

# Acute kidney injury following massive honeybee envenomation in a child: A case report

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International Journal of Science and Research Archive, 2026, 20(01), 904–907

Publication history: Received on 13 June 2026; revised on 25 July 2026; accepted on 27 July 2026

Article DOI: <https://doi.org/10.30574/ijrsra.2026.20.1.1532>

## Abstract

Massive honeybee envenomation is an uncommon but potentially life-threatening medical emergency. Although most bee stings are self-limiting, massive honeybee envenomation may cause severe systemic toxicity and can be life-threatening (1–3). Acute kidney injury (AKI) is one of the most serious complications and requires prompt recognition and supportive management (2). We report an 8-year-old previously healthy boy who sustained more than 100 honeybee stings and subsequently developed AKI, acute liver injury, intravascular haemolysis, and thrombocytopenia. He was managed conservatively with supportive therapy and blood transfusions, resulting in complete recovery of renal function and normalisation of laboratory abnormalities. This case shows the importance of early recognition, early supportive management, and close monitoring in children with severe honeybee envenomation

**Keywords:** Honeybee sting; Acute kidney injury; Paediatric; Bee venom; Multiple bee stings; Envenomation

## 1 Introduction

Bee stings are common worldwide and usually produce localized pain, erythema, and swelling (1). However, massive honeybee envenomation can cause severe systemic toxicity because of the large amount of venom inoculated (1,2). Bee venom contains several biologically active substances, including melittin, phospholipase A<sub>2</sub>, hyaluronidase, apamin, and vasoactive peptides, which can induce direct tissue injury and trigger systemic inflammatory responses (1).

Children are particularly vulnerable because the venom dose per kilogram of body weight is relatively higher than in adults (2). Severe envenomation may result in acute kidney injury, rhabdomyolysis, intravascular haemolysis, hepatic dysfunction, coagulopathy, thrombocytopenia, and multiorgan dysfunction (2,3). Acute kidney injury is among the most serious complications and contributes significantly to morbidity following massive bee stings (2).

We report a child who developed severe multi-system toxicity after sustaining more than 100 honeybee stings and recovered completely following conservative supportive management.

## 2 Case Report

We report the case of an 8-year-old previously healthy boy who was attacked by a swarm of honeybees while playing outdoors. He sustained more than 100 bee stings, predominantly affecting the face and neck, with additional stings involving the back (Figure 1).

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**Figure 1** Clinical photograph obtained on admission showing marked swelling of the face, neck, and lips following multiple honeybee stings. Prominent periorbital oedema and diffuse facial soft tissue swelling are evident, consistent with a severe local reaction after massive honeybee envenomation.

Immediately after the attack, he developed severe pain and swelling of the whole face and neck. The bee stingers were promptly removed, and he received oral paracetamol, intravenous antihistamines, and intravenous dexamethasone for symptomatic relief.

The following day, he developed nausea, vomiting, abdominal pain, progressive facial puffiness, periorbital oedema, and reduced urine output, prompting hospital admission.

Laboratory investigations revealed leukocytosis ( $16,500/\text{mm}^3$ ) and thrombocytopenia ( $45,000/\text{mm}^3$ ). Liver function tests demonstrated marked hepatocellular injury with alanine aminotransferase (ALT) of 6,139 U/L and aspartate aminotransferase (AST) of 3,643 U/L. The international normalized ratio (INR) was prolonged at 1.9. Renal function tests showed acute kidney injury with a serum creatinine of 2.8 mg/dL and blood urea nitrogen (BUN) of 74 mg/dL.

There was also evidence of intravascular haemolysis, which included progressive anaemia, with haemoglobin declining from 9.2 g/dL to 5.2 g/dL, dark-coloured urine, elevated unconjugated bilirubin (2.58 mg/dL of a total bilirubin of 2.92 mg/dL), and lactate dehydrogenase (LDH) of 1,710 IU/mL.

Based on the clinical presentation and laboratory findings, the child was diagnosed with severe systemic honeybee envenomation complicated by acute kidney injury, acute liver injury, intravascular haemolysis, thrombocytopenia, and coagulopathy.

