



Acute kidney injury and rhabdomyolysis due to multiple wasp stings

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Abstract

In most patients, wasp stings cause local reactions and rarely anaphylaxis. Acute kidney injury and rhabdomyolysis are unusual complications of wasp stings. We report a case of acute kidney injury and rhabdomyolysis secondary to multiple wasp stings. A 55-year-old farmer developed multi organ dysfunction with acute kidney injury and rhabdomyolysis 3 days after he had sustained multiple wasp stings. The etiology of acute kidney injury is probably both rhabdomyolysis and acute tubular necrosis. He improved completely after hemodialysis and intensive care.

Keywords: Acute kidney injury, pigment nephropathy, rhabdomyolysis, wasp stings

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Introduction

Bees and wasps commonly sting because an intruder has neared the hive or nest, which has become quite common in India due to its large rural population and increasing deforestation. Insect stings belonging to hymenoptera such as wasps, yellow jackets, bees, or hornets are generally associated with local reactions and occasionally anaphylaxis. Systemic complications such as acute renal failure, liver dysfunction can rarely occur following multiple stings. Late diagnosis and delayed treatment increases morbidity and may prove fatal in many cases.

Case Report

A 55-year-old farmer attended our emergency department with history of multiple wasp stings on his right shoulder and trunk, while working in his fields. He developed severe pain and swelling at the site of the bites. Initially, he was treated at a nearby hospital with oral antihistamines, steroids, and local anesthetic application.

At 3 days later, patient developed progressive oliguria and swelling of the face and legs. Past medical history was unremarkable.

On examination, patient was afebrile with pedal edema. His pulse rate was 94/min, respiratory rate 18/min and blood pressure of 126/82 mm of Hg. 51 sting marks were found on the posterior aspect of neck, anterior aspect of right forearm, both anterior and posterior aspect of his right shoulder and chest wall [Figure 1]. The systemic examination was normal.

Investigations revealed hemoglobin 10.8 g/dl, total count 8320 cells/mm³, blood urea 224 mg/dl, serum creatinine 6.2 mg/dl, serum sodium 136 meq/L, potassium 6.2 meq/L, serum bilirubin 2.2 mg/dl, aspartate aminotransferase 689 IU/L, alanine aminotransferase 864 IU/L, lactate dehydrogenase (LDH) 1640 IU/L, and creatinine kinase (CPK) 89252 IU/L. His 24 h urine volume was 210 ml. His arterial blood gas analysis showed pH 7.31, pCO₂ 24 mmHg, and HCO₃ 12 meq/L. Urine examination showed 2+ proteinuria with dark granular casts. Coagulation profile was normal. Myoglobin level was not done due to nonavailability.

The patient had progressively worsening renal failure and remained oliguric in spite of adequate hydration. Hence, the patient was initiated on intensive hemodialysis,

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and treated with antibiotics, antihistamines, and diuretics. He received a total of eight sessions of hemodialysis over a period of 2 weeks. Gradually, his urine output improved and his serum CPK levels were 12,266 IU/L, 876 IU/L, and 233 IU/L on 5th, 7th, and 14th day after admission, respectively [Table 1]. He was discharged after 2 weeks of hospitalization with serum creatinine of 2.8 mg/dl and urine output >1.5 L/day. His serum creatinine during the last follow-up was 1.0 mg/dl.

Discussion

Bee and wasp stings are commonly observed in our country and are potential environmental hazard. Stinging insects belong to the order Hymenoptera and class *Insecta*. Hymenoptera insects include *Apidae* (bees) and *Vespidae* (wasps and hornets). These patients usually develop allergic local reactions. Very few patients can develop systemic complications after insect stings.

