CASE REPORT

SCORPION STING AND UNILATERAL PULMONARY EDEMA: A CASE REPORT

Akhwand Shakeel Ahmad
Sultan Qaboos Hospital, Salalah-Oman

A man inflicted with scorpion sting on his left big toe developed dyspnoea and hypotension 6 hours later. The chest X-ray showed alveolar infiltrates only on right side with elevated Troponin-T and B-type natriuretic peptide levels. Toxic myocarditis is a rare and under-recognized but potentially fatal complication of scorpion envenomation; development of pulmonary oedema only on one side is even more uncommon and can cause delay in the diagnosis. Awareness of the condition is important to guide the treatment and avert complications.

Keywords: Scorpion sting; Toxic myocarditis; Cardiogenic shock; Unilateral pulmonary oedema

Citation: Ahmad AS. Scorpion sting and unilateral pulmonary oedema: A case report. J Ayub Med Coll Abbottabad 2025;37(2):259–61.

DOI: 10.55519/JAMC-02-12995

INTRODUCTION

Scorpion stings are common in tropical countries and constitute about one-fifth of all human exposure to animal bites and stings in Oman.[1] Among 1500 known species of scorpion, about 20-25 are dangerous to humans; most of them belong to the family Buthidae. Majority of scorpions in Oman are the dangerous buthids, recognizable by their thin claws and thick tails.[2] The list of dangerous scorpions here includes *Hottentotta jayakari* (Figure 1a); at least three species of 'man-killer' Androctonus (*A. australis*, *A. bicolor*, and *A. crassicauda* (Figure 1b); and 'death stalker' *Leiurus quinquestriatus* (Figure 1c), one of the most dangerous scorpions on earth.[2] The scorpion stings though very painful are usually confined to local effects only. However, severe respiratory, cardiac and neurological complications, impaired haemostasis, pancreatitis, multi-organ failure and even death can occur.[3] We describe here a case of myocarditis due to scorpion sting with an unusual presentation of pulmonary edema only on one side.

CASE REPORT

A previously well 34-year-old man presented with pain and swelling in left big toe after a scorpion sting an hour ago. Apart from slight swollen toe, the physical examination was unremarkable. Routine blood tests were normal except for mild leucocytosis of $12.9x10^9$/liter. He received local treatment, intravenous paracetamol, steroids, antihistamine and tetanus antitoxin. Six hours later, he vomited twice and was short of breath with mild pain in lower chest. The blood pressure dropped to 90/60 mm Hg, pulse was 116 beats per minute, temperature 37.6ºC, and he was hypoxic with oxygen saturation of 88% on pulse oximetry, rising to 96% on 8 liters per minute of supplemental oxygen. Crackles became audible on right side of the chest. The arterial blood gases obtained on room air showed severe hypoxemia and metabolic acidosis (pO^2 32 mm Hg, oxygen saturation 60%, pCO^2 45 mm Hg, pH 7.28, bicarbonate 19.1 mmol/l, lactate 2.49 mmol/l). Extensive alveolar infiltrates were visible on chest X-ray on right side (Figure 2a); electrocardiogram demonstrated sinus tachycardia. Co-amoxyclav was given intravenously and half-liter of saline was rapidly infused; but the dyspnoea worsened, oxygen saturation dropped to 88% despite supplemental oxygen, blood pressure sank to 72/44 mm Hg, crackles on right side of chest increased, and pulsations of right internal jugular vein rose to mid-neck. Furosemide was given as intravenous bolus and continued as infusion along with norepinephrine infusion. An urgent echocardiogram showed mild to moderate mitral regurgitation, normal ventricles and a left ventricular ejection fraction of 50%. Further blood tests revealed normal levels of C-reactive protein and D-dimer but high Troponin-T, 0.928 ng/ml (reference range 0.002-0.014) and markedly high B-type natriuretic peptide, 3860 pg/ml (reference range 0-300). The PCR test for SARS-Coronavirus-2 returned negative. Norepinephrine and furosemide infusions were successfully tapered off by 48 hours when his vitals had settled and he was no more dyspnoeic. The pulmonary oedema had resolved on follow-up chest X-ray (Figure 2b) and Troponin-T dropped to 0.079 ng/ml. He was doing well on follow-up 6 months later without needing any further treatment.

Figure-1a: *Hottentotta jayakari* scorpion

Figure-1b: Arabian black fat-tailed Scorpion (*Androctonus crassicauda*).

Figure-1c: Death-stalker scorpion (*Leiurus quinquestriatus*).

