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Case Study

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"SILENT SWARM, SEVERE STORM: A RARE CASE OF ACUTE KIDNEY INJURY AND RHABDOMYOLYSIS FOLLOWING MULTIPLE WASP STINGS"

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ABSTRACT

Background: Wasp stings typically cause local allergic reactions, but mass envenomation can occasionally result in severe systemic complications. Rhabdomyolysis and acute kidney injury (AKI) are rare yet life-threatening sequelae of multiple wasp stings, with limited case reports in literature today. **Case Presentation:** We report the case of a 50-year-old woman with no prior comorbidities who presented with systemic symptoms following multiple wasp stings. Laboratory investigations revealed markedly elevated creatine phosphokinase (CPK) levels, progressive renal dysfunction and leukocytosis. Despite initial worsening renal function, the patient responded to conservative management including aggressive hydration, urine alkalinization, corticosteroids and antibiotics. Renal replacement therapy (RRT) was advised if further worsening. Her renal function gradually improved and she was discharged with stable parameters and continues to remain under follow-up. **Conclusion:** This case highlights that mass envenomation from wasps can cause rhabdomyolysis-induced AKI even in immunocompetent hosts and early recognition combined with timely supportive care can reverse renal dysfunction without dialysis**.** Clinicians should be alert to delayed systemic manifestations following multiple stings. In select patients, non-oliguric presentation, preserved hemodynamics and proactive monitoring may allow for full recovery without invasive intervention.

INTRODUCTION

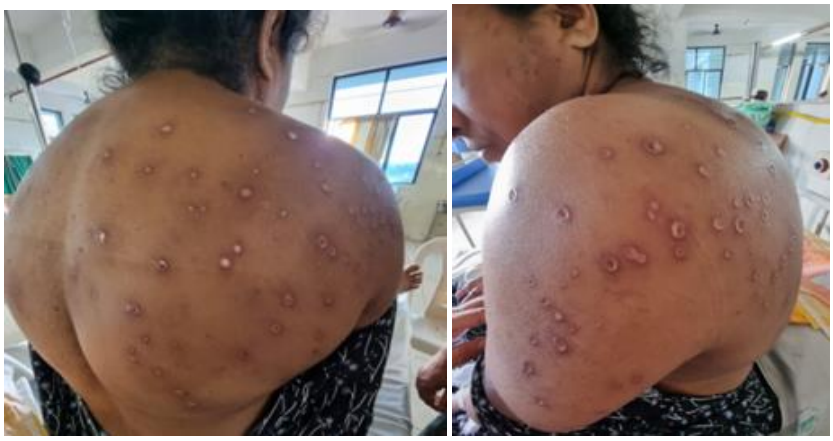
Mass envenomation due to multiple wasp stings is a rare but potentially life-threatening medical emergency. While local pain and allergic manifestations are common, systemic toxicity can manifest as rhabdomyolysis, intravascular hemolysis, liver dysfunction, coagulopathy and acute kidney injury (AKI). Pigment nephropathy resulting from myoglobinuria and hemoglobinuria is the most recognized mechanism of AKI in this setting. This case adds to the growing body of evidence that early and aggressive supportive care can reverse potentially severe outcomes.

CASE REPORT

A 50-year-old female with no known comorbidities presented to the emergency department with facial puffiness and fever three days after sustaining multiple wasp stings over her entire body at home. She was initially treated at a local facility with oral antihistamines and corticosteroids.

