


CASE REPORT

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Basal ganglia hemorrhage secondary to scorpion sting: a fatal presentation



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Abstract

Introduction: Cerebrovascular manifestations are uncommon presentations of scorpion sting in the Indian subcontinent. Encephalopathy, cerebral edema, subarachnoid hemorrhage, non-hemorrhagic strokes, and cortical necrosis are a few CNS complications described in the medical literature due to scorpion envenomation.

Case description: We report a rare case of scorpion envenomation in a 40-year old, non-hypertensive farmer, who presented in an unconscious state. Non-contrast CT head revealed intracerebral hemorrhages in left temporoparietal lobe extending into left basal ganglia with intraventricular extension.

Discussion and evaluation: Toxin-induced autonomic storm is mostly responsible for the acute hypertensive crisis in affected individuals leading to stroke (commonly cerebral infarct) as a CNS complication.

Conclusion: Basal ganglia bleed following scorpion sting is an extremely rare scenario which is usually fatal as was in our case. Early suspicion and prompt institution of treatment (prazosin) is crucial in the management of intracranial bleed secondary to scorpion sting.

Keywords: Scorpion sting, Scorpion bite, Stroke, Basal ganglia bleed

Introduction

Scorpion sting is a medical emergency; it is more common in rural parts of India. Farmers and laborers who are exposed to outdoor activities are often the worst victims. About 100 scorpion species are found in India. The most common species causing envenomation are *Hottentotta tamulus* (previously known as *Mesobuthos*) commonly called Indian red scorpion [1, 2]. Among many constituents of scorpion venom, alpha toxins produce significant human toxicity by binding to sodium channels in cell membranes, and inhibiting inactivation of action potentials [3] causing prolonged depolarization and excessive release of acetylcholine, epinephrine, and norepinephrine from autonomic ganglia. This excessive release of neurotransmitters results in autonomic storms

thus produces clinical manifestations ranging from a mild local skin reaction to severe cardiovascular, respiratory, and neurological complications [4]. Neurological manifestations complicating scorpion sting such as cerebral edema, encephalopathy, and subarachnoid hemorrhage have been reported in the past [4] but basal ganglia hemorrhage is a rare occurrence. Here, we describe the case of basal ganglia hemorrhage in a 40-year-old Indian farmer who had been stung accidentally by a scorpion while working in paddy fields.

Case description

A 40-year-old farmer from the Indian state of Uttar Pradesh presented in the emergency room in an unconscious state with a history of a scorpion sting (*Mesobuthus tamulus* or the Indian red scorpion) in his right foot. As per the attendants, the patient returned from work with headache, vomiting, and pain at the site of the sting. Eventually, he developed weakness of the right side of the body and lost his consciousness within 4 h. The patient had no history of hypertension or any

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drug intake or any significant illness in the family. He had no other addiction apart from smoking 10 cigarettes per day for the last 20 years. On initial evaluation in the ER, the patient was altered with Glasgow Coma Scale score of 6 (E2V2M2), pupils were mid-dilated and reactive, blood pressure was elevated (178/100 mmHg), and pulse rate was 110 per minute and oxygen saturation of 84% on room air. Cellulitis of the right foot was obvious on general examination (Fig. 1). Auscultation of the chest revealed bilateral coarse crepitations. An urgent non-contrast CT scan of the head showed intracerebral hemorrhage (left basal ganglia involving left temporoparietal lobe with intraventricular extension) (Fig. 2). Hematoma volume was 140 cc as measured by ABC/2 score [5].

The patient was shifted to the intensive care unit; his airway was first secured with intubation and mechanical ventilation. He was put on intravenous fluids, mannitol, dexamethasone, and prazosin. Arterial blood gas analysis, complete hemogram (hemoglobin 120 g/L; total leucocyte count, $14 \times 10^9/L$; platelets, $160 \times 10^9/L$), liver

and kidney functional tests, serum electrolytes, coagulation profile (prothrombin time, 14 s; international normalized ratio, 1.8; activated partial thromboplastin time, 34 s), FDP (7 mg/L), and D-dimer (< 0.50) were within normal limits. Chest radiograph showed bilateral basal infiltrates due to aspiration, sinus tachycardia on electrocardiogram, and elevated troponin T (0.8 ng/ml) suggested possible myocarditis. Transthoracic echocardiogram showed mild diastolic dysfunction without valvular and pericardial involvement, and left ventricular ejection fraction was 56%. A neurosurgical consultation was taken and an external ventricular drain was planned. But surgery was deferred as the patient developed hypotension on day 3 (blood pressure—systolic 60 mmHg) probably due to sepsis secondary to aspiration pneumonia or toxin-induced myocarditis. The patient was given intravenous vasopressor support, and blood pressure was intensively monitored. He had a cardiac arrest and eventually succumbed to his illness on day 4 despite the best possible efforts.

