Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2016; 4(1B):85-88 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2016.v04i01.016

Original Research Article

A study of snake bite patients with reference to time of delay in management

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Abstract: 200000 persons sustain snakebite injuries every year, about 5oooo of them die. We studied about 200 cases of snakebite during the year 2002. Among these 174 of them had definitive signs snakebite envenomation. 115 patients had ASV treatment within 12 hours and mortality rate among them was 2.6%. 59 patients had ASV treatment after more than 12hours and the mortality rate among them was 13.5%. Most of the bites in our study were due to viper bite. Commonest cause of death was acute renal failure.
Keywords:ASV, Bite to hospital time, Mortality rate

INTRODUCTION:

Snake bite injury is common in India and it has been estimated at about 200000 persons have snake bite every year. About 50000 of them die [1]. We have studied 200 cases of snake bite during 2002 at Coimbatore Medical College-Hospital, Coimbatore, Tamilnadu, and South India. Aim of the study is to observe epidemiology, clinical features, and analysis of possible relationship between time delay in administration of ASV and mortality.Composition of anti snake venom available at Coimbatore Medical College Hospital is polyvalent. Each 1 ml neutralizes 0.6mg of dried cobra venom 0.45mg of dried krait venom 0.6mg of Russell's viper dried venom and 0.45mg of dried saw scaled viper venom

MATERIALS AND METHODS:

All patients who presented with a history of snake bite or showing evidence of envenomation such as swelling, bleeding manifestation or neurotoxicity during the period of March 2002 to December 2002 at Coimbatore medical college -hospital were included in the study. A total of 200 patients were studied.Detailed history with reference to envenomation was obtained. Time interval between bite and initiation of treatment with ASV, treatment given elsewhere were also noted. A thorough general physical examination and a detailed local examination were carried out. Urine analysis, CBC, bleeding time, clotting time, prothrombin time, APTT, platelet count, LFT, renal parameters were done. After establishing envenomation, polyvalent ASV was given intravenously. Inj. Tetanus toxoid, broad spectrum antibiotics were also given. If required, patients were transferred to ICU. Previous to IV administration, hypersensitivity was ruled out by intra dermal testing. Cumulative Dosage of ASV varied from 50 ml t0 500 ml.

RESULTS:

Of these 200 patients 128 (64%) are males and 72 (36%) are females. 152(76%) patients were below 40 years of age. 48 (24%) patients were above 40 years of age. Of these 200, only 174 (87%) patients showed definitive evidence of envenomation and received ASV. This analysis included these 174 patients only. Time delay between bite and initiation of treatment had a bearing on mortality. When treatment was started before 12 hours, the mortality rate was 2.6% and if treatment was delayed for more than 12 hours, the mortality rate was 13.5%. .Total number of deaths was 11

Table 1: Time Interval between Bite and ASV Administration

Time interval between bite and as administration	No. of patients	No. of deaths	Percentage of death
<6 hours	78	2	2.5%
6-12 hours	37	1	2.7%
12-24 hours	27	3	11.1%
24-48 hours	19	3	15.7%
>48 hours	13	2	15.3%

Time interval	No. of Patients	No. of deaths
<12 hours	115	3 (2.6%)
>12 hours	59	8 (13.5%)

Table No: 2. Site of snake bite

Site of bite	No. of patients
Upper limb	53 (26.5%)
Lower limb	142 (71%)
Trunk	4 (2%)
Face	1 (0.5%)

Table No: 3. Distribution of clinical features

Clinical feature	No. of patients
Pain and swelling	152 (76%)
Bleeding	74 (37.5%)
Nephrotoxic	10 (5%)
Neurotoxic	33 (16.5%)

Bleeding phenomena included bleeding from the site of bite, haematuria, hematemesis, melena, and epistaxis. Subconjunctival hemorrhage and bleeding gums. Clotting time was prolonged in most of the patients.

