



## ENCEPHALOPATHY: A MANIFESTATION OF SCORPION STING ENVENOMISATION

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### ABSTRACT

**Background:** Scorpion sting presents with varied clinical manifestations that includes cardiovascular, pulmonary and rarely neurological.

**Case Characteristics:** 10 month old female presented with seizures and altered sensorium following a scorpion sting.

**Observation:** Clinical findings suggested autonomic disturbance following scorpion sting without any significant changes in CT head.

**Message:** Administration of prazosin is life-saving and reduces morbidity including reversal of encephalopathy and mortality associated with scorpion sting.

**KEYWORDS :** Encephalopathy, scorpion sting

### INTRODUCTION

Scorpion sting is a public health problem especially in the rural parts of our country<sup>1</sup>. Clinical symptoms range from local to life threatening conditions. Almost every system of the body can be involved, mainly cardiovascular and respiratory systems. Mortality rates range from 3-22% in various regions of India, Saudi Arabia and South Africa<sup>2,3,4</sup>. Here we present a case of encephalopathy subsequent to scorpion sting.

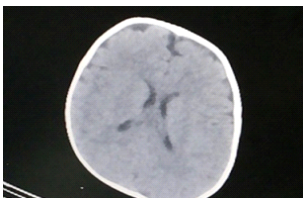
### CASE REPORT

A 10 month old 6 kg weight female child residing in the rural area of district Bhopal was admitted in the night of 29<sup>th</sup> June 2017 with chief complaints of single episode of uprolling of eyeballs. On taking detailed history mother revealed scorpion sting on left thigh in the night of 27<sup>th</sup> June which was followed an hour later by cold extremities, sweating and 4-5 episodes of vomiting. The child was taken for witchcraft the same night and no medical help was taken. Cold extremities subsided by the morning. The child suffered with an episode of uprolling of eyeballs the next day and was brought to our hospital on the same night, about 48 hours after the sting.

On admission, the child had temperature 100.6<sup>o</sup>F, Heart rate of 150/minute, Respiratory rate of 34/minute and Blood pressure 84/42 mm of Hg which was below 50<sup>th</sup> centile. No pallor, cyanosis, icterus or clubbing was noted. Extremities were warm and dry. Anterior fontanelle was pulsatile and open at level. Posterior fontanelle was closed. On systemic examination of abdomen, respiratory and cardiovascular systems, no abnormality was clinically appreciated. On neurological examination, GCS was 8/15 (E2V2M4) with hypotonia, absent deep tendon reflexes, flexor plantar reflexes and normal superficial reflexes. No signs of meningeal irritation were present and bilateral pupils were equal in size and reactive to light. No local signs of inflammation were noted.

Treatment was started with a broad spectrum antibiotic (3<sup>rd</sup> generation Cephalosporin). Prazosin, a competitive alpha 1 receptor antagonist, was started along with Injection Dobutamine for cardiac support. IV fluids were given for maintenance therapy.

Laboratory reports showed Hemoglobin 8.2g/dl, TLC 9500 with 68% polymorphs, platelet counts 3.2 lacs, normal liver and kidney function tests, normal electrolytes and routine microscopy of urine. Cerebrospinal fluid analysis revealed normal findings. ECG done on the day of admission and CT scan of head done 24 hours after admission revealed normal findings.



After 24 hours of initiating the treatment, vitals were recorded as HR=120/min, RR=30/min, BP=92/50 (50<sup>th</sup> and 90<sup>th</sup> centile) with no fever or any sympathetic overactivity. GCS became 12/15 (E4V2M6). Injection Dobutamine was tapered off gradually and prazosin was continued. Soon gavage feeds were started and the child shifted from PICU to Step down. The child was shifted to the ward on the 4<sup>th</sup> day after admission as she became alert, active and completely responsive. The child was discharged on the sixth day with no neurological deficits.

### DISCUSSION

Scorpions are predatory arachnids belonging to the order Scorpionidae. They are eight-legged species having a characteristic grasping pedipalps and a narrow segmented tail that ends in a venomous stinger<sup>5,6</sup>. Being found in all continents except Antarctica, they number to upto 1750 different described species out of which about 86 are found in India<sup>5,7</sup>. They live in warm dry regions all over India mainly in crevices, underground burrows, under logs and in coconut and sugarcane plantations. They are found more in regions containing red soil<sup>7</sup>.

Scorpion stings are primarily accidental; being attacked by the predator only when handled roughly or trodded on. Moreover, not all stings are envenomed as scorpions can control their ejaculation<sup>8</sup>. Scorpions capable of causing fatal envenomation are all belonging to family Buthus and Scorpionidae.<sup>5,6</sup>

Scorpion stings are an occupational hazard for farmers, villagers and migrating populations. Envenomation can cause a variety of clinical effects mainly cardiovascular, pulmonary and neurotoxicity. Gastrointestinal, genitourinary, hematologic, endocrine and immunological effects are amongst the others that occur post scorpion envenomation<sup>8</sup>. Mechanism of action of the venom is mainly through autonomic disturbance. Venom is a mixture of many low molecular weight proteins and a cocktail of various neurotoxins, cardiotoxins and nephrotoxins. Main target is voltage-gated sodium and potassium channel mediating synergistic effects causing intense and persistent depolarization of autonomic nerves leading to massive release of autonomic neurotransmitters aptly called the "autonomic storm"<sup>9,10,11</sup>.

The annual numbers of scorpion envenomation cases are way more than are actually reported. Case fatality which was about 30% during 1970s has now reduced to around 2-4% after the advent of Prazosin and other improved ICU care<sup>2,4</sup>.

Scorpion envenomation can cause serious systemic effects, mainly cardiovascular and respiratory. Although neurological effects are less common, but can be fatal if present. These can be either encephalopathy, cerebral edema or stroke which again can be ischemic or haemorrhagic.

Various mechanisms have been attributed for the same. The "autonomic storm" characteristic with scorpion stings is the major

factor causing all the systemic effects. Sudden changes in blood pressure causes vasogenic edema leading to encephalopathy. Same can be responsible for haemorrhagic stroke as well as severe vasoconstriction leading to ischemic stroke<sup>12,13</sup>.

Direct toxicity of the toxins on neural tissues, although rare, is also inscribed as a cause for the above mentioned effects. Usually toxins do not cross blood brain barrier but damage caused by the toxin may lead to entry of toxins into the central nervous system<sup>12,13,15</sup>. Other associated factors might be acidosis, hypoxia and hypoglycaemia that deteriorate the prognosis<sup>13,14</sup>.

In cases of scorpion envenomation, the exact effect on CNS and the time lapse between the sting and the appearance of first neurologic manifestation is unclear. As in our case, the child presented with seizures 48 hours after the scorpion sting and no radiographic abnormality could be documented.

However early and prompt treatment in such cases can save lives which can otherwise be fatal. Early institution of ICU care alongwith prazosin administration is the key to saving such patients<sup>16</sup>.

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