IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 5 Ser.15 (May. 2020), PP 05-08
www.iosrjournals.org

Clinical Profile and Efficacy of Prazosin in Scorpion Sting Envenomation in Children at a Tertiary Care Hospital

Dr MD RIZWAN AKHTAR[1], Dr AKHILESH KUMAR[2], Dr BINOD KR SINGH[3], Dr GIRIJANAND JHA[4]

[1]*Assistant Professor, Deptt of Pediatrics, N.M.C.H, Patna, Bihar*
[2] *Associate Professor, Deptt of Pediatrics, N.M.C.H, Patna, Bihar*
[3]*Professor and H.O.D, Deptt of Pediatrics, N.M.C.H, Patna, Bihar*
[4]*Senior Resident, Deptt of Pediatrics, N.M.C.H, Patna, Bihar*
Corresponding author: Dr. AKHILESH KUMAR (drakhi29@gmail.com)

Abstract
OBJECTIVE: *This study was an evaluation of clinical presentation, the outcome and the efficacy of Prazosin in scorpion sting envenomation at Nalanda Medical College Patna Bihar, India.*
METHOD:*A total of 120 children were studied prospectively. The data include, demography, the time of presentation, clinical features, premedication before the arrival at this hospital, response to prazosin and the hospital outcome.*
RESULT:*Local pain at the site of the stings, sweating and peripheral circulatory failure were the common clinical presentations. Complications like acute pulmonary edema, myocarditis, shock & encephalopathy were also seen. These were treated with oral prazosin with either inotropes or vasodilators. Mortality was seen in 8 (6.6%) children. The mortality was higher among those patients who had taken pre-medications with anti-histamines and steroids. Oral prazosin, a post-synaptic alpha-1 blocker is a highly effective drug for scorpion sting envenomation.*
CONCLUSION: *Scorpion sting envenomation is a life-threatening emergency situation in children. Early presentation at hospital and early intervention with prazosin, hasten the recovery and reduce mortality among scorpion envenomated victim.*
Keywords: *Scorpion sting, autonomic storm, alpha blocker, prazosin*

Date of Submission: 14-05-2020 Date of Acceptance: 29-05-2020

I. Introduction

Scorpion sting envenomation is an acute life-threatening medical emergency in pediatric patients if left untreated. It frequently occurs in tropical, Sub-tropical and temperate zone of the world and poses a common public health problem in certain part of India (1).

Indian red scorpion or *Mesobuthustamulus*is the most lethal known scorpion species, and are found abundantly in Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh and Bihar (2,3). The pediatric age group are at greater risk of severe envenomation like cardiac, respiratory, and neurological complications as compared to adults. Common clinical manifestations include local pain (often severe), vomiting, profuse sweating, cold extremities, hypertension, hypotension and in severe envenomation, pulmonary edema and death may occur (4,5). The cause of death in severe envenomation are attributed to cardiopulmonary complications like myocarditis and acute pulmonary edema (6,7,8).

Prazosin, a post synaptic alpha-1 blocker counteracts the effects of catecholamine released due to envenomation, and arrest the development of severe systemic manifestations. It has been found to be single most very effective drug for scorpion sting envenomation and has reduced the mortality to 1% as compared to 30% mortality in pre-prazosin era (9,10,11).

The present study was done to observe the pattern of clinical presentation, outcome and the efficacy of prazosin in scorpion sting envenomation in children who were admitted at the tertiary center.

II. Material And Method

This was a prospective study conducted at tertiary center Nalanda Medical College Patna Bihar, India, during the period from January 2017 to December 2019(2years). All the cases who were aged between 0 to 14 years presented to the emergency department with a history of scorpion sting envenomation, sting mark, the scorpion seen in the vicinity of the child by the parents, were admitted. In total of around 120 cases were studied during the two years period. Informed consent was taken from parents or relatives of the children studied. The

details of clinical features and treatment given at the local level were also noted from the referral letter. All clinical findings like temperature, pulse, heart rate, blood pressure, chest findings were noted hourly. Various systemic involvement was assessed according to clinical findings and investigation done. Myocarditis was diagnosed if the patient had tachycardia, muffled heart sounds, gallop rhythm, systolic murmurs, ECG changes like low amplitude waves, ST segment changes, abnormal rhythm, elevated LDH level, cardiomegaly on chest x-ray and a decreased ejection fraction on 2D echocardiography. Acute pulmonary edema was diagnosed on the basis of tachypnea, pink frothy sputum, bilateral crepitation and radiological findings along with suggestive ABG analysis. The autonomic storm was diagnosed when there was excessive sweating, salivation, shivering, vomiting, hypertension or hypotension and priapism were found.

