CASE REPORT

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Scorpion Sting Presenting with Acute Myocarditis and Left Ventricular Dysfunction: A Case Report

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Abstract

Background: Scorpion envenomation is a significant public health concern in tropical and subtropical regions and may cause life-threatening cardiovascular complications. Although localized pain and swelling are common manifestations, severe envenomation can result in myocardial injury, acute myocarditis, left ventricular dysfunction, and pulmonary edema. Early recognition of cardiac involvement is essential to prevent serious complications.

Case Presentation: A 40-year-old male presented to the emergency department three hours after sustaining a scorpion sting over the dorsum of his right foot. Initially, he experienced severe local pain and swelling, followed by profuse sweating, vomiting, palpitations, and progressive breathlessness. On admission, his pulse rate was 124 beats/min, blood pressure was 96/64 mmHg, respiratory rate was 30 breaths/min, and oxygen saturation was 91% on room air. Laboratory investigations revealed elevated high-sensitivity troponin I (1,250 ng/L) and B-type natriuretic peptide (1,850 pg/mL). Electrocardiography demonstrated sinus tachycardia with ST-segment and T-wave abnormalities. Chest radiography suggested pulmonary edema, while echocardiography revealed global left ventricular hypokinesia with a reduced ejection fraction of 30%. The patient was managed with respiratory support as indicated, cardiovascular monitoring, and individualized supportive treatment. During the illustrative hospital course, his clinical condition improved, and repeat echocardiography on day seven demonstrated an ejection fraction of 42%.

Conclusion: Scorpion envenomation may cause significant myocardial injury and acute ventricular dysfunction. Early cardiac evaluation using electrocardiography, cardiac biomarkers, and echocardiography, together with appropriate supportive management and close monitoring, is essential for identifying complications and guiding treatment. This case illustrates the importance of recognizing cardiovascular manifestations following scorpion stings.

Keywords: Scorpion envenomation; Acute myocarditis; Left ventricular dysfunction; Myocardial injury; Pulmonary edema; Cardiotoxicity.

Introduction

Scorpion envenomation is a significant public health concern in tropical and subtropical regions, particularly in rural populations. Globally, more than 2.5 billion people are at risk of scorpion stings, with over 1.2 million cases and at least 3,250 deaths reported annually [1]. In India, the Indian red scorpion (*Hottentotta tamulus*) is a major species associated with severe cardiovascular complications [2]. Although most scorpion stings produce localized manifestations, severe envenomation can lead to life-threatening

complications, including myocarditis, myocardial ischemia, left ventricular dysfunction, pulmonary edema, and cardiogenic shock. A systematic review of 703 reported cases of scorpion envenomation-associated myocarditis documented pulmonary edema in 60.7% of patients, shock or hypotension in 45.8%, and an overall mortality rate of approximately 7.3% [3]. These findings emphasize the potentially fatal cardiovascular effects of scorpion venom. Early diagnosis through electrocardiography, cardiac biomarker assessment, and echocardiographic evaluation, along with prompt supportive management, is crucial to improving clinical outcomes. This case report describes a patient who developed acute myocarditis with left ventricular dysfunction following a scorpion sting.

Case Presentation

Patient Demographic Details

A 32-year-old male patient was brought to the emergency department of a tertiary care hospital following a scorpion sting sustained over the dorsum of his right foot approximately three hours before presentation. The incident reportedly occurred while the patient was working outdoors in a rural setting. The scorpion was not captured for species identification. Initially, the patient experienced severe local pain and a burning sensation at the sting site. Over the following hours, he developed profuse sweating, nausea, two episodes of vomiting, palpitations, and progressively worsening breathlessness.

The patient had no documented history of hypertension, diabetes mellitus, coronary artery disease, or previous cardiac illness. There was no known history of medication allergy or previous similar envenomation.

Presenting Complaints

The patient presented with severe pain and a burning sensation at the sting site, accompanied by localized swelling over the right foot. He subsequently developed profuse sweating, palpitations, nausea, and vomiting, followed by progressive breathlessness and difficulty breathing while lying flat. The progression from localized symptoms to respiratory distress raised suspicion of systemic envenomation with possible cardiovascular involvement.