Table 4: Distribution of clotting time

Clotting time (minutes)	No. of patients
<10	22 (12.6%)
11-15	9 (5.1%)
16-20	132 (75.9%)
>20	11 (6, 3%)

Anuria and oliguria were nephrotoxic features. 21 patients had a serum creatinine level above 1.5 mg/dl. Of these 21, only 10 patients required dialysis. 6 of the 11 patients died had renal failure as cause of death.

Table 5: The distribution of neurotoxic features

Neurotoxic signs	No. of pts.
Drooping of eyelids	18 (10.3%)
dysphagia	6 (3.4%)
dysphonia	4 (2.3%)
Respiratory paralysis	5 (2.8%)

ASV was administered depending upon severity of envenomation. 50-60ml of ASV was administered every 4-6 hours until clotting time normalizes. The total dose of ASV varied from 50 ml to 500 ml.

Table 6: The distribution of ASV dosage

Volume of ASV (in ml)	No. of patients
<50	24 (13.8%)
60-100	80 (45.9%)
110-200	40 (22.9%)
210-300	14 (8%)
310-400	7(4%)
410 500	9 (5.1%)

Table 7: Distribution of duration of hospital stay

Number of days	Number of patients
<5	153 (76.5%)
6-10	24 (!2%)
11-15	14 (7%)
16-20	4 (2%)
21-30	3 (1.5%)
>31	2 (1%)

DISCUSSION

Various hospital based studies have reported mortality rate ranging from 3% to 20%.(2-3,4)) It has been found many contributors to death- Delay in arriving the hospital (2-13) Respiratory failure,(5,6,7,10) Acute renal failure(5,6,7), presence of severe Coagulopathy or Diffuse Intravascular Coagulation, Shock(6,7,10,11) In this study we wish to high light the relationship between delay in initiating treatment with ASV and mortality..

Out of200 patients 174 of them treated with ASV among these 174 patients 115 (66%) had treatment within 12 hours and mortality rate in this group was 2.6% (3 patient died (aged 61, 47, and 41 years). Out of59 (34%) patients who received ASV after a delay of more than 12 hours the mortality rate was 13.5%.

Sharma *et al.;* [2] found that median bite to hospital time in their study group was 9 hrs and delayed arrival was seen in patients presenting with ARF.

Kalantri *et al.;* [3] studied 277 patients , in whom mean bite to hospital time was 6.5+10.3 hrs .In survivors it was 5,6 +10.3 hrs and in no survivors it was11.4+14.5 hrs

Sanjib K Sharma *et al.;*[4] wrote in their study that simple educational messages and promotion of immediate and rapid transport of victims to a treatment center by motor cycle volunteers decreased the mortality rate and incidence of snakebite in southeastern Nepal. In particular the use of a motorcycle to transport the victim was strongly associated with survival.

Narvencar K [5] in his study of Correlation between timing of ASV administration and complications in snakebites stated that the early institution of ASV was beneficial in preventing complications however severe was the systemic envenomation.

S.A.M. Kularatne [6] in his study of Common Krait (Bangarus caeruleous) bite in Anuradhapura, Srilanka : A prospective clinical study 1996-98 - stated that his study identified factors such as poor resuscitation, delay in hospital treatment

Suchithra N *et al.;*[7] stated in their study of Snakebite envenoming in Kerala, South India; Clinical profile and factors involved in adverse outcomes: Those who received ASV early (bite to needle time < 6hrs) had more severe local envenoming than those who received ASV late (bite to needle time > 6 hrs), but latter group were more likely to suffer complication and those who received ASV late had a higher risk of developing acute renal failure. Higher rates of complications were seen in those with severe coagulopathy, leucocytosis and those who received ASV late.

Looareesuwan *et al.;*[8] concluded in their study of Factors contributing to fatal snakebite in the rural tropic: analysis of 46 cases in Thailand =delayed arrival in the hospital after traditional treatment as one of the factors contributing to fatal outcome admission and complications contributing to deaths in common krait bite in Srilanka.