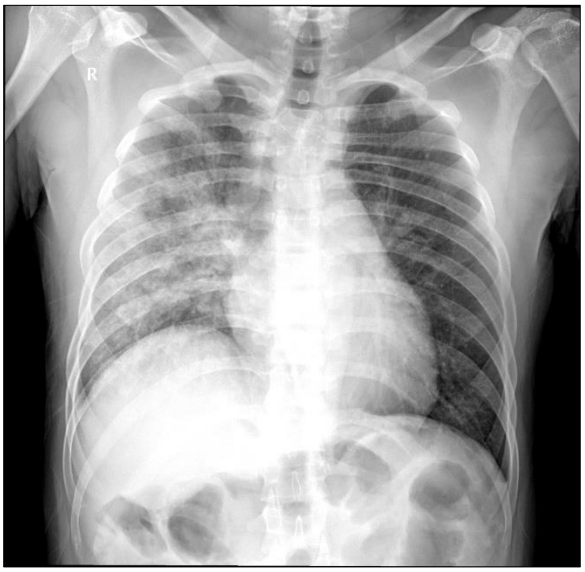

Figure-2a: Chest X-ray on day 1 showing right-sided pulmonary oedema.

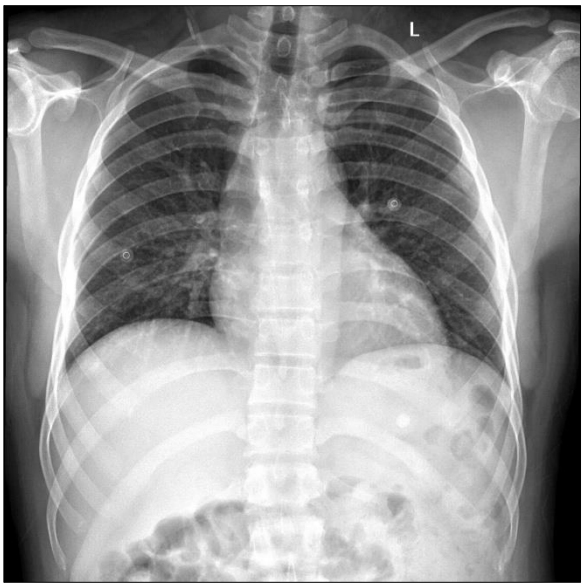

Figure-2b: A normal follow-up Chest X-ray on day 4.

DISCUSSION

The systemic effects of scorpion venom culminated in myocarditis in this case but pulmonary oedema developed only on right side that was unusual and resulted in delay in the diagnosis. Although not as common as in case of snake bites, systemic toxicity with scorpion envenomation does occur, even fatally, mostly in children. Globally the annual number of scorpion stings exceeds 1.2 million with 0.27% deaths;[4] however, a higher mortality of 5.5% has been reported in Egypt, mainly by the *Androctonus* scorpions.[5] Cardiogenic shock and pulmonary oedema are the leading cause of death in fatal cases.[6]

The incidence of myocarditis among all cases of scorpion sting remains challenging to assess as most of the case series report from the admitted cases only where it can be as high as one-third in case of children in intensive care.[7] Among those complicated with myocarditis, pulmonary oedema is reported in 60.7% and shock or hypotension in 45.8%.[8] The cardiopulmonary symptoms usually take a few hours to present, followed later by pulmonary oedema and shock in some cases.[8]

The pathogenesis is unclear. An "autonomic storm" by massive release of catecholamines induced by neurotoxins in the scorpion venom can be a plausible explanation.[9] With an early vascular phase of vasoconstriction and increased afterload, and a later myocardial phase of myocardial stunning and hypotension which is usually reversible, the phenomenon resembles takotsubo or stress cardiomyopathy where a storm of catecholamines culminates into myocardial ischemia through spasm of coronary vessels.[10] Moreover, direct toxic effects on the myocyte by disrupting the ion concentrations have been suggested.[11]

Absence of a phase of hypertension or bradycardia in our patient nonetheless argues against autonomic storm. His hypotension with secondary tachycardia could be a consequence of direct cardiotoxic effects of the venom.

Among all-cause pulmonary oedema, unilateral presentation accounts for 2.1% of the cases, occurs mostly on the right side and has significantly higher mortality.[12] It is treated in the same way. It can easily be confused with pneumonia or other causes of unilateral infiltrates on chest radiograph. Prolonged rest on one side in patients with cardiac failure and rapid drainage of massive pleural effusion or pneumothorax can lead to pulmonary oedema on same side; while hypoplasia or stenosis of pulmonary artery, pulmonary embolism, bullae and Swyer-James syndrome are some of the pathologies related to the opposite side. Nevertheless, severe mitral regurgitation remains the principal perpetrator.[13] The direction of the eccentric regurgitation jet within left atrium blowing towards left or right determines the predominant effect on one side.[14]

Interestingly, unilateral pulmonary oedema has been mentioned in context of scorpion sting as well but only as very rare case reports and precise aetiology remains unknown.[15,16] Abroug's classification divides severity of scorpion stings into grade I (local symptoms only), grade II (systemic symptoms like fever, diaphoresis, nausea, vomiting, diarrhoea, hypertension and priapism) and grade III (complications including cardiovascular, respiratory or neurological distress).[17]

