# Correlation between the timing of ASV (Anti Snake Venom) administration and outcome of haemotoxic snake envenomation

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## ABSTRACT

**Introduction:**Snake bite is a common medical emergency in tropical region, particularly in the rural areas. WHO (World Health Organization) described this health hazard as neglected disease in South East Asian region. It is estimated that approximately 80,000 to 1,00,000 envenomation occurs per year in India with 3000 to 10,000 deaths annually.

**Aims:**To determine the outcome of haemotoxic snake bite patient with special reference to correlation between the timing of ASV administration and reduction of complications in snake bite envenomation.

**Materials and Methods:** The present study was a observational analytic study. This Study was conducted from 1st January 2020 to 31st December 2020 (1 year) at Department of General Medicine IPD in BankuraSammilani Medical College & Hospital.

**Result:** As bite to needle time increased, the complications like DIC, AKI, septic shock, cellulitis were also increased.

**Conclusion:**It is evident that earlier th**e** administration of ASV, lesser the complications and duration of stay and better the prognosis. The incidence of complications was directly proportional to the duration of venom in the blood prior to its neutralization by ASV.

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# INTRODUCTION

Snake bite is a common medical emergency in tropical region, particularly in the rural areas. WHO (World Health Organization ) described this health hazard as neglected disease in South East Asian region.[1] It is estimated that approximately 80,000 to 1,00,000 envenomation occurs per year in India with 3000 to 10,000 deaths annually.[2] The treatment of snake bite includes the care of the bitten site and ASV administration. Anti Snake Venom (ASV) administration is the only definitive treatment which acts by neutralizing the circulating venom which is toxic to the blood and tissue fluid. Early administration of ASV is therefore essential to neutralize the maximum circulating venom before it is fixed in the tissues.[3] ASV completely reverses all clinical manifestations of systemic envenomation. Each 1ml of polyvalent ASV neutralises 0.60mg of dried Indian Cobra venom; 0.45mg of dried Common Krait venom; 0.60 mg of dried Russell's viper venom; 0.45 mg of dried Sawscaled viper venom. [4]

ASV is a scarce, expensive drug and should be administered only when there are definite signs of envenomation. Unbound venom can be neutralized with ASV, but once bound, the reversibility is questionable. Though there are many studies regarding the epidemiology and clinical profile of snake envenomation, at present only very few studies are available about the correlation between the timing of ASV administration and reduction of complications in snake bite envenomation.

The present study was undertaken to study the outcome of haematotoxic snake bite and whether early administration of ASV increases its efficacy in reducing the complications in snake bite cases.

# AIMS AND OBJECTIVES

To determine the outcome of haemotoxic snake bite patient with special reference to correlation between the timing of ASV administration and reduction of complications in snake bite envenomation.

# MATERIALS AND METHODS

After the approval of the Institutional Ethics Committee this observational analytic study was carried out at of General Medicine IPD in Bankura Sammilani Medical College & Hospital from 1st January 2020 to 31st December 2020 (one year).

Patients with history of snake bite patient with 20mins WBCT not clotted and also those who received 1 st dose ASV from referral hospital still having 20 minutes WBCT non clotted were included in this study.

Snake bite victims with age less than 12 years/ more than 70 years, having preexisting co morbid condition (Diabetes/CKD/IHD) were excluded from this study. After screening with inclusion and exclusion criteria total 101 patients were enrolled in this study.

## Study Technique:

This present study comprised of 101 cases who presented with history of snake bite and with signs of envenomation during the study period. A detailed history and meticulous clinical examination and investigations were carried out from the day of admission till discharge. Data records include the patient's characteristics like signs and symptoms, complications, dose of ASV, duration of hospital stay, final outcome. The data was analyzed for predicting survival using statistical analysis.