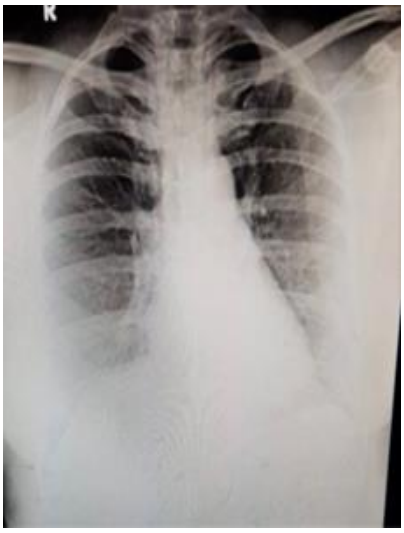
On examination

- **General:** Febrile, facial puffiness
- **Vitals:** Pulse – 72/min, BP – 160/100 mmHg
- **Systemic examination:** Normal
- **Local:** Multiple inflamed and infected sting wounds over the back and bilateral upper limbs



Investigations on admission revealed

- Serum creatinine: 8.0 mg/dL
- Urea: 174 mg/dL
- CPK: 5369 U/L
- LDH: 814 U/L
- Total leukocyte count: 13,450/mm³
- Serum potassium: 4.62 mmol/L
- Urine myoglobin: Negative
- Ultrasound: Bilateral grade I renal parenchymal changes
- Renal Doppler: No evidence of renal artery stenosis



Management

The patient was started on:

- Intravenous fluids with strict input-output monitoring
- Urine alkalinization with sodium bicarbonate
- Broad-spectrum intravenous antibiotics
- Oral corticosteroids
- Antihypertensive medications

Renal replacement therapy was suggested due to progressive azotemia but was declined by the patient and patient party. Despite this, her CPK levels showed a steady decline with continued hydration. There was no further oliguria or anuria throughout the course.

Trend of laboratory values

Day	CPK	UREA	Creatinine	S.K	Input	Output
1st day	5369	174	8	4.62	3600	2500
2nd day	1868	178	8.8	4.43	4800	3450
3rd day	573	169	8.9	4.9	4200	3100
5th day	134	167	9.63	4.93	2500	4600

7th day	87	159	9.95	4.93	2400	4350
10thday		142	10.45	5.88	2500	4200
12th day		144	10.91	4.81	2000	3100
15th day		153	9.8	4.35	2500	3600
17th day		156	8.8	4.35	2500	3250
27th day		123	6.5			

By the 4th week, patient's creatinine began to improve without dialysis. At follow-up on after 15 days to OPD, serum creatinine was improved to 2.3 mg/dL and she remained asymptomatic.

DISCUSSION

Wasp stings, though often regarded as minor allergic insults, can lead to devastating systemic complications in cases of mass envenomation, as seen in our patient. Rare but increasingly reported in tropical regions like South and Southeast Asia, multiple stings can result in rhabdomyolysis**,** acute kidney injury (AKI)**,** liver dysfunction and coagulopathy due to the systemic effects of venom components. Wasp venom contains a potent mix of biologically active substances—including melittin, phospholipase A2, hyaluronidase**,** and mastoparan—which promote cellular lysis**,** inflammation**,** and vascular injury, precipitating multi-organ dysfunction.

In a landmark study by Vikrant et al., 42.5% of 50 patients with wasp stings developed AKI, and over 60% required dialysis. Mortality was associated with oliguria, hepatic dysfunction, and coagulopathy.[1] Similarly, Pramanik et al. reported AKI in seven of 16 patients with wasp stings; two required renal replacement therapy (RRT) and one succumbed to multi-organ failure.[2]

In contrast, our patient—despite a peak serum creatinine of 10.91 mg/dLand CPK of 5369 U/L—recovered fully with conservative management alone, without dialysis. She remained non-oliguric through out her illness, which likely played a protective role**,** allowing the avoidance of RRT. This outcome aligns with a smaller subset of previously reported cases that responded favourably to early IV hydration, urine alkalinisation and close monitoring**,** even with significant biochemical derangement.

The pathogenesis of rhabdomyolysis in wasp envenomation is primarily due to direct myotoxicity from venom components, compounded by systemic inflammation, oxidative stress and hypovolemia. This leads to the release of CPK, myoglobin, potassium and other intracellular contents into circulation. Myoglobin, when filtered through the kidneys, contributes to pigment nephropathy via: Tubular obstruction by myoglobin casts, Direct tubular epithelial toxicity, Renal vasoconstriction.