Discussion and evaluation

We demonstrate a rare but fatal case of scorpion envenomation resulting in basal ganglia hemorrhage. Scorpion sting is a potentially lethal entity. The clinical manifestations are myriad depending on the venom composition and often can be life-threatening owing to severe compromise of cardiac, pulmonary, renal, coagulation, and CNS function. Scorpion venom is secreted chiefly by the glands present in the distal portion of the tail. It contains the low molecular weight, water-soluble polypeptides with pro-inflammatory and enzymatic properties that can activate the coagulation cascade. Cerebrovascular involvement occurs in approximately 8% of cases [6]. Mechanism of action of toxins in scorpion venom has been implicated to the presynaptic nerve endings targeting the sodium and potassium channels [4]. CNS injury following scorpion sting occurs in many ways: direct action on CNS by neurotoxin results in encephalopathy, blood pressure undulations due to counteraction of sympathetic and parasympathetic systems can result in stroke, direct damage to endothelium by toxins causes vasculitis and can lead to thrombosis of vessels and infarction. Disseminated intravascular coagulation (DIC) may result in infarction or hemorrhagic stroke, prolonged hypoxia, anoxia, and dehydration are other mechanisms by which CNS damage can occur. These toxins possibly create an imbalance in sympathetic and parasympathetic systems, leading to an autonomic outburst and massive secretion of catecholamines [4]. An acute rise in blood pressure due to sympathetic stimulation and loss of cerebral autoregulation would explain basal ganglia hemorrhage. In our case, the patient had no family history of hypertension or any



Fig. 1 Photograph of right foot showing cellulitis (note the prominent erythema and swelling)

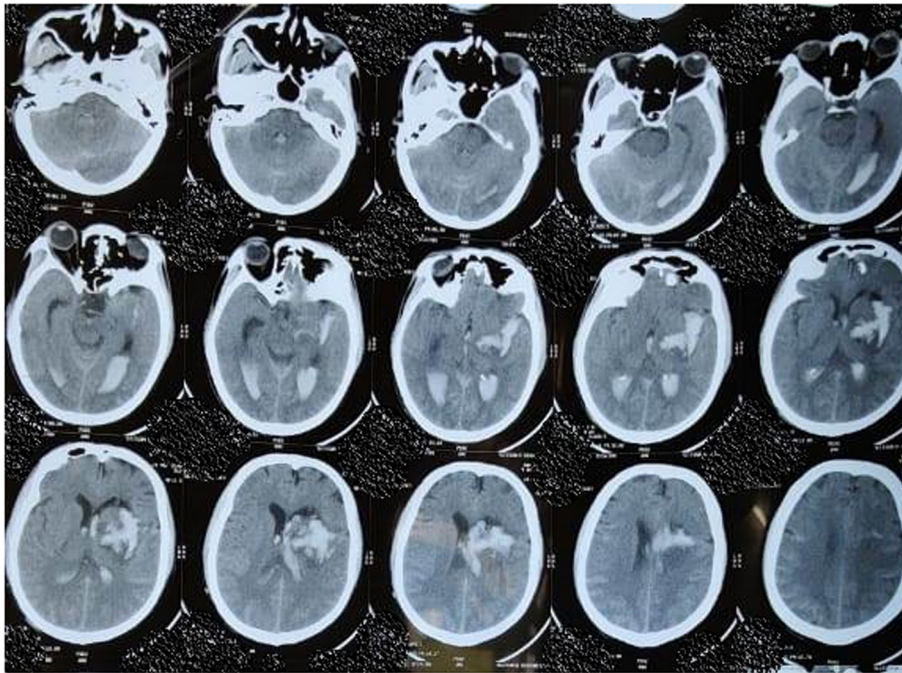


Fig. 2 NCCT head (axial sections) showing hyperdensities in left basal ganglia extending to left temporoparietal lobe, also involving the lateral ventricles—suggestive of intracerebral hemorrhage

personal history of intake of antihypertensive drugs or sympathomimetic drugs. Disseminated intravascular coagulation was ruled out by normal D-dimer and coagulation profile. Due to a deteriorating clinical condition, we could not perform CT or MR angiography. Despite adequate treatment and supportive measures, the involvement of CNS in cases of scorpion envenomation carries a dismal prognosis [4, 7].

Conclusion

Early diagnosis and prompt treatment can reduce mortality and morbidity related to the neurological manifestations of scorpion sting. Basal ganglia hemorrhage with intraventricular extension secondary to scorpion envenomation is infrequent and is rarely reported in the literature. Treatment with prazosin, if initiated early, may prevent many cerebrovascular manifestations of scorpion sting.

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Authors' contributions

AM: write-up of article, data acquisition, analysis, reviewing literature, conceptualization, and submission of article. VA conceptualization, planning, supervision, data analysis, and review of final submission. SA: conceptualization, write-up of article, analysis of data, supervision, and final review before submission. SK data acquisition and planning,

conceptualization, and reviewing literature. AB data acquisition and analysis. The author (s) read and approved the final manuscript.

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Ethics approval and consent to participate

Not required

Consent for publication

A written informed consent was obtained from legal guardian of the patient for using the image.

Competing interests

The authors declare that they have no competing interests.

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