The patient was managed conservatively with supportive therapy, including careful fluid management, analgesia, broad-spectrum antimicrobials, correction of electrolyte abnormalities, nutritional support, and close monitoring of renal, hepatic, and haematologic parameters. Three units of packed red blood cells were transfused to correct severe anaemia secondary to haemolysis.

Cutaneous symptoms, including persistent pain, erythema, swelling, and pruritus at the sting sites, were treated with topical emollients and oral antihistamines.

Urine output gradually improved over the following three days, accompanied by progressive recovery of renal function. Serial laboratory investigations demonstrated normalization of renal function, liver enzymes, platelet count, coagulation profile, and haemoglobin concentration. The periorbital oedema and diffuse facial soft tissue swelling also resolved significantly (Figure 2).



**Figure 2** Follow-up clinical photograph demonstrating significant improvement in facial, periorbital, neck, and lip oedema after supportive treatment, with near-complete resolution of the swelling.

The child was discharged on day thirteen of admission in good clinical condition with normal urine output. At follow-up, he remained clinically well with normal renal function.

### 3 Discussion

Massive honeybee envenomation is an uncommon but potentially fatal condition resulting from the toxic effects of large quantities of bee venom (1,2). Unlike isolated bee stings, which usually produce localized reactions or IgE-mediated hypersensitivity, massive envenomation causes direct systemic toxicity involving multiple organs (1).

Acute kidney injury is one of the most frequently reported severe complications following multiple bee stings (2,3). The underlying mechanisms include direct nephrotoxicity of bee venom, acute tubular necrosis, renal ischaemia, pigment nephropathy secondary to intravascular haemolysis and rhabdomyolysis, and systemic inflammatory responses (2,3). In our patient, acute kidney injury occurred together with laboratory evidence of haemolysis, suggesting a multifactorial pathogenesis.

Massive bee envenomation may also affect several other organ systems. Our patient developed marked hepatic dysfunction, thrombocytopenia, coagulopathy, and intravascular haemolysis, illustrating the multi-system nature of severe bee venom toxicity (1–5). Similar complications have been described in both paediatric and adult patients following massive bee attacks (3–7).

Management of severe bee envenomation is primarily supportive and includes early removal of retained stingers, adequate hydration, analgesia, correction of electrolyte abnormalities, blood transfusion when indicated, and close monitoring of organ function (2). Although renal replacement therapy may be required in patients who develop persistent or severe acute kidney injury (2–7), our patient demonstrated progressive improvement in urine output and renal function within three days of supportive management alone, without requiring dialysis. In our setting, early supportive management and close monitoring were associated with complete recovery of renal function without the need for dialysis.

Several paediatric cases with severe bee venom-induced acute kidney injury have been reported from Africa and other parts of the world (4–7). A similar case from Tanzania described successful recovery following appropriate supportive management in a resource-limited setting (6). Our case further contributes to the limited literature by demonstrating that severe multi-system involvement, including acute kidney injury, liver injury, and haemolysis, can resolve completely with early supportive care and close clinical monitoring.

## 4 Conclusion

Massive honeybee envenomation can result in severe multi-system toxicity involving the kidneys, liver, and haematologic system (1,2). Acute kidney injury is an important complication that requires early recognition and close monitoring (2). This case demonstrates that severe bee venom-induced acute kidney injury and associated multi-organ dysfunction may recover completely with timely supportive management, emphasizing the importance of early diagnosis, vigilant monitoring, and appropriate multidisciplinary care (2,3,6).

## Compliance with Ethical Standards

### *Acknowledgement*

The authors sincerely acknowledge Tumbi Regional Referral Hospital for granting ethical approval and administrative permission to publish this case report. We are also grateful to the child's parents for providing consent to publish this case report for educational purposes. Furthermore, we acknowledge all healthcare workers involved in the diagnosis, management, and follow-up of the patient.

### *Disclosure of Conflict of Interest*

No conflict of interest to be disclosed.

### *Statement of Ethical Approval*

Ethical approval for publication of this case report was obtained from the relevant institutional authorities at Tumbi Regional Referral Hospital.

### *Statement of Informed Consent*

Written informed consent for publication of this case report and the accompanying clinical images was obtained from the patient's parents. Patient confidentiality and anonymity have been maintained throughout the preparation and publication of this manuscript.

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