

When Small Bugs Cause Big Problems: Tropical Insect Bite Led to Myocarditis

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Abstract

Wasp bite induced allergic reactions or organ dysfunctions are not uncommon in tropical countries. Most people affected with insect bite hardly develop any signs or symptoms; however, about 30 percent of them may show signs of illness which is often overlooked and causes fatality. Among the fatal complications specially anaphylaxis and renal dysfunction have been reported; however, myocardial involvement in the form of myocarditis is very rare. Awareness about such complications is important as these affect the clinical course and outcomes of the patients. We have presented a case of wasp bite induced myocarditis and heart failure here, which was diagnosed at a later stage as patient did not improve being admitted in the emergency department and subsequently transferred to the critical care unit.

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Introduction

Wasps (Vespidae) are venomous stinging insects (class Hymenoptera). Wasp bites are a common form of toxic envenomation in tropical countries.¹ Wasp sting events have occurred world-wide, especially in developing countries with swarm attack.² The clinical manifestation can be local or systemic, which include but not limited to anaphylactic reactions, and serious clinical sequelae like intravascular haemolysis, rhabdomyolysis, thrombocytopenia, acute kidney injury, liver function impairment, myocardial infarction, and myocarditis.¹⁻⁴ Those clinical characteristics are due to the wasp venom toxicity which is attributed to several haemolytic, myotoxic, neurotoxic, vasodilatory, nephrotoxic and hepatotoxic enzymes. Evidence showed that delays in management increase morbidity and might cause fatality. We have presented here a case of wasp bite associated myocarditis and heart failure, which is a rare form of complication in such case; however, the patient could recover with prompt supportive measures following the diagnosis.

Case report

A 29-year-old Bangladeshi male construction worker was admitted to the acute medical unit through emergency department with a history of unknown insect bite in his hands about 12 hours before admitting to the RIPAS hospital at Bandar Seri Begawan of Brunei Darussalam. As per history and captured snap in his mobile phone, he was diagnosed as a case of wasp bite. He had received intravenous fluids, adrenaline, steroids and antihistamines at emergency department; however, he was transferred to the critical care

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unit due to persistent low blood pressure and tachycardia. The ICU team was called when his blood pressure was not improving despite fluid resuscitation and further inotropic support was needed. When he was admitted to ICU, his pulse rate was 121 beats/min, blood pressure was 74/45 mm of mercury and arterial oxygen saturation (SpO₂) was 94%. On auscultation, bilateral basal crackles were noted but x-ray of the chest (P/A view) was normal. His haemoglobin, total leukocyte count, serum urea and serum creatinine were 11.7g/dL, 16,300cells/cu mm, 30mg/dL, and 1.4 mg/dL respectively. Arterial blood gas analysis on admission showed metabolic acidosis. Electrocardiogram showed sinus tachycardia. His serum electrolytes, renal function and liver function tests were found within normal limits. There was mild swelling of the biting hand, but no facial swelling was observed. His ECG shows sinus tachycardia. His cardiac biomarkers were mildly raised. He was treated with IV fluid and albumin supplement, and injectable antibiotic (meropenem) to cover sepsis. Central and arterial lines were placed having intravenous administration of adrenaline and nor-adrenaline. Hydrocortisone and antihistamines were also given.

His clinical condition was deteriorated rapidly within the next 12 hours, and he was intubated due to Type I respiratory failure. His requirement of inotropic support was increasing progressively within 48 hours following admission despite other signs of improvement. Bedside echocardiography revealed global hypokinesia of the left ventricle with mildly decreased contractility and LVEF revealed 30-35% functionality. His serum cardiac troponin T (cTnT) was negative. Repeat ECG showed sinus tachycardia with non-specific ST/T

wave changes. He subsequently developed mild renal impairment, and coagulopathy. A diagnosis of myocarditis was made. However, he improved over next 48 hours with all symptomatic and inotropic support, which was withdrawn after 4 days. He was weaned off ventilator by the 7th day of admission. Repeat echocardiography after 2 weeks of admission revealed improvement functioning myocardium with 55-60% LVEF. He was discharged after 3 weeks of hospital stay as he reverted to his normal conditions.

Discussion

Stinging insect like Apidae (bees) and Vespidae (wasps and hornets) insects belong to the order Hymenoptera and class Insecta. Their venoms are a mixture of amines such as mellitin, apamine, phospholipases, hyaluronidases, acid phosphatase, histamine and kinin. Phospholipase A and surface agent such as mellitin and apamine act on the red cell membrane leading to haemolysis. Coagulopathy has been related to increased level of antithrombin and decreased level of fibrinogen, high molecular weight kininogen, factor V and VII.

Rhabdomyolysis is a direct effect of the venom on the muscular tissues. Other manifestation can be renal failure due to acute tubular necrosis because of hypotension or pigment nephropathy resulting from rhabdomyolysis or intravascular haemolysis.^{3,5-7} Most people affected with insect bite hardly develop any signs or symptoms; however, about 30 percent of them may show signs of illness which is often overlooked and causes fatality. Among the fatal complications specially anaphylaxis and renal dysfunction have been reported; however, myocardial involvement in the form of myocarditis is very rare.^{7,8}

Wasp bite induced cardiac complications have been reported in some literature.⁹⁻¹² Myocardial involvement was really critical in those previously healthy patients. Direct toxic effects of the venom on myocardium seemed like culprits. Deficient coronary perfusion secondary to anaphylactic shock leads to acute myocardial infarction and other sequelae. Also, acute pulmonary oedema can occur secondary to anaphylactoid reaction or left heart failure in some.

Anaphylaxis is a life-threatening emergency needing immediate treatment. Immediate summoning of the emergency medical services is generally indicated. The first steps of treatment are cardiopulmonary resuscitation (severity grade IV), epinephrine administration (grade II or above; usually given intramuscularly by the first helper on the scene), and, as soon as possible, shock positioning and the placement of an intravenous catheter (all grades).^{3,4} In our patient, treatment of anaphylaxis unmasked myocardial involvement as shock did not improve on expected lines. Tachycardia, non-specific ST/T wave changes on electrocardiogram, signs of heart failure, diffuse myocardial involvement and decreased LV function suggested a diagnosis of myocarditis. It could be due to diffuse coronary spasm or direct effect of toxins on myocardium. Gradual improvement was observed with inotropic and supportive management and a complete recovery happened over next 3 weeks, which are concordant with the diagnosis of myocarditis. As patient never had fever and other related clinical manifestations, common infectious causes of myocarditis were not considered in this case.

Conclusion

The treatment of wasp bite is timely management of anaphylaxis and supportive therapy for organ related complications e.g., dialysis for acute

kidney injury etc. It is likely that individuals with comorbidities would be at higher risk for development of complications. Our case highlighted a rare cardiovascular complication associated with wasp sting envenomation. Hence, a thorough cardiovascular evaluation is essential in patients stung by wasps. There could be some factors which could predispose the patient to cardiac complications, or the wasp venom may contain certain toxins affecting the heart.

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