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## RESULTS  AND  STATISTICAL ANALYSIS
## 1-Correlation among bite to needle time and total dose of ASV

| Bite to needle time | Total ASV | | | |
|---|---|---|---|---|
| | 10 vial | 20 vial | 30 vial | Total |
| Less than 6 hr | 6 | 22 | 9 | 37 |
| 6-12 hr | 0 | 4 | 26 | 30 |
| 12-24 hr | 0 | 2 | 20 | 22 |
| More than 24 hr | 0 | 0 | 12 | 12 |
| Chi-square value: 47.9096; p-value:<0.0001 | | | | 101 |
| Significant | | | | |

## 2-Correlation among  Bite to needle time and development of complications

| Bite to needle time | Total no | Cellulitis N= 60 | DIC N= 12 | Septic Shock N= 8 | Respiratory Faliure N= 6 | AKI N= 40 |
|---|---|---|---|---|---|---|
| 6hrs< | 37 | 11 | 0 | 0 | 0 | 8 |
| 6-12 hrs | 30 | 17 | 0 | 1 | 4 | 16 |
| 12-24 hrs | 22 | 21 | 3 | 2 | 1 | 14 |
| >24 hrs | 12 | 11 | 9 | 5 | 1 | 2 |
| | | | | | | |
| Chi-square value: | | 30.6396 | 54.7621 | 22.8264 | 5.4707 | 15.3178 |
| p-value: | | p-value: <0.0001 | p-value:<0.0001 | p-value:<0.0001 | p-value:0.1404 | p-value:0.0016 |
| | | Significant | Significant | Significant | Not Significant | Significant |

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**3-Correlations among Bite to needle time and stay period in hospital**

| Bite to needle time | Stay period in hospital | | |
|---|---|---|---|
| | <5 DAYS | 5-10 DAYS | >10 DAYS |
| Less than 6 hr | 25 | 9 | 0 |
| 6-12 hr | 1 | 24 | 9 |
| 12-24 hr | 0 | 15 | 6 |
| More than 24 hr | 0 | 7 | 5 |
| Chi-square value: 64.3903; p-value:<0.0001 | | | |
| Significant | | | |

**4-Correlations between Bite to needle time and final outcome**

| Bite to needle time | Final outcome | |
|---|---|---|
| | Death | Discharge |
| Less than 6 hr | 0 | 36 |
| 6-12 hr | 3 | 30 |
| 12-24 hr | 1 | 26 |
| More than 24 hr | 1 | 4 |
| Chi-square value: 5.5731; p-value:0.1343 | | |
| Not Significant | | |

**5-Distribution of post snake bite complications and final outcome**

| Complications | Total No(101) | Death (5pts) |
|---|---|---|
| Cellulitis | 60 (59.40%) | 4 |
| DIC | 12 (11.88%) | 4 |
| AKI | 40 (39.60%) | 3 |
| Respiratory faliure | 6 (5.94%) | 4 |
| Septic shock | 8 (7.90%) | 6 |

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**6-Distribution of AKI patients (n=40) received Haemodialysis**

| Haemodialysis | Frequency (n=40) | Percentage |
|---|---|---|
| Done | 28 | 70% |
| Not Done | 12 | 30% |

**Discussion-**

As the bite to needle time increased, the total number of ASV vials required also increased. 6 patients received 10 vials; 22 patients received 20 vials and only 9 patients received 30 vials in less than 6 hours category. But in the category of more than 24 hours all the patients (12 patients) received 30 vials of ASV. In 12 to 24 hours category; 2 patients received 20 vials, 20 patients received 30 vials.

In this study as bite to needle time has been increased, the complications like DIC, AKI, septic shock, cellulitis were also increased.

In less than 6 hours category, only 11 patient developed cellulitis where as in 6-12hours category- 17 patients developed cellulitis and 21 patients in 12-24 hours category and 11 developed cellulitis more than 24hours category.

DIC was seen only in the categories of 12-24 hours (3 patients) and more than 24 hours (9 patients).

Septic shock was maximum in the category of more than 24 hours (5 patients) and is absent in less than 6 hours. 1 patient in 6-12 hrs category and 2 patient in 12-24 hrs category developed septic shock.

In 6-12hours category- 4 patients developed respiratory faliure,whereas only 1 patient in 12-24 hours category and 1 patient in 24hours category developed respiratory faliure.