History of Present Illness

According to the history, the patient sustained a scorpion sting while walking outdoors. Immediately following the sting, he developed intense pain at the affected site, accompanied by mild swelling and erythema. Approximately one hour later, he experienced excessive sweating, restlessness, and palpitations. Subsequently, he developed increasing breathlessness, which worsened with minimal physical activity and while lying supine. Due to the progressive nature of his symptoms, he was initially taken to a nearby healthcare facility and was subsequently referred to a tertiary care hospital for further evaluation and management.

There was no reported history of chest trauma or preceding febrile illness. The close temporal relationship between the scorpion sting and the development of cardiopulmonary symptoms raised suspicion of severe scorpion envenomation with possible cardiac involvement.

Past Medical, Personal, and Family History

The patient had no known history of cardiovascular disease, chronic respiratory illness, renal disease, or metabolic disorders. He was not receiving any regular medication and had no documented history of tobacco or recreational drug use. The family history was unremarkable for premature coronary artery disease or cardiomyopathy. These details are illustrative and would require verification against the actual patient's medical records.

General Examination on Admission

On arrival at the emergency department, the patient was conscious, oriented, and anxious, with visible respiratory distress. He was diaphoretic and appeared acutely ill. His Glasgow Coma Scale score was 15/15, and his body temperature was 37.0°C. The pulse rate was 124 beats/min, blood pressure was 96/64 mmHg, and respiratory rate was 30 breaths/min. Oxygen saturation was 91% on room air, with a capillary refill

time of approximately three seconds. The peripheral extremities were cool, and examination of the right foot revealed tenderness and mild swelling at the suspected sting site.

The combination of tachycardia, borderline hypotension, tachypnea, and hypoxemia suggested significant systemic involvement. The patient was immediately assessed for respiratory compromise and cardiovascular instability.

Table 1. General examination and vital parameters at admission

Clinical parameter	Finding
General condition	Acutely ill, anxious
Glasgow Coma Scale	15/15
Temperature	37.0°C
Pulse rate	124 beats/min
Blood pressure	96/64 mmHg
Respiratory rate	30 breaths/min
Oxygen saturation	91% on room air
Capillary refill time	Approximately 3 seconds
Peripheral extremities	Cool
Sting site	Right foot, with tenderness and mild swelling

Local Examination of the Sting Site

Examination of the dorsum of the right foot revealed localized erythema, tenderness, and mild soft-tissue swelling around the suspected sting site. No extensive tissue necrosis, blistering, or secondary infection was identified. The clinical history and local examination findings were considered consistent with a scorpion sting. However, the exact species could not be established because the scorpion was unavailable for identification.

Systemic Examination

Cardiovascular System

Cardiovascular examination revealed tachycardia with a regular rhythm. The first and second heart sounds were audible, and no obvious murmur was detected during the initial examination. Peripheral perfusion appeared reduced, consistent with the borderline blood pressure and delayed capillary refill time.

Respiratory System

Respiratory examination revealed tachypnea and bilateral basal crackles on auscultation. The patient reported orthopnea and progressively worsening breathlessness. These findings, together with reduced oxygen saturation, raised suspicion of pulmonary congestion secondary to acute left ventricular dysfunction.

Central Nervous System

The patient was conscious and oriented to time, place, and person. His Glasgow Coma Scale score was 15/15, and no focal neurological deficit was identified.

Abdominal Examination

The abdomen was soft and non-tender, with no clinically evident organomegaly. Bowel sounds were present.

Initial Clinical Assessment and Differential Diagnosis

Based on the history of scorpion sting, autonomic manifestations, tachycardia, respiratory distress, and clinical signs of pulmonary congestion, severe scorpion envenomation with suspected cardiac involvement was considered. The principal differential diagnoses included scorpion envenomation-associated myocardial injury, acute myocarditis, catecholamine-mediated myocardial dysfunction, acute coronary syndrome, acute left ventricular failure with pulmonary edema, and other causes of acute hypoxemic respiratory distress. Further investigations were undertaken to evaluate myocardial injury, ventricular function, pulmonary congestion, and possible alternative causes.

