

CLINICAL IMAGES

A Wasp Sting and a Broken Heart



A 60-year-old woman with known allergy to honeybee venom was stung on her right hand by a “wasp” while gardening. She suffered a syncopal spell and was transported by emergency medical services to the closest hospital. The patient had no other allergies and gave a medical history of osteoarthritis and mild hypertension managed with nonsteroidal anti-inflammatory agents and hydrochlorothiazide, respectively. On arrival in the emergency department, the patient was hypotensive (systolic blood pressure < 100 mmHg) with inverted T-waves on her electrocardiogram. The patient was treated with intravenous fluids (500 mL of normal saline), intravenous boluses of diphenhydramine (25 mg), and dexamethasone (2 mg), and a single intramuscular injection of 0.3 mL of a 1:1000 dilution of epinephrine (0.3 mg). Despite initial positive response

to rehydration and medication, the patient developed hemolysis and acute oliguric renal failure requiring hemodialysis 12 hours after admission. Recovering from renal failure 10 days later, the patient became tachycardic (heart rate > 120 bpm) and hypotensive (systolic blood pressure < 100 mmHg), and an apical balloon configuration of the left ventricle was found during cardiac catheterization performed to rule out acute myocardial infarction (Figure 1).¹ Cardiac damage biomarkers, including troponin, were not significantly elevated. Coronary angiography did not find evidence of coronary artery disease or vasospasm. Within 5 days, the patient recovered completely from both renal and cardiovascular toxicity and was discharged. A consulting allergist/immunologist recommended Hymenoptera venom immunotherapy as an outpatient.

What Are Your Diagnoses?



Figure 1. Left ventriculography during cardiac catheterization at systole that demonstrates apical ballooning akinesis with basal hyperkinesis. This was not the left ventriculogram during the cardiac catheterization of the case reported. Photograph by Steven Fruitsmaak (public domain).

DIAGNOSES

Kounis syndrome with acute renal failure and takotsubo cardiomyopathy (“octopus pot heart”) due to Hymenoptera venom allergy.

Discussion

Most people are stung by bees, wasps, or hornets (order Hymenoptera) during their lifetimes and experience only local, short-lived symptoms.² Significant allergic reactions with regional edema and urticaria will, however, develop in less than 10% of individuals stung by Hymenoptera. Potentially fatal systemic allergic reactions, such as anaphylactic shock, may occur in less than 10% of individuals who are stung.² The most unusual manifestations of hymenoptera venom allergy include Kounis syndrome with or without takotsubo or octopus pot heart cardiomyopathy.^{2,3}

The risk factors for significant allergic reactions to Hymenoptera venom have been identified as multiple prior stings in predisposed beekeepers and gardeners, previous allergic reactions to Hymenoptera stings, elevated baseline serum tryptase levels (>10 ng/mL), mastocytosis, and antihypertensive therapy with angiotensin-converting enzyme inhibitors and possibly β -blockers.² In the case presented, the patient exhibited 2 of these risk factors for Hymenoptera venom allergy: prior Hymenoptera stings as an outdoor gardener, and known allergy to honeybee (order Hymenoptera, family Apidae) venom.

In 2006, N.G. Kounis, a cardiologist, described mast cell activation and measured several inflammatory mediators in the serum and urine of patients with acute-onset angina pectoris and acute myocardial infarction.⁴ Kounis noted several similarities between acute coronary syndromes associated with chemokine releases and other causes of mast cell activation, such as allergic hypersensitivity reactions and anaphylactoid and anaphylactic reactions to foreign proteins, including Hymenoptera venoms, radiographic contrast agents, chemicals, and medications.⁴

Despite the similarities that Kounis described in the chemical inflammatory mediators associated with both cardiac ischemic and acute allergic events, Kounis syndrome remains incompletely understood and may actually represent unusual manifestations of pre-existing cardiac pathology exacerbated by atypical atopic responses to foreign proteins.⁵ Future descriptions of similarly documented outcomes following atopic challenges will be required to confirm Kounis’s findings.⁵

In 2011, Kounis et al described 3 distinct variants of the Kounis syndrome: Type I. Vasospastic allergic angina;



Figure 2. Traditional Japanese octopus trapping pot or takotsubo. The shape of the octopus pots resembles the characteristic systolic left ventriculogram described in cases of takotsubo or octopus pot cardiomyopathy. Source: National Library of Medicine of the National Institutes of Health (public domain).

Type II. Allergic myocardial infarction; and Type III. Coronary artery stent thrombosis with the stent-occluding thrombus infiltrated by eosinophils and mast cells.⁴ In very rare cases of Kounis syndrome, a distinctive transient cardiomyopathy without myocardial infarction, now known as takotsubo or octopus pot heart cardiomyopathy may occur.³



Figure 3. The lesser banded hornet, *Vespa affinis*, is widely distributed throughout Southeast Asia, and is responsible for the highest number of deaths after Hymenoptera stings in Sri Lanka. In addition to fatal anaphylactic shock, its stings have been followed by acute pulmonary edema, acute oliguria renal failure, and Kounis syndrome with and without takotsubo or octopus pot cardiomyopathy. This image was not the implicated Hymenoptera species in the case reported. Public domain image.

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