RESEARCH BRIEF

Effectiveness of Anti Scorpion Venom for Red Scorpion Envenomation

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Objective: To study the efficacy of anti-scorpion venom plus prazocin. **Methods:** Comparison of clinical features, outcome and duration of stay between children receiving anti-scorpion venom plus prazocin or prazocin alone for management of red scorpion envenomation. **Results:** Requirement for dopamine and requirement and duration of dobutamine therapy were significantly less in patients received anti-venom plus prazocin than those had prazocin only. Faster recovery was seen in cases who received anti-scorpion venom plus prazocin than prazocin only group. **Conclusion:** Anti-scorpion venom plus prazosin was safe and more effective than prazocin alone for scorpion envenomation.

Keywords: *Anti scorpion venom, Children, Red scorpion sting.*

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Scorpion envenomation by Indian red scorpion, *Mesobuthus tamulus* is frequently seen in rural areas of Central India with significant mortality. Pediatric population accounts for nearly 28% of victims [1]. There are no exclusive studies on anti-scorpion venom (AScV) in pediatric patients. Moreover many published studies excluded victims with life threatening manifestations like pulmonary edema and shock and thus evidence for the role of antiscorpion venom in these conditions is limited. This study was conducted with the aim of analyzing the influence of AScV when used along with Prazocin on entire clinical spectrum of morbidity and mortality in children affected by scorpion envenomation.

METHODS

This was a prospective case control study conducted in the Department of Pediatrics, SS Medical College and associated GM Hospital, Rewa, Madhya Pradesh from May 2011 to November 2011. Sixty two patients (age 1 to 18 years) with history of scorpion sting were enrolled in the study. Clinical Composite Scoring system (CCS) by Natu, *et al*. [1] was used for assessment of severity of symptoms and calculation of AScV dose. The maximum CCS that could be attained was 25 and the minimum was zero. Patients with CCS 5-25 were included in the study and informed consents were taken. Those with CCS of <5 at the time of admission were excluded even if they deteriorated later. Prazosin was given in a dose of 30 micrograms per kg body weight to all patients on admission and three hourly till symptoms abated.

Anti-scorpion venom is available as a lyophilized, monovalent refined immunoglobulins and is manufactured by Haffkine bio-pharmaceutical corporation Ltd, Pune. Doses of AScV were determined by CCS and age of patients. AScV was administered only after a test dose (0.1 mL SC) and no adverse reaction to the anti-venom was noticed. No absolute contraindication was mentioned by the manufacturer. A vial of AScV was dissolved in 10 ml distilled water and injected IV over a period of 5-7 minutes. Procedures for procurement of anti-venom was started in May 2011 and it was available from August 2011.

The study was started from May 2011 and patients admitted till 31 July received only Prazocin, as anti venom was unavailable and were termed as group A (Prazocin only group). All patients with CCS more than 5 and admitted after the procurement of anti venom received both AScV and Prazocin, and were labeled as group B (Prazocin + AScV group).

Heart rate and respiratory rate were recorded from multipara monitor at 0, 6, 24 and 48 hours. Monitoring of blood pressure, capillary refilling time, peripheral temperature and chest auscultation for crepitations were also done at frequent intervals. Clinical recovery was assessed based on a set of uniform parameters like, normal heart rate, respiratory rate and blood pressure for age and sex of the patients and presence of normal neurological status. The average duration of hospital stay in two groups was also calculated. Shock was identified on the basis of following clinical features; feeble peripheral pulses, oliguira, altered mental status and less than normal

values of blood pressure for age and sex. Ionotropic support was started with Dobutamine 5 mcg and titrated up to maximum of 15 mcg per kg of body weight. Dopamine was added to cases not showing satisfactory response with dobutamine monotherapy.

RESULTS

Thirty five children (56.45%) received only prazocin and were labeled as Group A. Twenty seven children (43.5%) received both prazocin and anti-scorpion venom and they were labeled as Group B. Baseline demographic and clinical factors including CCS were comparable in two groups (***Table* I**).

Requirement for inotropic support with dopamine and dobutamine and the average duration of inotropic support with dobutamine were significantly less in group B compared to group A ($P<0.05$). Duration of dobutamine therapy was also significantly longer in group A than group B. Requirement of inotropic support with dopamine also showed similar trend, and the difference was statistically significant (***Table* II**). Duration of dopamine therapy and requirement and duration of nitroglycerine were not significantly associated with AScV therapy.