When these insects sting a person, they inject venom under the skin. Their venom is a concentrated mixture of various biogenic amines, such as melittin, apamine, phospholipases, hyaluronidase, acid phosphatase, histamine, and kinin.^[1] These have direct and indirect hemolytic effects, neurotoxic, and vasoactive properties. Phospholipase A and surface agents such as mellitin and apamine act on red cell membranes leading to hemolysis.^[2] Though the exact mechanism of rhabdomyolysis is unknown, it is probably due to direct toxic effect of venom on muscular tissue. The systemic manifestations are seen only in patients with more than 50 stings and the potentially lethal number of stings has been estimated to be 500.^[2]



Figure 1: Multiple wasp stings on front and back of right shoulder and chest

Common manifestations of hypersensitivity reactions to toxins of insects range from local swelling to angioedema and anaphylaxis. Pain occurs immediately followed by erythematous papular lesions accompanied by urticaria and edema of varying degrees, which resolve in 4-6 h.

Wasp stings can result in multi system involvement ranging from hemolysis, rhabdomyolysis, acute renal failure, disseminated intravascular coagulation, myocardial dysfunction, hepatic dysfunction, and thrombocytopenia, which may occasionally become fatal. Acute kidney injury can occur due to acute tubular necrosis secondary to shock, or pigment nephropathy resulting from rhabdomyolysis and intravascular hemolysis, interstitial nephritis from a hypersensitivity reaction to the wasp venom, or direct nephrotoxicity of venom. Acute cortical necrosis has also been reported following wasp stings.^[3] Other systemic manifestations include myocardial necrosis and infarction, centrilobular necrosis of liver, and thrombocytopenia as a result of direct platelet toxicity.^[4]

In a review of previously reported 24 cases of wasp sting, hemolysis and rhabdomyolysis were observed in 14 out of 21 evaluated cases and 11 out of 19 evaluated cases, respectively.^[5] Abnormal liver function tests were observed in almost all cases.^[5] The most common histological diagnosis was acute tubular necrosis, though acute interstitial nephritis, acute cortical necrosis, and thrombotic microangiopathy have also been reported.

Management of these patients includes early correction of hypotension, forced alkaline diuresis in case of rhabdomyolysis and hemolysis, and hemodialysis if required. In a large case series of 75 patients from China, 7 (9.3%) died, and 8 (10.7%) developed chronic kidney disease (CKD).^[6] Most other patients survived with complete recovery of their kidney function. Further analysis showed no difference in the mortality rates between the modality of dialysis (continuous and intermittent with or without plasma exchange). Wasp sting fatality rate has been found to be 0.02 and 0.2 per million population per year in an Australian study and Swedish registry, respectively.^[7,8] Even though, wasp stings are quite common there are no such data available from India.

Table 1: Laboratory results during the course of illness

Day	Blood urea (mg/dl)	Serum creatinine (mg/dl)	Serum bilirubin (mg/dl)	Aspartate aminotransferase (IU/L)	Alanine aminotransferase (IU/L)	Lactate dehydrogenase (IU/L)	Creatinine phosphokinase (IU/L)
On admission	224	6.2	2.2	689	864	1640	89252
5	140	4.6					12266
7	122	4.4	1.4	68	42		876
14	64	2.8	0.8	33	30	206	233
28	22	1.0	0.9				145

Since a kidney biopsy was not done, we could not identify the exact mechanism of acute renal failure in our patient. Since, the muscle enzymes (CPK, and LDH) were highly elevated, and there was no evidence of hemolysis or no prior episode of hypotension, our patient developed acute kidney injury probably secondary to rhabdomyolysis causing pigment nephropathy and acute tubular necrosis.

Conclusion

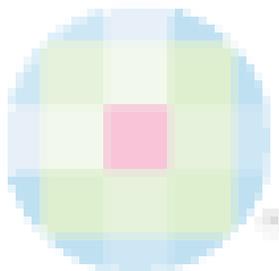
Patients who have sustained multiple stings by bees or wasps should seek medical care as early as possible, even if they are apparently normal. Primary as well as emergency care physicians must be well aware of these complications and investigate actively to exclude anaphylaxis, damage to the kidneys, blood, liver, and muscles. This case report highlights the importance of early recognition and treatment of acute kidney injury as delay in management may lead to CKD and mortality in a significant number of patients.

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