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Oqunfowokan.O *et al.;*[9] concluded in their study of relationship between bite–to-hospital time and morbidity in victims of viper bite in North-Central Nigeria as morbidity caused by carpet viper bite is high in Nigeria and worsen with increasing bite to hospital time.

Tejendra *et al.;*[10] in their study of Predictors of mortality in patients of poisonous snakebite: Experience from a tertiary care hospital in Central India found that prolonged bite to hospital time i.e. , delayed arrival to hospital was associated with mortality

Suresh David *et al.;*[11] in his study of Mortality Predictors of Snakebite Envenomation in South India – A Ten- year Retrospective Audit of 533 Patients stated that the mortality rate was 18% in patients with pre-hospital delay more than 24 hrs, as against 5% when admitted within the above specified period.

Shuang Jianbo*et al.;*[12] in their A 10 year retrospective review of 107 snakebite patients in Sanya, China concluded that the outcome worsens in those who received delayed treatment , prevention, pre-hospital management (first aid) and the importance of the early transfer to hospital should be emphasized

Kulkarni *et al.;*[13] found that out of the 633 cases, 42 (6.6) were admitted within 1 hr of bite and 22% of the patients came to hospital after 24 hrs. In a study conducted by Steinmann *et al.;*[14] almost 87% of the patients were brought to hospital with in 1 hr.

Most of the studies observed this correlation between bite to hospital and complication and mortality [2-14]. The incidence of complication is directly proportional to duration of venom in the blood prior to neutralization by ASV, due to lack of awareness of hazards of snake bite, belief in traditional treatment [15] and lack of transport facilities [16].

Studies have shown that average dose of ASV for Elapidae bite was 51 vials; Viperidae bite was 31 vials [17]. In our study we have treated 104 patients with less than 10 vials, 40 patients received 10 -20 vials. 30 patients received more than 21 vials. This corralates with most of the available studies.

Vomiting is an important feature of severe systemic envenomation though vomiting is not a specific sign of severe envenoming. Vomiting may occur due to fear, herbal treatment, as anaphylactoid reaction to ASV, autonomous disturbance, uremia, or due to consumption of alcohol after snake bite.

Commonest feature of neuroparalysis is ptosis. As severity of neuroparalytic feature increases, the symptoms progresses to involve the respiratory muscles [9, 10, 11]. Krait venom blocks both the pre and post synoptic receptors and need prolonged mechanical respiration until their receptors are regenerated.- Bawaskar *et al.;*[18]. Cobra venom blocks the post synoptic receptors [19] and needs more ASV and neostigmine. In our study we had only one patient with neuro paralysis and he died on the 10^{th} day though he was infused with 15 vials of ASV.

Acute renal failure is the common cause of death in viper bite [7, 9, 10] usually coexists with coagulopathy which adds to the mortality. Signs of uremia develop in 3-7 days after bite [20]. Naked haematuria with in the first week of illness indicate patient may need peritoneal dialysis [20].This observation was confirmed by Soe *et al.;*[11]. Many studies had found that ARF was the major cause of death [11]. Snake venom contains various procoagulant factors that activate coagulation casecade and consumption of various clotting factors and platelets leading to spontaneous bleeding. The spontaneous bleeding indicates the presence of unneutralized venom and indicates the need for another dose of ASV. DIC had been one of the major contributors to death in many studies [7,10, 12, 17]. Sub conjunctival haemorrhage was present in 7 out of 11 deaths. 8 out of 11 deaths occurred after 7 days, 2 died after 2 days, 1 died after 3days. Major cause of death was acute renal failure. Out of 11 deaths 6 were due to acute renal failure.

CONCLUSION

Thus we conclude that time delay between the snake bite envenomation and initiation of treatment with ASV has a great bearing on mortality rate. If the ASV treatment is initiated within 12 hrs the mortality

rate may be as low as 2.6% and if it is more than 24 hrs the mortality rate will be around 13.5%. In our study most of the snake bites were due to viper bite and common cause of death was acute renal failure.

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