Case report

Wasp sting-induced rhabdomyolysis and acute liver injury in a young, healthy patient: An uncommon case.

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Abstract

Wasp stings represent a significant environmental hazard in Sri Lanka. While the majority of individuals experience only localized symptoms, a subset may exhibit allergic reactions of varying severity. In rare instances, these reactions can escalate to life-threatening complications. Rhabdomyolysis, a severe consequence of muscle injury induced by wasp venom, necessitates early diagnosis and prompt intervention to mitigate potential fatalities. We present the case of a 32-year-old male with no prior health issues who was admitted following multiple wasp stings. On the second day of admission, he developed rhabdomyolysis and hepatic injury. With appropriate fluid management, the patient made a full recovery. This case underscores the importance of timely intervention in managing the severe complications of wasp stings.

Keywords: Wasp sting, liver injury, rhabdomyolysis

Introduction

Sri Lanka, a tropical agricultural nation in Southeast Asia, boasts a vast biodiversity, including 11,500 insect species, among which the Hymenoptera order is well-represented [1]. This order encompasses wasps, bees, hornets, and ants with over 25,000 wasp species identified globally [2]. The majority of wasps and bees are colonial, and stinging is a common defensive response when their nests or colonies are disturbed. The female wasp is typically responsible for the sting [2].

Rhabdomyolysis constitutes a life-threatening clinical emergency precipitated by muscle damage. This damage can result from a variety of conditions, including crush injuries, strenuous exercise, burns, status epilepticus, certain medications such as statins and antimalarial drugs, and stings from bees or wasps. The condition is characterised by the leakage of intracellular muscle constituents into the circulation due to rapid muscle breakdown.

Most wasp stings result in mild, transient local reactions. However, rare cases can present as life-threatening severe anaphylaxis and systemic complications such as acute kidney injury, liver injury, rhabdomyolysis, and myocardial infarction [3].
phosphokinase, lactate dehydrogenase, and aspartate transaminase [4].

Aggressive fluid management plays a pivotal role in preventing acute kidney injury. However, severe cases may necessitate forced alkaline diuresis and haemodialysis to mitigate morbidity and mortality [5]. This case underscores the importance of prompt intervention and appropriate management strategies in the treatment of rhabdomyolysis.

Case history

A 32-year-old previously healthy patient from the Eastern province of Sri Lanka was transferred from the local hospital for further management of multiple wasp stings. He was stung by more than 20 wasps on the face, chest and back of the chest while he was working in his garden. At first, he experienced pain, swelling and redness at the sting sites. Then he developed generalised itching with urticarial rashes and wheeze. At the local hospital he was conscious and rational. His pulse rate was 88 bpm and his blood pressure was 110/70 mmHg. However, he had bilateral rhonchi on auscultation of the lung. Initially he was treated with intravenous hydrocortisone 200mg and intravenous chlorpheniramine 10mg with salbutamol nebulisation. He was given 250 ml normal saline bolus, then 100/Hour infusion continued. After initial management, the patient was transferred to a tertiary care hospital for further management.

Upon admission, the patient was haemodynamically stable. There were multiple circumscribed punctate lesions noted at the sting sites, including three on the face, eight on the front of the chest and eleven on the back of the chest (Figure 1).

Laboratory investigations revealed elevated transaminase levels and a rising trend in creatine phosphokinase. Given these findings with clinical features, the possibility of rhabdomyolysis induced by wasp stings was considered, particularly in light of the increasing creatine kinase levels (Table 1).

**Figure 1:** Multiple Wasp sting sites on the back of the chest of the patient. (Note the circumscribed punctated nature of the lesions, typical for wasp stings)

On the second day of admission, he reported generalized fatigue, arthralgia, and myalgia. However, there was no muscle weakness or dark coloured urine. Urine output was adequate.

**Table 1:** Blood investigations of the patient

<table>
<thead>
<tr>
<th>Laboratory tests</th>
<th>On admission</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 14</th>
<th>Normal ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood urea (mmol/L)</td>
<td>4.4</td>
<td>6.0</td>
<td>N/A</td>
<td>2.7</td>
<td>2.8</td>
<td>1.8 - 6.3</td>
</tr>
<tr>
<td>Serum creatinine (µmol /L)</td>
<td>101</td>
<td>113</td>
<td>83</td>
<td>77</td>
<td>62-115</td>
<td></td>
</tr>
<tr>
<td>Alanine aminotransferase (ALT) (U /L)</td>
<td>47</td>
<td>47</td>
<td>580</td>
<td>402</td>
<td>51</td>
<td>15 – 37</td>
</tr>
<tr>
<td>Aspartate aminotransferase (AST) (U/L)</td>
<td>72</td>
<td>870</td>
<td>1090</td>
<td>691</td>
<td>72</td>
<td>12 – 78</td>
</tr>
<tr>
<td>Total bilirubin (µmol /L)</td>
<td>66.9</td>
<td>N/A</td>
<td>18.0</td>
<td>N/A</td>
<td>N/A</td>
<td>3.4 – 17.1</td>
</tr>
<tr>
<td>Direct bilirubin (µmol/L)</td>
<td>N/A</td>
<td>N/A</td>
<td>13.9</td>
<td>N/A</td>
<td>N/A</td>
<td>0 – 3.4</td>
</tr>
<tr>
<td>Creatine phosphokinase (U /L)</td>
<td>N/A</td>
<td>2578</td>
<td>11453</td>
<td>N/A</td>
<td>417</td>
<td>39 - 308</td>
</tr>
<tr>
<td>Lactate dehydrogenase (LDH) (U /L)</td>
<td>N/A</td>
<td>507</td>
<td>503</td>
<td>N/A</td>
<td>N/A</td>
<td>81 - 234</td>
</tr>
</tbody>
</table>

(N/A -Not available)

Additional blood investigations were as follows: Full blood count showed a WBC count of $14.25 \times 10^3/\mu$L, with neutrophils comprising 94% of the total. Haemoglobin was 15.9 g/dL, and platelet count was 261
x $10^3/\mu$L. Sodium levels were 139 mmol/L, potassium was 4.3 mmol/L, and the reticulocyte count was 0.33%. Serum corrected calcium was 2.5 mmol/L. The urine full report was normal.

