Case Report:

Cerebrovascular manifestations following scorpion sting

P Nataraja,[1] S.V. Naveen Prasad,[1] G. Obulareddy,[2] Ch. Anil,[3] T. Naveen,[1] B. Vengamma[1]

Departments of [1]Neurology, [2]Cardiology, [3]Radiology, Sri Venkateswara Institute of Medical Sciences, Tirupati

ABSTRACT

Scorpion sting is a common clinical problem in Rayalaseema area of Andhra Pradesh State in India. Clilnical presentation of scorpion envenomation can range from mild local pain to systemic manifestations involving almost all systems. Cerebrovascular manifestations of scorpion sting have been sparsely documented. We report two cases who presented with ischaemic stroke and haemorrhagic stroke following scorpion sting.

Key words: *Scorpion stings, Cerebrovascular disease*

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INTRODUCTION

Scorpion sting contains a water soluble mixture of toxins with various concentrations.[1-2] Neurotoxin in the venom impairs the nerves, muscles and heart by altering ion channels. Neurotoxin has two components, a long polypeptide, which causes prolonged opening of voltage gated sodium channels leading to continuous firing of somatic, sympathetic and parasympathetic neurons and a short polypeptide that blocks potassium channels.

The prolonged opening of sodium channels and closing of potassium channels result in persistent stimulation of autonomic nerves and a massive release of catecholamines from adrenal medulla, initiation of autonomic storm by stimulating parasympathetic, sympathetic nerve endings.[3-4]Neurotoxin in venom acts on respiratory centre, vasomotor centre, nerve terminals and endplate of both striated and non striated muscles.[5]

CASE REPORTS

Case 1

A 25-year-old lady sustained scorpion sting on her right foot while working in her house. After few hours she developed severe breathlessness, for which she was admitted to the intensive coronary care unit (ICCU) of the Department of Cardiology at our tertiary care teaching hospital. She was diagnosed to have myocarditis with moderate left ventricular dysfunction and the left ventricular ejection fraction (LVEF) was 48%. Six hours after admission her respiratory effort declined and in view of deteriorating oxygen saturation she required tracheal intubation and assisted mechanical ventilation. She also received intravenous diuretics and other supportive measures. She recovered rapidly, was weaned off the ventilator over three days and was discharged from hospital after 10 days. On the third day after discharge, she had sudden onset of weakness of right upper and lower limbs with slurring of speech.

On examination she was conscious and coherent, pulse was 110/min, normal sinus rhythm, blood pressure was 120/80 mm Hg. Pupils were normal in size, and were reacting to light. Glasgow Coma Scale (GCS)[6] at presentation was eye opening (E) 4, verbal

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Corresponding author: Dr B. Vengamma, Senior professor, Department of Neurology, Sri Venkateswara Institute of Medical Sciences, Tirupati, India.
e-mail: bvengamma@yahoo.com

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response (V) 5, motor response (M) 6. Speech was slurred. Neurological examination revealed left upper motor neuron type facial palsy, paucity of movements in left upper and lower limbs. Deep tendon reflexes were diminished on the left side and were normal on the right side. Plantar was extensor on left side and flexor on the right side. Rest of the neurological examination and other systems examination were normal.

On laboratory testing, complete haemogram, serum biochemistry including serum electrolytes, coagulation profile, serum homocysteine levels and urine analysis were normal. Electrocardiogram (ECG), chest radiograph, ultrasonography (USG) of abdomen were normal. Two-dimensional echocardiography (2D Echo) at admission revealed LVEF to be 48%. The LVEF improved to 68% on third day with treatment. Carotid doppler study was normal. Serological testing for human immunodeficiency virus (HIV) infection, Venereal Disease Research Laboratory (VDRL) test, antinuclear antibody (ANA) and antiphospholipid antibodies were negative. Non-contrast computed tomography (NCCT) of brain showed acute infarct in right parietal region, corona radiata, lentiform nucleus (Figure1). Magnetic resonance angiogram (MRA) with diffusion weighted imaging (DWI) of brain showed an acute infarct in the right capsuloganglionic region (Figure 2).