While urine myoglobin was negative in our patient, this is not uncommon and can be explained by its rapid clearance, binding to plasma proteins**,** or delayed sampling**.** CPK levels remain a more reliable and sensitive marker of muscle injury in such cases.[3,4]

Bosch et al**.** highlighted that myoglobin-induced acute tubular necrosis (ATN) is exacerbated by hypovolemia and acidic urine, further supporting the role of aggressive fluid resuscitation and urine alkalinization in management.[3] Huerta-Alardín et al.also emphasized that CPK is more dependable than urine myoglobin in diagnosing rhabdomyolysis.[5]

Another possible mechanism of AKI is acute interstitial nephritis (AIN)**,** which has been documented in biopsy-proven cases. Trivedi et al. and Kumar et al. reported cases of wasp sting-induced AIN that responded well to corticosteroids, indicating an immune-mediated renal injury in select patients.[6,7] Although a renal biopsy was not performed in our patient, the use of oral corticosteroids and her favourable response raise the possibility of a component of AIN.

AKI from wasp envenomation typically develops within 48–72 hours**.** The mainstay of treatment includes: Aggressive IV fluid therapy to preserve renal perfusion, Urinealkalinization with sodium bicarbonate to prevent myoglobin precipitation, monitoring and correction of electrolytes and early consideration of dialysis if oliguria or uremia develops.

Our case illustrates that not all patients with severe AKI and high creatinine require dialysis**.** Factors such as preserved urine output**,** hemodynamic stability and early intervention may allow for full recovery without RRT. The use of corticosteroids may be beneficial in cases with suspected AIN, even though it is not routinely recommended.

Other reports offer a broader clinical context. Chatterjee and Natarajan described oliguric AKI requiring dialysis[8], while Kularatne et al.reported hemoglobinuria contributing to renal damage.[9] Pediatric cases from Bhatta et al.and Mishra et al. showed higher dialysis requirement and even progression to chronic kidney disease, highlighting age and reserve as important prognostic factors.[10,14] Das et al. presented a case

involving both rhabdomyolysis and hemolysis with delayed recovery.[11]

Importantly, standard references such as Harrison's[12] and Goldfrank'sToxicologic Emergencies[13] emphasize timely hydration, urine alkalinization and treatment of secondary infections—interventions central to the recovery of our patient, who also had multiple infected sting sites treated with antibiotics.

This case underscores a vital clinical lesson: multiple wasp stings are not always benign and systemic toxicity can escalate silently beneath minimal external signs**.** Early identification of rhabdomyolysis, guided by elevated CPK even in the absence of myoglobinuria and timely initiation of supportive measures can prevent irreversible renal damage and obviate the need for dialysis**.** While the venom was potent, it was the speed and precision of clinical response that dictated the outcome. In an era of aggressive intervention, this case reminds us that not all critical renal insults require invasive rescue—sometimes, vigilant observation and timely basics are the most powerful therapy.

CONCLUSION

Multiple wasp stings can trigger life-threatening rhabdomyolysis and AKI, even in healthy individuals. In this case, early recognition, prompt IV hydration**,** urine alkalinisation and targeted antibiotics for secondary skin infections led to full recovery without dialysis**,** despite a creatinine peak of 10.9 mg/dL. The absence of oliguria and rapid supportive care were key. This case underscores that timely intervention can reverse venom-induced AKI and empirical antibiotics should not be overlooked in the setting of envenomation-related soft tissue infection. Always think beyond allergic reactions systemic toxicity can strike silently but swiftly. Clinicians should maintain a high index of suspicion for systemic envenomation effects in any patient presenting with multiple wasp stings, even if they appear stable initially. Serial labs, early hydration, urine alkalinisation and close observation can prevent progression to severe renal damage. Public health education on the dangers of wasp nests and rapid response to envenomation may help reduce the burden of such life threatening complications.

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