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Wasp sting – Causing a fatal menace

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Abstract:

Wasp stings are seen routinely in emergency setup, especially in developing countries. They result in varied manifestations, including both local and systemic reactions. Neurological complications, like stroke, are infrequent in the presentation. A 40-year-old healthy male presented with two episodes of generalized tonic-clonic seizures with left dense hemiplegia after 6 h of massive wasp stings. Local manifestations of urticaria, redness, and itching were present over the face, neck, and upper limbs. Magnetic resonance imaging showed massive infarct in the anterior and middle cerebral artery regions with right internal carotid artery thrombosis. An echocardiogram showed severe left ventricular dysfunction with no evidence of clot, and the carotid duplex study was normal. Systemic manifestations such as anaphylactic shock, stroke, and myocarditis are rare, fatal, and life-threatening. We must be aware of these most unusual and possible complications following a hymenopteran sting.

Keywords:

Anaphylaxis, ischemic stroke, vascular complications, wasp sting

Introduction

Wasp stings account for millions of cases commonly encountered worldwide. They can cause a mosaic of local and clinical manifestations – these range from mild allergic reactions to anaphylactic shock.[1] Rare systemic complications such as neurological, vascular, cardiovascular, and even multiorgan failures are known to be reported. Most commonly noted are local inflammatory changes. Single or multiple wasp stings can be appropriate to cause severe complications. Neurological manifestations such as stroke are known to be uncommon, and the pathogenesis underlying can be multifactorial. Here, we present a previously healthy male presenting with cerebral ischemia, occurring 6 h after a massive wasp sting.

Case Report

A 40-year-old male, a forest officer by occupation, presented to our emergency ward in a postictal state preceded by three episodes of generalized tonic-clonic seizures (GTCS) at 4 pm, April 18, 2019, with the last one occurring just after arrival to the emergency. His history revealed that he had multiple wasp stings over his forehead, arm, and neck while traveling on a two-wheeler at 9 am on the same day of presentation. He developed mild urticaria and itching. Initially, he was treated at a local hospital at 9.30 am with phenergan and chlorpheniramine and was discharged on an outpatient basis. He was asymptomatic for 6 h. Later at 3 pm, while having a routine conversation with the family, he developed two episodes of GTCS, each episode lasting for 5 min with a 10-min interval in between. It was associated with tongue bite, frothing, and urinary incontinence, following which he was brought to the emergency at 6.15 pm for further management. There was no history of preceding vascular risk factors. There was no history of fever, preceding head trauma, or any other trauma.

On arrival, he had another episode of GTCS at the emergency. He was loaded with fosphenytoin (20 mg/kg) and levetiracetam (30

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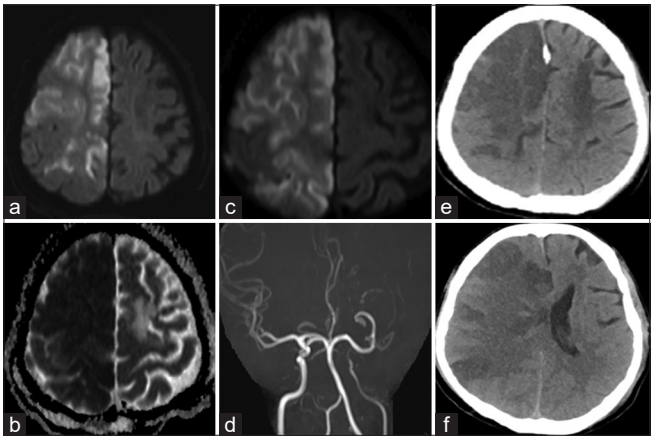

Figure 1: Radiological images of the brain – magnetic resonance-diffuse weighted images (a and c) showing hyperintensities in the right middle cerebral and right anterior cerebral artery regions with the corresponding hypointensity in apparent diffusion coefficient image (b). Magnetic resonance angiography of the carotid vessels showing left internal carotid artery occlusion (d). Computed tomography images of the brain (e and f) showing established infarct in the consistent region with mass effect and effacement of the ventricle