She was managed with intravenous mannitol, oral asprin, nutritional care and physiotherapy. Neurosurgery opinion was taken, and the neruosugenos advocated conservative management. The patient was discharged on tenth day. At the time of discharge, the patient had mild dysarthria and left hemiparesis. On follow-up after two months,the patient had mild weakness of left upper and lower limbs but was able to walk without support.

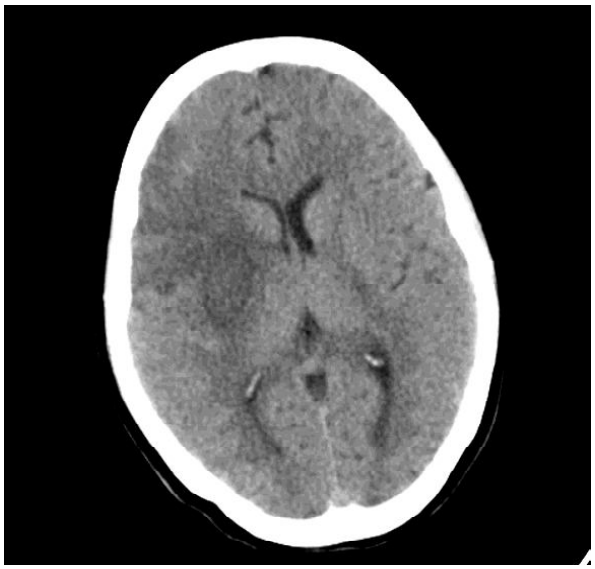

Figure 1: NCCT of brain showing acute infarct in right parietal region, corona radiata, lentiform nucleus
NCCT = non-contrast computed tomography

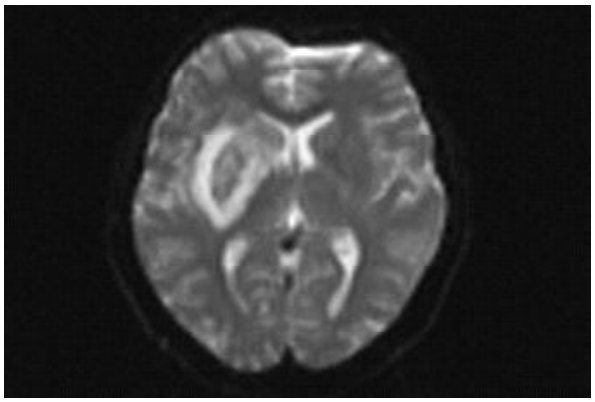

Figure 2: MRI Brain with DWI image showing acute infarct right capsuloganglionic region
MRI=magnetic resonance imaging; DWI=diffusion weighed image

Case 2

A 32-year- old female had sustained Indian red scorpion sting while she was working in a rice field. After few hours she developed severe breathlessness and had presented to our institute emergency service. She was diagnosed to have myocarditis with a LVEF 35%. She required admission to the ICCU and was treated with intravenous diuretics and ionotropes. Three days after admission, she developed left sided ptosis and drowsiness. On examination she was drowsy, but arousable to verbal commands, not obeying commands with GCS was E3V5M4, pulse rate was 88/min, rhythm was normal;

blood pressure was 120/80 mm Hg. Neurological examination revealed left complete third nerve palsy with left sided ptosis. Pupil on left side was 6 mm in size, with a sluggish reaction to light, the eye was deviated down and out; right sided pupil was 4 mm in size, reacting to light, and was in normal position. Motor system examination showed right hemiperisis, plantar response on right side was extensor and fanning of other toes with triple flexion of ankle, knee and hip joint was observed. Sensory system examination was normal. Cerebellar examination was consistent with motor power. On laboratory testing haemogram, renal function test, liver function test, coagulation profile were normal. At admission 2D-echocardiography showed a LVEF of 35%, it had improved to 70% by three days of treatment with intravenous diuretics and ionotropes. Carotid doppler study was normal. NCCT of brain showed acute haemorrhage in left frontal region (Figure3). Computed tomography (CT) angiogram of brain showed normal vasculature.