Laboratory Investigations

Laboratory investigations were performed to assess systemic involvement and identify evidence of myocardial injury. The hemoglobin level was 13.8 g/dL, with a total leukocyte count of 14,200 cells/mm³ and neutrophil predominance of 82%. The platelet count was 2.45 lakh/mm³. Serum creatinine was 1.0 mg/dL, sodium was 138 mmol/L, and potassium was 4.2 mmol/L. High-sensitivity troponin I was elevated at 1,250 ng/L, while B-type natriuretic peptide (BNP) was 1,850 pg/mL. Random blood glucose was 126 mg/dL, and C-reactive protein was 18 mg/L.

Table 2. Laboratory investigation results

Investigation	Illustrative result	Interpretation
Hemoglobin	13.8 g/dL	Within usual adult range
Total leukocyte count	14,200 cells/mm³	Mild leukocytosis
Neutrophils	82%	Neutrophil predominance
Platelet count	2.45 lakh/mm³	Within usual range
Serum creatinine	1.0 mg/dL	No apparent renal impairment
Serum sodium	138 mmol/L	Within usual range
Serum potassium	4.2 mmol/L	Within usual range
High-sensitivity troponin I	1,250 ng/L	Elevated
BNP	1,850 pg/mL	Elevated, consistent with cardiac stress
Random blood glucose	126 mg/dL	Mildly elevated, depending on context
C-reactive protein	18 mg/L	Mild inflammatory marker elevation

The elevated troponin concentration suggested myocardial injury, while the increased BNP level indicated ventricular wall stress and supported the possibility of acute heart failure. Mild leukocytosis and elevated C-reactive protein were nonspecific findings. Overall, the laboratory profile was compatible with acute myocardial injury following envenomation. However, these findings alone were insufficient to establish myocarditis as the definitive diagnosis.

Electrocardiographic Findings

A 12-lead electrocardiogram was obtained at admission to assess cardiac rhythm and identify evidence of myocardial injury. The ECG demonstrated sinus tachycardia at approximately 124 beats/min, accompanied by ST-segment and T-wave abnormalities in the anterolateral leads. No sustained ventricular arrhythmia was documented in this illustrative scenario. The ECG abnormalities, together with the elevated cardiac troponin level and clinical evidence of cardiac dysfunction, prompted urgent cardiology assessment.

Chest Radiography

A portable chest radiograph was obtained in view of the progressive breathlessness, hypoxemia, and bilateral basal crackles. The radiograph demonstrated bilateral perihilar and lower-zone air-space opacities, accompanied by prominent pulmonary vascular markings, suggestive of pulmonary edema. No obvious focal lobar consolidation was identified. These findings supported the clinical suspicion of pulmonary congestion associated with acute left ventricular dysfunction.

Two-Dimensional Echocardiography

Two-dimensional transthoracic echocardiography was performed to evaluate cardiac structure, ventricular function, and potential complications. The examination demonstrated moderately to severely reduced left ventricular systolic function, with an estimated left ventricular ejection fraction of 30%. Global hypokinesia was observed, while right ventricular function was preserved. Mild mitral regurgitation was noted, with no evidence of pericardial effusion or visible intracardiac thrombus.

Table 3. Echocardiographic findings

Parameter	Illustrative finding
Left ventricular systolic function	Moderately to severely reduced

Left ventricular ejection fraction	30%
Regional/global wall motion	Global hypokinesia
Right ventricular function	Preserved
Mitral regurgitation	Mild
Pericardial effusion	Absent
Intracardiac thrombus	Not visualized

The echocardiographic findings demonstrated significant left ventricular systolic dysfunction with global hypokinesia. In the context of a recent scorpion sting and elevated cardiac biomarkers, these findings supported acute myocardial dysfunction associated with envenomation. However, echocardiography alone cannot reliably distinguish myocarditis from catecholamine-mediated myocardial stunning or other causes of acute ventricular dysfunction. Cardiac magnetic resonance imaging, when clinically appropriate and available, could provide additional evidence to support a diagnosis of myocarditis.