The patient was continuously monitored for temperature blood pressure, pulse, respiratory rate, SPO2, CRT and signs of systemic involvement like development of myocarditis, pulmonary edema, shock and encephalopathy. A complete hemogram, blood sugar, serum electrolyte, ABG, LFT, RFT, ECG, CXR were done in all children. 2D echocardiography were done in patients with features of myocarditis.

Patient who reached within six hours of envenomation were given paracetamol for local pain and prazosin tablets 30 microgram/kg body weight orally or through NG tube every four hourly till symptoms subsided. Asymptomatic patients who came after six hours of envenomation were kept under observation and they received only symptomatic treatment without prazosin.

All the symptomatic patients were given prazosin along with supportive cares. Patient with acute pulmonary edema were managed with judicious use of vasodilators and inotropes and were ventilated whenever required. All the cases were observed for a minimum period of 24 hours. Complicated patients were observed minimally 24 hours off the drugs and were discharged only after they were stable clinically for at least 48 hours.

The analysis was done in respect to complications, the interval between scorpion sting and admission to the hospital and the mortality.

III. Observation And Result

120 children between the age group of 0-14 years were studied in a 2 years period, among them 35 children were mildly symptomatic (only local pain and swelling) and were discharged after 24 hours of observation as per the protocol. The remaining 85 children were treated with prazosin, IV fluids, analgesic and other supportive measures, like inotropes and vasodilator whenever required. Most of the cases (75%) were under the age group of 2-7 years followed by 8-12 years. Males were outnumbered (59%) over females (41%) children. The most of the cases were belong to rural areas (88%) with peaks during summer. Most of the cases (80%) of envenomation were caused by Indian red scorpion (*Mesobuthus tamulus)*. The commonest sites of sting were on the lower extremities 85(71%), followed by upper limb in 30(25*%)* cases and on the face, 5 cases (4.2%).

Children with autonomic storm had excessive parasympathetic activity who presented early within an hour of sting (sweating, salivation, vomiting and bronchospasm) and those who presented late had excess sympathetic features, like tachycardia, cold extremities, intense vasoconstrictions and features of carditis.

The most common presenting symptoms were irritability, profuse sweating, cold extremities, rapid breathing followed by altered sensorium. The common clinical signs, were tachycardia tachypnea, cold clammy skin, perspiration and hypotension (Table-1).

Table-1: Clinical features of scorpion envenomation:

No	Symptoms/Signs	N=120(%)
1.	Local Pain	85(70%)
2.	Sweating/Perspiration	95(79.1%)
3.	Salivation	45(37.5%)
4.	Cold Periphery	105(87.5%)
5.	Peripheral Circulatory failure	92(76%)
6.	Vomiting	52(43.3%)
7.	Pain abdomen	15(12.5%)
8.	Altered Sensorium	18(15%)
9.	Seizure	4(3.3%)
10.	Priapism	39(32.5%)
11.	Pupillary Abnormality	22(18.3%)
12.	Tachycardia	110(91.6%)
13.	Bradycardia	8(6.6%)
14.	Hypertension	96(77.5%)
15.	Hypotension	21(17.5%)
16.	Tachypnoea	75(62.5%)
17.	Crepitation	26(21.6%)
18.	S3 gallop	23(19.1%)
19.	Myocarditis with ECG changes	30(25%)
20.	Acute Pulmonary Edema (APE)	20(16.6%)

21.	Encephalopathy	14(11.6%)

Clinical myocarditis was found in 30 (25%) of cases, with ECG changes (ST depression) were found in 20% of cases. Pulmonary edema with myocarditis were found in 20 cases (16.6%) whereas acute pulmonary edema with shock and encephalopathy were found in 14 cases (11.6%), 10 of them required mechanical ventilation. Out of 10 cases who were ventilated 8 patients died, all of them had received parenteral dexamethasone and anti-histaminic prior to hospitalization. They had also presented late (6-12 hrs.) after envenomation.