There was no statistically significant difference in duration of hospital stay between two groups. Mortality was lesser in group B (7.4%) than in group A (14.3%), but the difference was not statistically significant (***Table* II**). Duration of hospital stay depended on time elapsed between sting and anti-venom administration. Average duration of hospital stay in children who received anti-venom within six hours was 53.9 hours compared to 67.0 hours in those received AScV after six hours, and the difference was statistically significant.

DISCUSSION

Scorpion anti-venom is effective in neutralizing the venom present in the circulation and other body compartments. Prazocin treatment is directed toward neutralizing the effects of the over-stimulated autonomic nervous system [1]. Demographic and baseline data of both the groups were comparable and children who received anti-scorpion venom documented an earlier clinical recovery and lesser systemic complication like shock, than those with same CCS scoring but received no AScV. This indicates the effectiveness of anti-scorpion venom in reverting the adverse effect of circulating venom.

The delay in initiation of treatment had a poor prognostic effect in the outcome as those children who received AScV within 6 hours of sting showed better outcome than late receivers. Bawaskar and Bawaskar also reported similar benefits of early administration of AScV [4].

TABLE I BASELINE CHARACTERISTICS OF THE PATIENTS AT THE TIME OF ADMISSION

	Group A (n= 35)	*Group B (n = 27)*	*Total (n=62)*
Age (y)	6.2 (3.8)	4.9 (3.5)	5.6 (3.7)
M:F	3:2	3:1	2:1
*Pulmonary edema	9 (25.7%)	5 (18.5%)	14 (22.6%)
Heart rate	129 (27)	131.6 (28)	130.1 (27)
Respiratory rate	40.9 (13.4)	41.3 (8.5)	41.1 (11.4)
Systolic BP	93.0 (22.5)	97.1 (26.0)	94.8 (24.0)
Diastolic BP	49.0 (27.6)	55.9 (22.8)	52.0 (25.6)
CCS	10.9 (3.0)	10.8 (2.8)	10.8 (2.9)

*BP-blood pressure; All values in mean (SD); * values in no. (%); CCS-composite clinical score.*

TABLE II CLINICAL PROFILE OF TWO GROUPS

	Group A (*n*= 35)	Group B (*n*=27)	*P value*
Dobutamine			
N (%)	28 (80.0%)	16 (59.3%)	0.074
Duration, mean (SD)	31.4 (22.8)	17.5 (17.0)	0.040
Dopamine			
N (%)	17 (48.6%)	5 (18.5%)	0.014
Duration, mean (SD)	22.71 (16.3)	28.4 (26.8)	0.56
Early discharge (<48 hours)	2 (6.7%)	9 (36.0%)	0.007
Hospitalization mean (SD), h	74.89 (52.01)	59.24 (24.74)	0.155
Death	5 (14.3%)	2 (7.4%)	0.657

Myocarditis and cardiogenic shock are the life threatening complication of the envenomation. Cardioprotective effect of antivenom is evident from the fact that requirement and duration of ionotropic support were significantly lesser in group B (AScV + Prazocin) than group A (Prazocin only).

There were no anaphylaxis or allergic reactions reported during the study .This adds to the acceptance of AScV in children. Similar safety profile was reported previously by Natu, *et al.* [1]. Higher mortality rates in our study than previous reports [2,3] could be due to the inclusion of patients with life threatening complications like shock with CCS >15, while most of the studies excluded critically ill patients with CCS 15 and more.

WHAT THIS STUDY ADDS?

- Monovalent AScV is safe in children with systemic scorpion envenomation. AScV with prazocin helps in better and early clinical recovery.

Limitations of the study were lack of randomization, and use of CCS, which is not well validated in younger children.

Evidence regarding effectiveness of anti-scorpion venom in children with systemic signs of envenomation has been found in this study. Previous studies had conflicting reports about anti-scorpion venom [4,5], but our study proved that AScV when used along with prazocin is safe in children and useful in hastening clinical recovery, preventing worsening of clinical condition, and reducing the requirement and duration of cardiorespiratory support.

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