Clinical Profile and Outcome of Snake Bite Patients in a Rural Medical College in Trans Himalayan Region

Dr. Aman Rana1 and Dr. Siddhartha Kheora2
1MD Pediatrics, Civil Hospital, Sarkaghat Distt Mandi, Himachal Pradesh, India
2MD Medicine, Civil Hospital Kunihar Arki, Solan Himachal Pradesh, India

*Corresponding Author
DR. AMAN RANA

Abstract: The clinical signs and symptoms in snake bite are result of identification of antigenic protein and the non-protein component of snake venom by immune system and arousal of inflammatory response in the victim's body. The objective of the study was to assess the clinical profile of snake bite patients and treatment given with outcome of snake bite patients. A hospital-based observational study was conducted at Department of Pediatrics, IGMC, Shimla in the study over a period of one year among the patients attending the pediatric emergency. Most common hemato logic abnormalities observed were hematuria and epistaxis. Proteinuria and acute kidney injury was also present in one-one case. Administration of Fresh frozen plasma (FFP) improved the outcome. Respiratory paralysis, ptosis and ophthalmoplegia were the most common presentation in all patients with neuroparalytic envenomation. All symptomatic patients were given ASV as primary treatment out of which more than 50% patients required more than 10 vials of ASV.

Keywords: antigenic protein and the non-protein, clinical signs and symptoms.

INTRODUCTION

Snakes are elongated, legless, carnivorous ectothermic reptiles covered with scales of suborder Serpentes. Snake bites are very prevalent in hilly regions. The prevalence of type of snakes varies in different geographical parts of the country. Therefore, the clinical manifestations and management practices for snake bite patients also vary accordingly. An early and adequate medical management of snake bite is needed to avoid prolonged hospitalization and mortality. Therefore, Health and Family Welfare Department, Government of India has prepared a National Snakebite Management Protocol (National snakebite management protocol, India, 2008) to provide the best scientific approach to deal with this problem. As per the modes of presentation of patients, snakes can be suggestive of either hemotoxic or neurotoxic nature.

The clinical signs and symptoms in snake bite are result of identification of antigenic protein and the non-protein component of snake venom by immune system and arousal of inflammatory response in the victim's body (Lovecchio, F., & DeBus, D.M. 2001). An enzyme, Phospholipase A2 inhibits electron transfer at cytochrome C level and renders mitochondrial-bound enzymes soluble, thus damages blood cells causing hemorrhages. Another enzyme, Hyaluronidase helps in spread of venom through tissues while proteolytic enzymes are responsible for local edema, blistering, and necrosis (Sharma, N. et al., 2005). Among the non enzyme polypepti dases, neurotoxins first cause release of acetylcholine at the nerve endings at the myoneural junction and then damage the endings, preventing further release of transmitter leading to a flaccid paralysis of the victim (Bhardwaj, A., & Sokhey, J. 1998).

For decreasing the mortality of snake bite patients, it is crucial to study the clinical profile of snake bite patients and treatment given with outcome of snake bite patients.

METHODOLOGY

A hospital-based observational study was conducted at Department of Pediatrics, IGMC, Shimla in the study over a period of one year. All children up to 18 years of age with history of snake bite as confirmed by themselves or by a reliable witness and gave consent were included in the study. For systemic examination, samples were collected for hematological and biochemical investigations. ASV was given as per Indian protocol. No test dose was given. Treatment protocol at hospital i.e administration of ASV (No. of vials used and duration of ASV), fluids, antibiotics, inotropes or i.e Ventilator support (Duration, oxygen) or any other medications given was noted. Neostigmine challenge test was given in patients with neuroparalytic envenomation. Neostigmine along with atropine was administered to all patients with neuropa ralysis till reversal of neurotoxic manifestations.
All cases were administered injection tetanus toxoid, if not given at previous institution and appropriate antibiotics and anti-inflammatory were administered. Antibiotics were selected by physicians on the basis of extent of systemic involvement and their experience. Patients showing severe cellulitis were referred to surgeons for necessary treatment. Each patient was assessed thoroughly for dissipation of signs of envenomation. Outcome and prognosis was recorded. Informed consent was obtained from parents or authorized representative/guardians before inclusion into study.

ETHICAL CONSIDERATIONS
Approval for the study was obtained from the Hospital Ethics Committee. All parents were explained briefly regarding methodology of study. The study was conducted in compliance with the procedures outlined in National Snake Bite Management Protocol for Management of Snake bite issued by the Ministry of Health & Family Welfare; Government of India according to WHO Guidelines. Participants were informed about the study in their own language before obtaining written consent.

STATISTICAL ANALYSIS
Data collected was entered and analyzed using Epi Info (Version 7.2.2.6). Data was expressed in its frequency and percentage. Data analysis was done by necessary descriptive and inferential statistics. Appropriate descriptive statistical technique like mean, median, mode, percentile and standard deviation was used for data analysis and analyzed data was presented in form of tables, diagram and graphs based on findings. The qualitative data was expressed in frequencies and proportions.

RESULTS
Thirty cases of snake bite were admitted in children less than 18 years of age of which 56.66% were males (n=17) and 43.33% (n=13) were females. 50% (n=15) of the patients were in the age group of 13-18 years, 43.33% (n=13) were in the age group of 7-12 years and 6.66 % (n=2) were between 0-5 years. Mean age of the patients was 12.23 years ± 3.31(SD).

In hemotoxic envenomation, haematological manifestations like hematuria (4.8%) and epistaxis (4.8%) were also observed in one-one patient. Proteinuria was observed in 19.04% (4/21) patients.