Mortality and complications were commonly seen in patients who presented late, usually after 6hrs of sting. Most of the death (75%) had occurred in the age group of 4-5 years. The highest mortality was due to cardiovascular complication, e.g., myocarditis (75%). Death due to acute pulmonary edema had occurred in 20% of cases and in 5% due to encephalopathy.

IV. Discussion

The venom of *mesobuthustamulus* or Indian red scorpion is a potent sodium channel opener (12) which cause stimulation of autonomic nervous system resulting in sudden and massive release of endogenous catecholamines into the circulation (3). After scorpion envenomation, there is initial transient cholinergic activity, followed by sustained adrenergic hyperactivity which depends upon the amount of venom injected (13). The clinical manifestation is also related to the dose of venom, the age of child, the season and the time lapse between the sting and hospitalization (5).

Of the 120 cases 71(59%) were boys and 49(41%) were girl child and was matched with Biswal et al study (14). 108 (90%) cases of sting are reported from rural areas, and 85(71%) cases had the sting on lower extremities which was similar to Boswak et al's observation (15). Peripheral circulatory failure with cold extremities were found in 92 (76%) of the cases which was close to Bawaskar et al (83%) and 75% which was reported by Biswal et al (14). This was due to early compensated shock resulted from excess catecholamine release and peripheral vasoconstriction without significant myocardial dysfunction. Most of the cases of myocarditis developed acute pulmonary edema with S3 gallop. There were no significant differences between the means of the basic parameters like age, blood pressure, GCS, Hb level, TLC and serum electrolyte among both survivors and non-survivors.

The determinant of better outcome & mortality was significantly dependent upon the time elapsed between scorpion sting and presentation to the hospital. The children who presented after 6 hours of sting had a significantly higher mortality rate, as reported by Biswal et al (14). Most of the cases with acute pulmonary edema, myocarditis and encephalopathy who were presented after 6 hours of sting had higher mortality and morbidity rates, however some studies have also shown higher mortality and morbidity who were admitted within 30 minutes to 3 hours of sting (6,11).

The mortality in present study were observed in 8 (6.6%) cases as compared to 1%-10.7% which were reported in various study in different places (14, 16, 17, 18). Higher mortality may be due to late presentation, use of IV dexamethson anti-histaminic and multi-system involvement. Dexamethasone in combination with anti-histaminic is known to potentiate the effect of catecholamine on cardiovascular and central nervous system leading to worsening of encephalopathy (14,19).

The mortality was lesser in patients who were treated with prazosin alone as compared to those who received inotropes or sodium nitroprusside (SNP) with prazosin. This could be due to protective effect of prazosin on CVS and respiratory system. Prazosin reverses both ionotropic and hypokinetic activity and also the metabolic effects of low insulin secretion (20). Thus, early administration of prazosin reduces mortality and morbidity associated with encephalopathy as well, due to neutralization of catecholamine releas in the brain and also prevent them to cross blood-brain barrier.

V. Conclusion

Scorpion sting envenomation is an acute life-threateningchildhood emergency. Timely referral along with early therapy with prazosin may be lifesaving. The poor outcome is associated with late presentation at hospital along with excessive use of steroids and anti-histaminic before hospitalization. The patient presented with myocarditis, encephalopathy, metabolic acidosis and acute pulmonary edema in the beginning are the significant determinant of higher morbidity and mortality. Oral prazosin is a highly effective fast acting easily available and cheap drug and free from serious side effects like anaphylaxis. Early intervention with oral prazosin and judicious use of inotropes and SNP can hasten recovery and prevent significant morbidity and mortality among the scorpion sting victim.