The treatment is supportive. Pulmonary oedema, be it unilateral or bilateral, is largely treated on the same lines as that due to other causes. Dobutamine may reduce mortality in severe cases by helping the cardiomyopathy.[10] Prazosin is useful for severe hypertension.[6] Administration of scorpion anti-venom may significantly decrease the time of recovery in patients with grade 2 severity[18] but remains under-utilized. Oman's national guidelines of poisoning management recommend 2-5 vials of polyvalent anti-venom infused over 30 minutes for systemic toxicity that can be repeated every 2 hours, up to 4 doses.[2]

Source of Funding: None
Conflict of Interest: None
Ethical Approval: Not required
Consent: Informed consent

REFERENCES

1. Lall SB, Al-Wahaibi SS, Al-Riyami MM, Al-Kharusi K. Profile of acute poisoning cases presenting to health centres and hospitals in Oman. East Mediterr Health J 2003;9(5-6):944–54.
2. Oman's Ministry of Health. National Management Guidelines of Poisoning, 2018, Chapter 28 Bites and Stings. [Internet]. [cited 2024 Feb 23]. Available from: https://fliphtml5.com/fmwam/dwrx/basic
3. Santos MS, Silva CG, Neto BS, Junior CRPG, Lopes VHG, Junior AGT, *et al*. Clinical and epidemiological aspects of scorpionism in the world: a systematic review. Wilderness Environ Med 2016;27(4):504–18.
4. Chippaux JP, Goyffon M. Epidemiology of scorpionism: a global appraisal. Acta Trop 2008;107(2):71–9.
5. Abd El-Aziz FZA, El Shehaby DM, Elghazally SA, Hetta HF. Toxicological and epidemiological studies of scorpion sting cases and morphological characterization of scorpions (Leiurusquin questriatus and Androctonus crassicauda) in Luxor, Egypt. Toxicol Rep 2019;6:329–35.
6. Bahloul M, Chaari A, Dammak H, Samet M, Chtara K, Chelly H, *et al*. Pulmonary edema following scorpion envenomation: mechanisms, clinical manifestations, diagnosis and treatment. Int J Cardiol 2013;162(2):86–91.
7. Prakash VJ, Patil MM, Patil SV, Kalyanshettar SS, Mohd S. Acute myocarditis in children with scorpion sting envenomation. Curr Pediatr Res 2021;25(4):578–82.
8. Fereidooni R, Shirzadi S, Ayatizadeh SH, Bahloul M, Tavangar A, Zomorodian SA, *et al*. Scorpion envenomation-associated myocarditis: a systematic review. PLoS Negl Trop Dis 2023;17(4):e0011219.
9. Chippaux JP. Emerging options for the management of scorpion stings. Drug Des Devel Ther 2012;6:165–173.
10. Abroug F, Souheil E, Ouanes I, Dachraoui F, Fekih-Hassen M, Besbes LO. Scorpion-related cardiomyopathy: Clinical characteristics, pathophysiology, and treatment. Clin Toxicol (Phila) 2015;53(6):511–8.
11. Wang R, Moreau P, Deschamps A, de Champlain J, Sauve R, Foucart S, *et al*. Cardiovascular effects of Buthus martensii (Karsch) scorpion venom. Toxicon 1994;32(2):191–200.
12. Attias D, Mansencal N, Auvert B, Vieillard-Baron A, Delos A, Lacombe P, *et al*. Prevalence, Characteristics, and Outcomes of Patients Presenting with Cardiogenic Unilateral Pulmonary Edema. Circulation 2010;122(11):1109–15.
13. Handagala R, Ralapanawa U, Jayalath T. Unilateral pulmonary edema: a case report and review of the literature. J Med Case Rep 2018;12(1):219.
14. Kashiura M, Tateishi K, Yokoyama T, Jujo M, Tanabe T, Sugiyama K, *et al*. Unilateral cardiogenic pulmonary edema associated with acute mitral regurgitation. Acute Med Surg 2017:4(1):119–22.
15. Bompelli N, Reddy CR, Deshpande A. Scorpion bite-induced unilateral pulmonary oedema. BMJ Case Rep 2018;2018:bcr2018224476.
16. Venugopal K, Kushal DP, Shyamala G, Chand NK. Unilateral pulmonary oedema: Rare manifestation of scorpion sting. Indian J Anaesth 2015;59(7):452–3.
17. Abroug F, Nouira S, Saguiga H. Envenimations scorpioniques: avancées chimiques, physiopathologiques et thérapeutiques [Monograph]. 1994; p.1–68.
18. Bawaskar HS, Bawaskar PH. Efficacy and safety of scorpion antivenom plus prazosin compared with prazosin alone for venomous scorpion (Mesobuthus tamulus) sting: randomised open label clinical trial. BMJ 2011;342:c7136.

Submitted: February 23, 2024	*Revised: June 19, 2024*	*Accepted: March 22, 2025*

Address for Correspondence:
Akhwand Shakeel Ahmad
FCPS Medicine (Pak); MRCP (UK) Senior specialist, Medicine, Sultan Qaboos Hospital, Salalah-Oman
Email: drakhwand@yahoo.com