A wide range of biochemical tests were done in all patients depending upon the type of envenomation. All patients had hemoglobin more than 10gm% and 18 patients (60%) had total leukocyte count more than 10,000 (leukocytosis) with increased neutrophils (neutrophilia) on admission. Among the thirty cases, 26.7% had thrombocytopenia with platelet less than 1.5 lakhs, 76.7 % had prolnonged PT/INR and 36.7% had prolonged activated partial thromboplastin time. In this study, thrombocytopenia was observed only in hemotoxic envenomation. Prolonged prothrombin time was observed (63.4%) in hemotoxic envenomation, 4.3% in neuroparalytic envenomation and 13.04% in cases of non poisonous bites. Activated partial thromboplastin time was observed 90.9% in hemotoxic envenomation and 9.1% neuroparalytic envenomation.

In one patient with acute renal failure, blood urea, creatinine and uric acid were found to be highly
deranged which gradually improved over the course of time.

All the venomous snake bite patients received polyvalent ASV as primary treatment. Dose used was 250.83 ± 117.47 ml (range: 100-600 ml). Out of the 24 symptomatic envenomation cases, 79.2% (n=19) required more than 10 vials of ASV while 45.83% required 10 or less than 10 vials. All patients received tetanus toxoid if not received at previous institutions. Neurotoxic snake bite patients were given antihistaminic, steroids, antibiotics and ASV according to standards doses. After neostigmine test, all three cases received Inj. Neostigmine and Atropine.

Figure 1. Number of ASV vials used in patients

Assisted ventilation was required in 16.7% symptomatic patients. Allergic reactions to ASV in the form of early anaphylaxis occurred in only 12.5% (3/24) patients which was managed by antihistamines, adrenaline and steroids. Most common complication observed in neuroparalytic envenomation was respiratory failure (66.7%), followed by aspiration pneumonia (33.3%). In hemotoxic envenomation, coagulation failure was commonest complication (47.6%) followed by acute renal failure (4.8%), nasal bleeding (4.8%) and gangrene (4.8%).

Table 2: Complication after Envenomation

<table>
<thead>
<tr>
<th>S No</th>
<th>Complications</th>
<th>No. of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Respiratory Failure</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Bite site Gangrene</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Aspiration pneumonia</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Coagulopathy</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Acute renal failure</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Nasal Bleeding</td>
<td>1</td>
</tr>
</tbody>
</table>

DISCUSSION

Depending upon the development of various clinical features, the type of snake are divided into venomous and non-venomous. Non venomous bite does not show any marked clinical features. Genically, pain is present at bite site but swelling or edema may or may not be noticed. Venomous snake bite show severe local symptoms (swelling rapidly crossing a joint or involving half of the bitten limb, in the absence of a tourniquet), systemic symptoms and coagulation defects. In our study, there were various modes of presentation of patients suggestive of either hemotoxic or neurotoxic nature of the snake (Fernando, P., & Dias, S. 1982). The bites have any of the following manifestations – whole blood clotting time (WBCT) of more than 20 min, haematuria, epistaxis, hypotension, ecchymosis, sub-conjunctival bleed, haematemesis or en-cephalopathy – were classified as haemotoxic bites. Those bites having ptosis, diplopia, convulsions, dysphagia or inability to speak were classified as neurotoxic bites (Cavazos, M. E. O. et al., 2012).

Most of the venomous bites (70%) in our study were hemotoxic. In our study hemotoxic snake bite caused hematuria (4.8%) and epistaxis (4.8%) in one-one patient. Proteinuria was also observed in 19.04% patients. Acute kidney injury was observed in one patient who required hemodialysis. One patient with hemotoxic envenomation also required blood transfusion while Fresh frozen plasma (FFP) was given in (20.8%) five cases. One patient with respiratory distress required oxygen by nasal prongs only. Hematologic abnormalities occur commonly after pit viper envenomation. It is observed that saw-scaled vipers do not cause renal failure where as Russell’s viper and hump-nosed pit viper do. In India, the incidence of acute renal failure is 13-32% following
viper bite. The findings were similar in the study conducted by Chugh et al., Chugh, K. S. (1989. It is observed that Russell’s viper sometimes can also manifest neurotoxic symptoms which can cause confusion in diagnosis. The neurotoxic symptoms in Russell’s viper are believed to be due to presence of a presynaptic toxin like that in common Krait.

Adjunct intravenous medications for allergic/anaphylactic reactions included administration histamine-blockers and steroids. The dose rate used for children was 0.2 mg/kg of antihistamine IV and 2 mg/kg of hydrocortisone IV. Once the patient stabilized, the ASV was restarted slowly for 10-15 minutes, keeping the patient under close observation. Thereafter the normal drip rate was resumed. It is observed that anaphylaxis to ASV occur in more than 10% patients who receive antivenom (Warrell, D.A. 2013). Our findings are in concordance with the national snake management guidelines (Agarwal, R. et al., 2005; & Bharti, O. K., & Singh, G. 2015) as well as the treatment protocols laid down by the World Health Organisation (Warrell, D.A. 2013).

Most common complication observed in neuroparalytic envenomation was respiratory failure (66.7%) followed by aspiration pneumonia (33.3%). In hemotoxic envenomation, coagulation failure was the commonest complication (47.6%) followed by acute renal failure (4.8%), nasal bleeding (4.8%) and gangrene (4.8%).

**Conclusion**

Most common hematologic abnormalities observed were hematuria and epistaxis. Proteinuria and acute kidney injury was also present in one-one case. Administration of Fresh frozen plasma (FFP) improved the outcome. Respiratory paralysis, ptosis and ophthalmoplegia were the most common presentation in all patients with neuroparalytic envenomation. All symptomatic patients were given ASV as primary treatment out of which 79.2% patients required more than 10 vials of ASV.

**References**