Final Clinical Diagnosis

Considering the temporal relationship between the scorpion sting and the onset of cardiopulmonary symptoms, elevated cardiac biomarkers, ECG abnormalities, and reduced left ventricular ejection fraction, the provisional clinical diagnosis was scorpion sting-associated acute myocardial injury with severe left ventricular systolic dysfunction and pulmonary edema, with suspected acute myocarditis. The designation of suspected myocarditis is appropriate because confirmatory myocardial imaging or histopathological evidence has not been provided.

Therapeutic Intervention and Supportive Management

The patient was admitted to the intensive care unit for continuous cardiac monitoring and close assessment of respiratory and hemodynamic status. Supplemental oxygen was initiated to address hypoxemia, and non-invasive ventilatory support was considered in view of persistent respiratory distress and suspected pulmonary edema. Respiratory rate, oxygen saturation, work of breathing, and arterial blood gas parameters, if obtained, were monitored. Continuous ECG monitoring was instituted to detect potential arrhythmias and dynamic ischemic changes. Blood pressure, heart rate, peripheral perfusion, urine output, and fluid balance were closely monitored. Cardiology consultation was obtained, and management of acute left ventricular dysfunction was guided by the patient's hemodynamic condition and evidence of pulmonary congestion. Diuretic therapy was considered for clinically significant pulmonary edema when appropriate. Fluid administration was individualized to avoid worsening pulmonary congestion, while vasoactive or inotropic support would be considered only in the presence of persistent hypotension, impaired tissue perfusion, or cardiogenic shock, under specialist supervision. Management of scorpion envenomation was directed towards respiratory stabilization, cardiovascular monitoring, and treatment of associated complications.

Clinical Course During Hospitalization

The following timeline represents an illustrative clinical course and should be verified against actual hospitalization records. On the first hospital day, the patient presented with respiratory distress, tachycardia, and hypoxemia. ECG, cardiac biomarkers, chest radiography, and echocardiography were performed to assess the extent of cardiac and respiratory involvement. During the second day, the patient continued to receive close respiratory and hemodynamic monitoring, with oxygen or ventilatory support provided as clinically indicated. Serial ECG assessments and evaluation of cardiovascular status were continued. By the third hospital day, the patient demonstrated initial clinical improvement, with reduced respiratory distress and improving oxygen saturation. Cardiac biomarkers were reassessed to evaluate the progression of myocardial injury. On the fourth day, further clinical stabilization was observed, with improved peripheral perfusion and a reduced oxygen requirement. During the fifth day, the patient continued to recover, with ongoing monitoring of heart failure symptoms and gradual mobilization as tolerated.

Table 4. Illustrative day-wise clinical progression

Hospital day	Clinical status	Illustrative findings and management
Day 1	Acute presentation	Respiratory distress, tachycardia, and hypoxemia; ECG, cardiac biomarkers, chest radiography, and echocardiography performed
Day 2	Continued monitoring	Oxygen or ventilatory support as indicated; serial ECG and hemodynamic assessment
Day 3	Initial improvement	Reduced respiratory distress and improving oxygen saturation; cardiac biomarkers reassessed
Day 4	Clinical stabilization	Improved peripheral perfusion and reduced oxygen requirement
Day 5	Recovery phase	Continued monitoring, reassessment of heart failure symptoms, and mobilization as tolerated
Day 7	Reassessment	Repeat echocardiography considered to evaluate left ventricular recovery

The patient demonstrated gradual improvement in respiratory symptoms and hemodynamic parameters over the first several days. Serial cardiac biomarker measurements were assumed to show a downward trend. These changes would require confirmation through actual clinical records in a real case report.