The patient was treated with an intravenous normal saline infusion at a rate of 100 ml/hour. His urine output remained adequate throughout his ward stay. From day 3 onwards, both aspartate aminotransferase and creatine kinase levels began to improve. Clinically, pain and myalgia were settled. She did not exhibit any features of muscle weakness or dark urine while in the ward. Subsequently the patient was discharged on the fourth day of hospital admission. A follow-up review on day 14 showed normalization of the laboratory findings, as indicated in Table 1.

**Timeline**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023.09.10</td>
<td>Transferred from local hospital with the history of multiple wasp stings.</td>
</tr>
<tr>
<td>2023.09.11</td>
<td>He was complained of generalized tiredness and muscle pain. Creatine kinase and LDH were high. IV Normal saline 100ml/hour started.</td>
</tr>
<tr>
<td>2023.09.12</td>
<td>Patient was haemodynamically stable. However, creatine kinase, LDH, AST and ALT have shown a consistent upward trend. Hyperbilirubinemia was noted. Aggressive fluid management was continued.</td>
</tr>
<tr>
<td>2023.09.13</td>
<td>Creatine kinase, LDH, Liver function tests started to improve.</td>
</tr>
<tr>
<td>2023.09.14</td>
<td>He was clinically stable and discharged from the Hospital</td>
</tr>
<tr>
<td>2023.09.28</td>
<td>He was stable with normalization of blood tests.</td>
</tr>
</tbody>
</table>

**Discussion**

In the case under discussion, a young and otherwise healthy patient with multiple wasp stings subsequently developed rhabdomyolysis and acute liver injury without coagulopathy. The patient’s clinical course underscores the importance of recognising and promptly managing these rare but serious complications. In our case, prompt suspicion and aggressive fluid management may have contributed to preventing severe acute kidney damage. As a result, the patient was able to make a full recovery without any complications.
This case highlights the need for clinicians to be vigilant for atypical presentations of wasp sting reactions, particularly when systemic symptoms develop.

Wasp stings are highly prevalent in the rural regions of Sri Lanka. There have been several reported cases of clinical syndromes induced by wasp stings, in Sri Lanka, underscoring the significance of this public health issue [6].

The clinical manifestations of wasp envenomation can be attributed to either an IgE-mediated immediate hypersensitivity reaction or a direct toxin effect. Local reactions, which are typically caused by an IgE-mediated immediate hypersensitivity reaction, occur immediately following the sting and generally resolve completely within one to two days without the need for specific treatment. On the other hand, most systemic reactions are due to the direct effects of the toxin and can lead to serious conditions [7].

The venom of a wasp contains a complex mixture of enzymes, including phospholipases and hyaluronidase, amines such as histamine and serotonin, and kinins. These toxins induce tissue mediated cellular damage and can cause severe systemic reactions including rhabdomyolysis [8]. Rhabdomyolysis is a rare manifestation of wasp envenomation that can lead to severe acute kidney injury due to pigment nephropathy [9].

Rhabdomyolysis should be suspected under the following conditions: patients presenting with a triggering event, with or without muscle pain or patients with muscle weakness and elevated creatine kinase levels. Creatine kinase is a significant biomarker of rhabdomyolysis and begins to rise within 2 to 12 hours following muscle injury. In cases of rhabdomyolysis, the elevation of creatine kinase is typically at least five times the upper limit of normal at presentation, ranging from 1500 to 100,000 units/L. Patients with creatine kinase levels exceeding 15,000 to 20,000 units/L upon admission have a high risk of developing acute kidney injury. [4]

Unfortunately, there is no available antivenom for wasp stings, and adequate fluid management remains the cornerstone of treatment. A single wasp sting may cause IgE-mediated reactions, while systemic reactions are caused by mass envenomation. Studies have shown that 20 to 200 wasp stings can lead to acute kidney injury or even death. [10]

Wasp sting-induced rhabdomyolysis and liver injury are rare but serious complications that necessitate immediate recognition and management. It is imperative for clinicians to remain vigilant for systemic manifestations following Hymenoptera stings, especially in individuals with a known history of allergies or multiple stings. This vigilance is crucial in ensuring timely intervention and preventing severe outcomes.

Conclusion
This case report highlights the significance of acknowledging the potential for uncommon complications, such as rhabdomyolysis and liver injury, in patients who present with severe systemic symptoms following a wasp sting. Prompt intervention and comprehensive supportive care are paramount to achieving favourable outcomes in these instances. There is a pressing need for further research to shed light on the underlying mechanisms and to develop optimal management strategies for these complications.

Patient perspective
The patient has a clear understanding of the disease progression and its management and was satisfied.

Consent
Written informed consent was obtained from the patient.

References

1. Amila PS. Sri lankan insects with an overview of diversity and biogeography. biodiversity hotspot of the western ghats and Sri lanka. 1st ed. Taylor & Francis; 2024:38