She was treated with intravenous mannitol, citicolin, and other supportive measures.

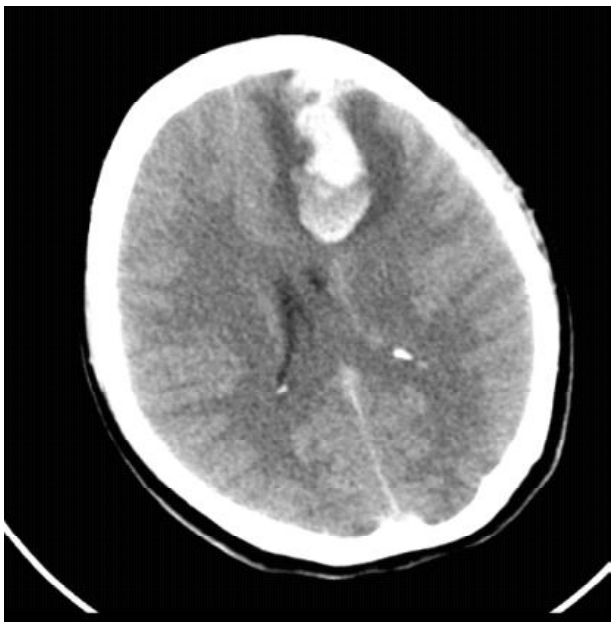

Figure 3: NCCT of brain showing acute haemorrhage in left frontal region with mild mass effect
NCCT= Noncontrast computed tomography

Neurosurgery consultation was taken inview of midline shift. Neurosurgeon had suggested medical management. Her sensorium improved after three days, and weakness improved over ten days. Patient was discharged after ten days, at the time of discharge she was conscious and coherent with stable vitals with mild residual ptosis with no motor deficit. On followup after two months her left sided ptosis completely improved.

DISCUSSION

Following scorpion sting local symptoms are the common manifestations, but various systemic complications like autonomic storm, disseminated intravascular coagulation (DIC), allergic reaction, anaphylactic reaction, acute pancreatitis, encephalopathy, cerebrovascular manifestations, myasthaenia like effect, acute renal failure, acute respiratory failure, systemic inflammatory response syndrome (SIRS), cardiovascular manifestations, metabolic acidosis and dyselectrolytemia are also described. Nervous system manifestations are rare, and are described in 2% of cases.[7]

Case 1 presented with infarction of right frontal regions, corona radiata, lentiform nucleus, due to myocarditis with embolism or by vasculotoxic action of venom causing endothelial damage, thrombosis. Case 2 presented with left sided ptosis with dilated pupil on left side,left eye deviated to down and out suggesting intracerebral bleed with mass effect, compressing the midbrain on left side. Acute rise in blood pressure might have ruptured unprotected blood vessels resulting in left frontal haemorrhage.

Scorpion venom can cause stroke by several mechanisms. Ischaemic stroke can occur as a result of thrombosis due to endothelial damage and vasculitis. Excess catecholamines acts on alpha receptors results in severe vasoconstric-

tion of cerebral vessels leading to low flow infarcts. Hypotension as cause of myocarditis, parasympathetic overactivity and dehydration leads to watershed infarcts. Embolic strokes may occur due to arrhythmias as a result of toxic myocarditis. Haemorrhagic stroke as a result of rupture of the unprotected blood vessels especially perforating arteries in acute rise of blood pressure during autonomic storm. DIC also can cause cerebrovascular manifestations.[8-12]

Scorpion envenomation considered a major public health problem in rural parts of India. Appropriate clothing, shoes could prevent the incidence of scorpion sting. Early hospitalization, suspicious of neurological complications, vitals monitoring in intensive care unit and appropriate treatment gives better prognosis.

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