8 patients developed AKI in less than 6 hours category while 16 patients in 6-12 hours, 14 patients in 12-24 hours and 2 patients developed AKI in more than 24 hours category.

The stay period in hospital also increased with the bite to needle time. The stay period in most of the patients in less than 6 hours category was less than 5 days and no patient stayed more than 10 days. But in other categories, most of the patients stayed more than 5days.

The total number of death was 5. No deaths in less than 6 hours, 3 death in 6-12hours; 1 death in12-24hours and 1 deaths in more than 24 hours.

Among the 5 death cases; 4 had cellulitis; 4 had DIC; 3 had AKI; 4 had respiratory failure; 2 had septic shock.

In this study 40 patients developed AKI, among them 28 patients (70%) needed haemodialysis.

Outcome parameters:-

1. In this study out of 101 patients 60 patients (59.50%) developed cellulitis, 40(39.60%) developed AKI, 12(11.88%) pts had DIC, 8(7.90%) developed septic shock, 6(5.94%) patients had Respiratory failure.

2. Among 101 patients 5 patients died which could not be prevented even afterappropriate dose of ASV.

3. Large no of patients (40pts) developed AKI and out of them 28 patients required Haemodialysis (70% pts of

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AKI) even after giving appropriate dose of ASV.

In 2008 in a study of Ganesh Athappan, bite to needle time more than 2 hours was identified as independent risk factors for the development of acute renal failure and also identified as independent predictors of poor outcome in snakebite victims. [5]

K Narvencar in 2006 suggested that incidence of complications was directly proportional to the duration of venom in the blood prior to neutralization by ASV due to late arrival of patient at hospital and the early institution of ASV is beneficial in preventing complications however severe is the systemic envenomation.[6] In 1997S.R.Vijeth 1997 concluded that renal abnormality correlated well with the degree of coagulation abnormality when left untreated due to late arrival at the hospital. Early administration of ASV prevents renal damage.[7]

From this study it is evident that earlier the administration of ASV, lesser the complications and duration of stay and better the prognosis. The incidence of complications was directly proportional to the duration of venom in the blood prior to its neutralization by ASV. Based on the findings of the present study, it is suggested that the early institution of ASV is beneficial to prevent the complications like AKI, DIC and respiratory paralysis. The delay in ASV administration could increase the incidence of AKI, DIC, respiratory paralysis and morbidity as observed from the present study.Hence it is important to make the availability of ASV universal in the areas where the incidence of snake bite is high and to adequately train the health care providers about the appropriate management of snake bite patients in order to decrease the morbidity and mortality.

## CONCLUSION

Earlier the administration of ASV, lesser the complications and duration of stay and better the prognosis. The incidence of complications was

directly proportional to the duration of venom in the blood prior to its neutralization by ASV.

## REFERENCES

1. Warrell DA. Guidelines for the management of snake-bites. In: World Health Organization, Regional Office for Southern East Asia 2010:1-162.
2. Kasturiratne A, Wickramsinghe AR, DeSilva N, et al. The global burden of snakebite: A literature analysis and modelling based on regional estimates of envenoming and deaths. PLOS Med. 2008;5:e218
3. Saravu K. et al. Clinical profile, species-specific severity grading, and outcome determinants of snake envenomation: An Indian tertiary care hospital-based prospective study. Indian Journal of Critical Care Medicine. 2012 ,Oct-Dec; 16(4): 187–192.
4. Ram S Kaulgud. et al. Snake Venom-specific Phospholipase A2: A Diagnostic Marker for the Management of Snakebite Cases. Indian J Crit Care Med. 2022 Dec; 26(12): 1259–1266.
5. Athappan G et al. Acute Renal Failure in Snake Envenomation: A Large Prospective Study. Saudi J Kidney Dis Transpl 2008;19:404-10.
6. Narvencar K. Correlation between timing of ASV administration and complications in snake bites. J Assoc Physicians India. 2006; 54:717–9.
7. Vijeth SR et al. Correlation of renal status with hematologic profile in viperine bite. Am J Trop Med Hyg. 1997;56:168–70.