Myocarditis following katipo spider bite

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Abstract

We report the case of a 22-year-old man who developed severe myocarditis following a presumed katipo spider bite. Katipo spiders are thought to be one of the most poisonous native creatures in New Zealand. No deaths from katipo spider bites have been reported since the 19th Century. A literature search reveals no previously reported cases of myocarditis following a bite from a katipo spider. The clinical presentation of latrodectism is discussed.

Case report

A 22-year-old Canadian man went nude swimming from a beach in Northland leaving his clothes in the sand dunes. He woke to find his penis swollen and painful with a red mark on the shaft suggestive of a bite. He rapidly developed generalised muscle pains, fever, headache, photophobia and vomiting.

On presentation to the local hospital at Dargaville he was febrile with a grossly swollen penis and tender palpable right inguinal lymph nodes. He was tachycardic at 116 bpm and his blood pressure (BP) was 132/79 mmHg; he was initially treated with IV cefuroxime and IV morphine.

The following morning he developed pleuritic chest pain relieved by sitting forward which became increasingly severe and associated with diaphoresis and the onset of shock with a BP of 75 mmHg systolic. The initial ECG was normal but a second ECG suggested pericarditis with saddle shaped ST elevation of 4mm in leads V3-V6, II, III and AVF with reciprocal ST depression in AVR. The initial Troponin T was 0.07µg/l (reference range <0.04), peaking at 3.27 the following day.

The clinical presentation was compatible with latrodectism and a presumptive diagnosis of katipo spider bite was made. Intravenous resuscitation was accompanied, approximately 36 hours after envenomation, by 500 units of katipo spider antivenom. His chest pain rapidly began to settle, blood pressure improved to 132/92 mmHg and heart rate fell to 98/min. The ST segments normalised over the next 12 hours; however, he had 5 runs of non-sustained ventricular tachycardia of up to 22 beats and developed signs of heart failure.

On transfer to Whangarei Hospital, initial echocardiography (echo) revealed a mildly dilated but severely impaired left ventricle (EF 20–29%) with lateral hypokinesia, infero-basal and posterior wall akinesia. The right ventricle was mildly enlarged with severely impaired systolic function. No pericardial effusion or thrombus was seen.

Subsequent coronary angiography in Auckland City Hospital revealed normal coronary arteries and repeat echo showed improving LV function with an EF of 41%. The hypokinesia appeared more apical and a moderate sized thrombus was attached to apico-inferolateral wall.
Cardiac MR showed normal sized ventricles with mild global impairment of the distal half of left ventricle. T2 weighted imaging showed increased signal in the lateral, anterior and inferior walls indicative of a diffuse inflammatory process.

Standard heart failure medication was introduced and he was warfarinised for the mural thrombus. He was discharged after a total of 16 days in hospital. On review he was generally well. His return to Canada precluded further follow-up.

**Discussion**

The katipo spider (*Latrodectus katipo*) is one of the 31 species of the genus *Latrodectus* collectively known as ‘widow spiders’, and includes the redback spider which has colonised some areas of New Zealand from Australia.

Katipo ('night stinger' in Māori language) spiders are small to medium sized with a distinctive white bordered red stripe on their back and have a highly specialised habitat amongst the sand dunes of New Zealand. Bites are rare as the spiders are not aggressive and are becoming more endangered due to loss of habitat and competition from introduced species.

The female katipo bite causes the syndrome of *latrodectism* characterised by severe muscle pain, initially in local muscle groups, spreading to regional groups. Associated non-specific symptoms include nausea, vomiting, headache and sweating and photophobia.

Tachycardia or bradycardia, hypertension, tachypnoea and hyperreflexia are common. Pain remote from the spider bite is especially common in the larger muscle groups of the chest, abdomen and trunk.

The mechanism of myocarditis following *Latrodectus* envenomation is unknown, however it is likely to be related to the most active component of the venom, a neurotoxin, α-latrotoxin. This toxin causes catecholamine release at adrenergic nerve endings and depletes acetylcholine at motor nerve endings.

It predominantly affects the nervous system but can affect other organs, including the heart. Possible mechanisms of cardiac dysfunction include the catecholamine surge causing coronary spasm, hypersensitivity reactions or direct toxic effects of α-latrotoxin to the myocardium.

There are scattered case reports of myocarditis following bites of other *Latrodectus* species but none following katipo spider bites. In those reports, three patients survived and one died. Of the survivors all had elevated cardiac markers. One patient had a normal echocardiogram while the other two had impaired left ventricular function with regionality. All three survivors made a complete recovery. The fourth case was a 19-year-old woman who died of cardiogenic shock following a likely black widow spider bite.

**Summary**

Katipo spider bites are rare and this is the first reported case (albeit presumptive) of myocarditis following its envenomation. Awareness of this spider in New Zealand is limited and in this case the prompt diagnosis and the use of antivenom hastened a favourable outcome.
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