Conflict of interest: None
Financial disclosure: The authors declare that this study hasn't received any financial assistance

References

[1]. Santhanakrishnan BR Ranganathan G, Ananthasubramanian e Cardiovascular manifestations of scorpion stings in children. Indian Pediatr 1977; 14:353-356.
[2]. Mahadevan S. Scorpion sting. Indian Pediatr 2000; 37: 504-513.
[3]. Ismai M.The scorpion-envenoming syndrome.Toxicon 1995; 3: 825-858.
[4]. Sofer S, Gueron M. Vasodilators and hypertensive encephalopathy following scorpion envenomation in children. Chest 1990; 97: 118-120.
[5]. Bawaskar HS, Bawaskar PH. Cardiovascular manifestations of scorpion sting in India (Review of 34 children). Ann Trop Pediatr 1991: 11:381-387
[6]. Santhanakrishnan BR, Balagopal Raju V. Management of scorpion sting in children. Trop Med Hyg 1974; 77: 133-135.
[7]. Biswal N, Murmu Uday C Mathai B, Balachander J, Srinivasan S. Management of scorpion sting envenomation. Pediatrics Today 1999; 2(4): 420-426.
[8]. Murthy KRK, Vakil AE, Yeolekar RE. Insulin administration reverses the metabolic and echocardiographic changes in acute myocarditis which is induced by Indian red scorpion (B. tamulus) venom in experimental dogs. Ind Heart J 1990; 42: 35-37.
[9]. Bawaskar HS, Bawaskar PH. Utility of scorpion antivenom vs Prazosin in the management of severe Mesobuthustamulus (Indian red scorpion) envenoming at a rural setting. J Assoc Physicians India.2007: 55: 14-21.
[10]. Miller R, Awarn A, Maxwell BB, Masson DT. Sustained reduction of cardiac impedance and preload in congestive cardiac failure with antihypertensive Prazosin. New Engl J Med 1977; 297: 303-307.
[11]. Bawaskar HS, Bawaskar PH. Scorpions sting: a review of 121 cases. J Wilderness Medicine 1991; 2: 164-174.
[12]. Vasconcelos F, Lanchote VL, Bendhack LN, et al. Effects of voltage gated Na+ channel toxin from Tityusserrulatus venom on rat arterial blood pressure and plasma catecholamines. Comp BiochemPhysiol C ToxicolPharmacol. 2005; 141: 85-92.
[13]. Bawaskar HS. Bawaskar PH. Management of cardiovascular manifestations of poisoning by the Indian red scorpion (Mesobuthustamulus). Br Heart J 1992; 68: 478-480.
[14]. Biswal N, Bashir RA, Murmu Uday C. Mathai B, Balachander J. Srinivasan S. Outcome of scorpion sting envenomation after a protocol guided therapy. Indian J Pediatr 2006; 73: 577-582.
[15]. Bosnak M, Levent YH, Ece A, Yidizdas D, Yolbas I, Kocamaz H, et al. Severe scorpion envenomation in children: management in the pediatric intensive care unit. Hum Exp Toxicol 2009; 28(11): 721-728.
[16]. Bawaskar HS Bawaskar PH. Prazosin in the management of cardiovascular manifestations of scorpion sting. Lancet 1986; 1:510-511.
[17]. Bawaskar HS, Bawaskar PH. Indian red scorpion envenomation.Indian J Pediatr 1998; 65: 383-391.
[18]. Prasad R. Mishra OP, Pandey N, Singh TB. Scorpion sting envenomation in children: Factors affecting the outcome. Indian Pediatr 2011; 78(5): 544-548.
[19]. Graham RM, Hettinger WA. Drug therapy-Prazosin. New Engl J Med 1979; 300: 232-235.
[20]. Bawaskar HS, Bawaskar PH. Vasodilators: Scorpion envenoming and the heart (An Indian experience). Toxicon 1994; 32: 10311040.

Dr MD RIZWAN AKHTAR, et. al. "Clinical Profile and Efficacy of Prazosin in Scorpion Sting Envenomation in Children at a Tertiary Care Hospital." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(5), 2020, pp. 05-08.