficulty in administering ASV further. 4 patients developed severe reaction like hypotension, wheezing, allergic rashes all over the body with itching and irritability. We had to stop administering ASV in these patient. Only on treatment with adrenaline we continue further ASV administration at slower rate.

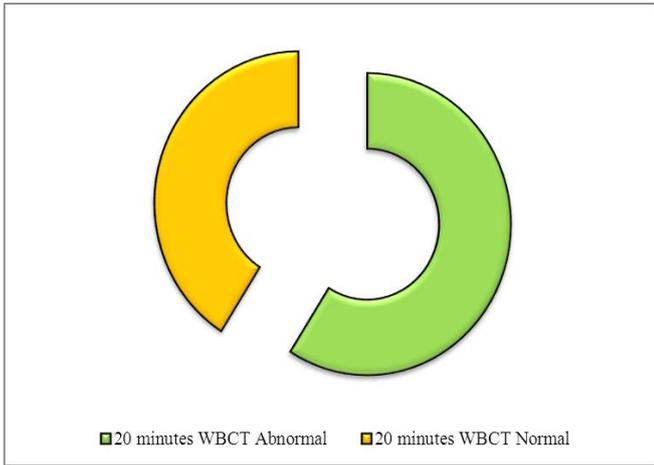


Age wise sex distribution



Duration between bite and admission





20 minutes WBCT

**Statistical Analysis of Haematological and coagulation tests**

		Mean	Std. Deviation	Minimum	Maximum
BT	Test	93.1300	61.12888	66.00	600.00
	Ctrl	87.7900	33.47011	66.00	235.00
CT	Test	245.7374	103.88039	.00	310.00
	Ctrl	243.2800	106.23559	.00	310.00
PT	Test	18.7216	5.43281	14.00	38.00
	Ctrl	18.8660	5.54457	14.00	38.00
APTT	Test	31.9583	21.60503	20.00	222.00
	Ctrl	31.9688	21.60431	20.00	222.00
PLT	Test	1.6581	.46551	.16	2.50
	Ctrl	1.9901	3.36664	.16	35.00

P < 0.05 is highly significant

20 minutes WBCT

		Groups		Total	
		Test	Ctrl		
20 min WBCT	Abnormal	Count	59	100	159
		% within Groups	59.0%	100.0%	79.5%
	Normal	Count	41	0	41
		% within Groups	41.0%	0	20.5%
Total	Count	100	100	200	
	% within Groups	100.0%	100.0%	100.0%	

**DISCUSSION**

In our study there was essentially no difference in the clinical picture of the patients bitten by Russel’s Viper and of those bitten by Echis carinatus. This result is similar to that of the study reported by Bhat RN from Jammu in 1973.

We observed that the study of time period between the snakebite and the onset of coagulation disorder varied from person to person between one to several hour depending upon the amount of venom injected and type of snake.

In his study Bhat reported that only 3% of his patients developed bleeding within the 1<sup>st</sup> 6 hours after the bite while the majority of the patients (83%) developed haemorrhages between 7 and 48 hours and 13% developed haemorrhages even after 48hour. So Bhat concluded that it is important to keep a patient under close observation till the coagulation defect is reversed. Since bleeding from some of the sites can be life threatening (eg. SAH) we agree with Bhat’s conclusion<sup>3</sup>.

Most common bleeding manifestation we have observed is bleeding form site of bite. Haemoptysis was actually mild with only blood stained sputum. As Bhat RN, we have not found it advisable to elicit this symptoms by asking the patient to cough hard, as has been recommended by Reid. Violent coughing can precipitate a severe haemoptysis in a patient with no clotting blood. None of our patients developed subarachnoid haemorrhage while Bhat reported three patients with subarachnoid haemorrhage.

Following his study suggested that it is important to keep a patient in bed rest as long as coagulation defect persist to prevent SAH. We strongly advocate this practice because SAH, once developed is dangerous, life threatening condition<sup>1,2,4-10</sup>.

The other symptoms which needed prompt attention was fear of death due to Ophidian myths the patient had. We took help of all the house surgeons working in the ward for reassuring the patients and their attenders.

None of our patient developed tetanus. Majority of the patient were given inj. Tetanus toxoid.

We have not come across the snakebite in a pregnant woman, we couldn’t analyse the effect of snake venom on pregnancy. All 3 pregnant patients in Bhat’s study aborted and had severe bleeding needing blood transfusion.

Shock in two patients were post haemorrhagic. Delay in treatment and haemorrhage are liable to precipitate post haemorrhagic peripheral circulatory failure. One patient developed shock within first 2 hr after the bite and died while undergoing treatment may be due to arrhythmias. In this regard we don’t agree with Bhat’s finding shock does not seem to be a direct result of envenomation<sup>10</sup>.

The only effective and relevant treatment of snakebite poisoning to be advocated in a hospital, is the administration of anti snakevenom. As signs of systemic poisoning are not always clinically evident and as a patient with a non-clotting blood is potentially in danger of developing haemorrhagic syndrome, its not our practice to delay the administration of ASV as has been suggested by Reid<sup>12</sup>. We agree with bhat’s this conclusion in administering ASV. Immediately after

admission when systemic poisoning is detected by finding defective coagulation ASV should be administered<sup>13</sup>. Delay in the administration of ASV will delay the reversal of coagulation defect and is liable to endanger a patient's life by otherwise preventable haemorrhage<sup>15</sup>.

In present study, it is clearly evident that the longer the treatment with ASV was delayed, the more persistent was the coagulation defect, more was the quantity of ASV necessary to reverse the defect. In all patients, whose bleeding continued in spite of ASV beyond 24hours, blood transfusion and fresh frozen plasma was given in addition. Besides replacing the blood lost, it shortens the duration of bleeding. In the absence of ASV, blood transfusion by itself can stop the bleeding but the coagulation defect may be reversed only temporarily.

In our study we observed that most of the patient (82%) came to hospital within six hour and received treatment and we observed very less complication compared to other studies with long duration between bite and admission to hospital. We strongly recommend to create public awareness regarding treatment of snakebite to reduce the complication.

## 5.CONCLUSION

The incidence of snakebite is significantly high specially in rural population for whom this can be called an occupational hazard. Though there seems to be an increasing awareness amongst the rural population about the first aid measures, the importance of early hospitalization and the usefulness of antsnake venom in the management, there is still a lot to be proved as we had 82% patient came within 6 hour of snakebite.

Regarding the management, simple, cheap procedures like estimation of bleeding time, clotting time and 20 minutes WBCT are adequate indicator of haematotoxicity of snakebite. But costlier and time consuming procedures like prothrombin time, activated thromboplastin time, thrombin time and fibrin degradation product are more sensitive and wherever possible these can be used.

Antsnake venom is of immense importance in the management of snakebites. A suitable dose and regimen is to be selected depending on the severity of envenomation whether mild, moderate or severe. Though administration of antsnake venom earlier is the better, antsnake venom should be continued till the sign and symptoms of envenomation are brought under control. Though anaphylaxis is a potentially dangerous complication, the incidence of this seems to be low and can be managed with steroids and antihistaminics.

Topical infiltration of antsnake venom seems to be of no use.

Blood transfusion helps to combat bleeding manifestation by providing clotting factor. Renal failure seen in cases of snakebites can be managed with dialysis for a brief period.

Antibiotics, tetanus toxoid, anti inflammatory drugs and anti-inflammatory enzymes are part of treatment. Prevention is better than cure. So protective measures should be taken to prevent the snakebite itself instead of killing the snake which alters the ecological balance.

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