mg/kg), followed by a maintenance dose. Clinically, he was drowsy with a Glasgow Coma Scale of 7/15 (postictal state). He was intubated and placed on mechanical ventilation because of decreased GCS. His blood pressure was low (blood pressure – 60/30 mmHg), which was corrected with intravenous fluids and then it was maintaining at 100/60 mmHg throughout without any inotrope support. He had tachypnea (35/min) and tachycardia (120 beats/min). General examination showed multiple sting bites with urticaria over the face and upper limbs. His pupils were equal on both sides, reacting to light. He was withdrawing right-sided limbs to the painful stimulus with left-sided dense hemiplegia. The left plantar was extensor, and the right was equivocal with no evidence of meningeal signs. His blood investigations were normal. The chest roentgenogram was normal. An electrocardiogram showed ST depression with T wave inversions in leads I, aVL, and V2–V6 with no evidence of arrhythmias. Continuous cardiac monitoring had been done during his stay in the intensive care unit. An echocardiogram showed global hypokinesia with an ejection fraction of 40%. His troponin T levels were grossly elevated – (4,668 pg/ml) – the picture was suggestive of myocarditis. He was put on continuous cardiac monitoring during the stay in the intensive care unit. His magnetic resonance (MR) imaging brain plain with MR angiogram showed acute massive infarct in the right middle cerebral artery and anterior cerebral artery territory [Figure1 a-c] with left internal carotid artery watershed infarcts with left internal carotid artery occlusion with no evidence of dissection [Figure 1 d]. A cardiologist also investigated him during the hospital stay. He was started on intravenous steroids, anti-histamines, antiplatelets, and statins with other supportive measures such as antacids, anti-edema measures, and intravenous fluids. His follow-up computed tomography brain plain showed massive established infarct with mass effect and midline shift of 9 mm [Figure 1e and f]. Decompressive craniectomy was advised, but the patient's attendees were not willing for the same. Due to anaphylactic shock, myocarditis, and massive infarct with raised intracranial pressure, he could not be revived and succumbed to death on April 22, 2020.

Discussion

Wasps belong to the order Hymenoptera, suborder Apocrita, and family Vespidae.[2] They are reported to have either a single sting or a swarm attack. Even though insect stings causing local and systemic allergic reactions are known, very few have reported the implication of systemic and vascular complications such as myocardial infarction or stroke following wasp stings. Wasp venom is a vasoactive inflammatory substance, also known to have a thrombogenic potential. Venom constitutes amines and thrombogenic peptides such as histamine, leukotrienes, thromboxane, and enzymes responsible for thrombogenic changes.[2] The venom also contains allergic proteins such as phospholipase A2, antigen 5, acid phosphatases, and hyaluronidases, which elicit immunoglobulin E response and mast cell activation. This mast cell activation causes the release of vasoactive amines such as histamines, acetylcholine, serotonin, several kinins, leukotrienes, thromboxane, proteins, and *de novo* synthesis of other mediators.[3] Phospholipases in wasp venom cause an anaphylactic reaction. There is an activation of the mast cells leading to the release of histamine and synthesized chemical mediators. These, in turn, cause vasospasm and vasoconstriction of the vasculature, causing ischemic complications. Cardiological manifestations of myocardial infarction, myocarditis, and atrial fibrillation have been reported.[4] The histamines and leukotrienes released from mast cell activation may result in cerebral vessels' vasoconstriction, and consequent cerebral infarction. Neurological complications include ocular myasthenia gravis,[5] optic neuritis,[6] limb numbness, trigeminal neuralgia, and encephalopathy.[7] Others include renal failure, disseminated intravascular coagulation, and multiorgan dysfunction.[8]

Here, cerebral ischemia is known to be rare in occurrence. There are only a few case reports showing the association of wasp sting with ischemic stroke.[9] Possible mechanisms of cerebral ischemia in this case include systemic effects of venom and anaphylaxis, including hemodynamic instability, myocarditis, and potential arrhythmia, causing thromboembolic stroke, hypoperfusion and watershed infarct, and vasculotoxic effects of venom.[10] Treatment includes antiplatelets and statins for the thrombogenic response. Anti-histamines and steroids help treat allergic reaction and prevent vasoconstriction.

Conclusion

Wasp sting may be fatal. Treating physicians must be aware of rare severe systemic manifestations, especially neurological complications such as a stroke, secondary to both allergic and direct toxin reactions. Steroids, anti-histamines, and antiplatelets play a pivotal role in management.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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