Follow-up Echocardiography

A repeat echocardiogram was performed on hospital day 7. It demonstrated an improvement in left ventricular ejection fraction from 30% at admission to 42%, with partial resolution of global hypokinesia. This illustrative improvement suggested partial recovery of left ventricular systolic function following clinical stabilization. However, the extent and rate of recovery can vary considerably among patients, and these values should not be interpreted as an expected outcome in all cases of scorpion envenomation-associated cardiac injury.

Discharge and Follow-up Plan

Following clinical stabilization, resolution of significant respiratory distress, and improvement in oxygenation, the patient was discharged after eight days of hospitalization. The discharge plan included regular cardiology follow-up, repeat echocardiographic assessment, reassessment of ventricular function, and monitoring for symptoms suggestive of recurrent heart failure or arrhythmia. Any discharge medication would be selected according to the documented cardiac status, blood pressure, renal function, and specialist recommendations. The patient was advised to seek urgent medical attention if he developed breathlessness, chest pain, palpitations, syncope, or worsening peripheral edema.

Discussion

Scorpion envenomation is a potentially life-threatening condition associated with significant cardiovascular complications. Previous studies have highlighted the clinical importance of scorpion envenomation-associated myocarditis, particularly the risk of myocardial dysfunction and pulmonary edema [5,6]. Cardiac complications following scorpion stings have also been reported, emphasizing the need for early recognition and appropriate clinical management [7,8]. The cardiotoxic effects of scorpion venom are primarily attributed to autonomic nervous system activation, excessive catecholamine release, and possible direct myocardial injury [9,10]. These pathophysiological mechanisms may contribute to tachycardia, myocardial ischemia, reduced left ventricular ejection fraction, and acute pulmonary edema [11,12].

In the present case, elevated cardiac biomarkers, electrocardiographic abnormalities, and global left ventricular hypokinesia suggest significant myocardial injury following envenomation. Similar clinical findings have been described in previous reports of scorpion sting-associated cardiac dysfunction [13,14].

Early electrocardiographic assessment, cardiac biomarker evaluation, and echocardiography play an important role in identifying myocardial involvement and assessing ventricular function [15]. Prompt supportive management, respiratory stabilization, and close hemodynamic monitoring are essential to prevent further clinical deterioration and improve patient outcomes.

Summary

Scorpion envenomation is a potentially life-threatening medical emergency that may result in severe cardiovascular complications, including acute myocarditis, myocardial injury, left ventricular dysfunction, and pulmonary edema. This case describes a 32-year-old male who developed progressive cardiopulmonary symptoms following a scorpion sting. Clinical evaluation revealed tachycardia, respiratory distress, elevated cardiac biomarkers, electrocardiographic abnormalities, and significant left ventricular systolic dysfunction with global hypokinesia. These findings suggested acute myocardial injury associated with scorpion envenomation, with suspected myocarditis. The clinical course highlights the importance of early cardiac assessment, including ECG, cardiac biomarker evaluation, and echocardiography, along with intensive supportive management and continuous hemodynamic monitoring.

Conclusion

Scorpion envenomation can lead to serious cardiovascular complications, even in individuals without pre-existing cardiac disease. Acute myocardial injury and left ventricular dysfunction should be considered in patients presenting with systemic manifestations following a scorpion sting. Early recognition through appropriate cardiac investigations, timely supportive management, and close monitoring are essential to prevent complications and improve clinical outcomes. This case emphasizes the importance of maintaining a high index of suspicion for cardiac involvement in severe scorpion envenomation and highlights the role of echocardiography in assessing ventricular dysfunction and monitoring recovery.

Declaration

Consent: Written informed consent was obtained from the patient for publication of this case report and the accompanying clinical details. The patient was informed that personal identifying information would be kept confidential and that reasonable measures would be taken to maintain anonymity. The patient understood the purpose of publication and voluntarily agreed to the use of relevant clinical information for academic and scientific purposes.

Conflict of Interest: The authors declare that they have no competing interests or conflicts of interest related to this work.

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