

Black widow spider bite in Johannesburg

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Black widow spider bites are uncommon in South Africa, but it is important for clinicians to be aware of the clinical presentation in order to initiate appropriate treatment. This case highlights the presentation and management of a middle-aged gentleman who presented to the Chris Hani Baragwanath hospital following a spider bite. The bite was later confirmed to be that of a black widow spider. The patient presented with the typical symptoms of latrodectism – autonomic dysfunction, muscle rigidity and cramps – and was managed symptomatically with a favourable outcome.

Keywords: black widow spider, latrodectism, spider bite

Introduction

Black widow spiders belong to the *Latrodectus* genus of spiders, which encompasses black and brown widow spiders.¹ Widow spiders are so named because female spiders are sometimes observed to kill their mates soon after mating. Although these spiders are often feared, a bite is rarely lethal and most widow bites cause systemic symptoms that can be effectively managed. No deaths from black widow spiders have been reported in the last five decades in South Africa.² There are 31 species of *Latrodectus* recognised worldwide, of which six are endemic to Southern Africa: these include the black widows, *Latrodectus indistinctus*, *Latrodectus cinctus*, *Latrodectus karooensis* and *Latrodectus renivulvatus*, and the brown widows, *Latrodectus geometricus* and *Latrodectus rhodensiensis*.^{1,3} The array of symptoms caused by black widow spider envenomation varies widely throughout the literature, but the majority of reports agree that necrotic arachnidism (necrosis at bite site) is not a feature. Instead, systemic symptoms due to neurotransmitter release from the peripheral nervous system are the result.¹ It is important for clinicians to be aware of the clinical presentation in order to initiate appropriate treatment. Identification of the spider aids in guiding management based on the expected symptomatology. The clinical presentation after envenomation, known as latrodectism, is a toxidrome of diaphoresis, flushing, muscle cramps and rigidity that can be effectively managed with specific and supportive measures. Antivenom may be indicated in specific cases, after considering the potential risk of anaphylaxis. This report outlines the case of a male patient who presented with a black widow spider bite to the Chris Hani Baragwanath hospital in 2016.

Clinical case report

A 38-year-old male presented to the admission ward of Chris Hani Baragwanath Hospital following a history of being bitten by a spider in the early hours of that morning. He reported feeling a stinging pain on his abdomen at 6:00 am and immediately investigated the site and caught a black spider, which he brought to the hospital. This was later identified to be a female black widow spider (*Latrodectus indistinctus* – see Figures 1 and 2).

Following the bite, he experienced the typical features of latrodectism. Symptoms included intense muscle pain and rigidity over the bite site, which radiated to his trunk, arms and neck. On examination he had a mild tachycardia. Muscle spasm

was evident. He was flushed, sweaty and anxious (Figure 3). Inspection revealed an erythematous area on the right lower quadrant of his abdomen, which was thought to be the bite mark (see Figure 3). His blood pressure, temperature and neurological state remained stable throughout his admission. Blood investigations revealed a mild leucocytosis of 13.61×10^9 cells/l and a creatine kinase of 1171 U/l. The remainder of the full blood count, urea and electrolytes, calcium, magnesium, phosphate, C-reactive protein and liver function tests were all normal. A toxicology screen for over-the-counter medication (paracetamol, barbiturates, salicylates and benzodiazepines), cerebrospinal fluid examination and blood cultures were all negative.

Treatment included intravenous fluids, calcium gluconate infusions for his muscle cramps and analgesia in the form of opiates and non-steroidal anti-inflammatories (NSAIDs). A short course of corticosteroids and antihistamines was administered, although there is no evidence that this is of benefit. Anti-tetanus toxoid was administered. Antivenom was sourced in consultation with an entomologist, but was not administered for two reasons: the patient did not display any danger signs, such as hypertensive urgency/emergency, shock or pain refractory to analgesia, and did report allergies to sulphur and penicillin. He recovered in hospital over the next few days with symptoms abating daily and was discharged home a week later. On follow-up a year later, he has no sequelae evident from the event.

Discussion

This case report details the typical presentation of a *Latrodectus indistinctus* bite. It was very helpful that the patient brought the offending spider to hospital, which could be identified promptly by an entomologist and guide effective management of the envenomation.

Widow spiders are typically 8–15 mm in length and pitch black to dark brown depending on species. No ventral markings are seen on the abdomen of a black widow spider; dorsal markings may include red, yellow to orange stripes or a spot just above the spinnerets.¹ This may fade as the spider ages, as in this specimen. Two of the four endemic black widow spider species are known to occur in Gauteng, *L. indistinctus* and *L. renivulvatu*.^{1,3} Female members of these two species are separable by internal reproductive anatomy and, to some degree, by size.³ The



Figure 1: Black widow spider with carapace width.



Figure 2: Dorsal and ventral images of spider: female *Latrodectus indistinctus*.



Figure 3: Flushing and bite site with surrounding erythema.

specimen submitted for identification was confirmed as being *L. indistinctus* based on the carapace width of 5 mm, which is significantly wider than the typical 3.35–4.45 mm for *L. renivulvatus*.

Latrodectus indistinctus is usually a veld species, found more commonly in the Western Cape in South Africa. Occasionally it is

noted around households and gardens. It is seldom found in Johannesburg. Only the female spider will bite humans and this is only when threatened. In our case the spider was likely disturbed when our patient turned over in bed. The spiders typically rest during the day and are active at night.²

Black widow spider bites, although feared, are rarely fatal in an adult patient. The amount of venom injected may, however, overwhelm a small child or animal and cause fatal symptoms. *Latrodectus indistinctus* is thought to be 3–4 times more venomous than *L. geometricus*.²

α -latrotoxin is a neurotransmitter found within black widow venom that binds non-specifically to neuronal presynaptic receptors within the peripheral nervous system. This causes massive release of neurotransmitters, especially acetylcholine and noradrenaline, resulting in the clinical symptoms observed. The toxin is unable to cross the blood–brain barrier, hence no central nervous system symptoms are observed.¹

Clinical features may be difficult to recognise and a high index of suspicion is required to make the diagnosis. A bite mark is unusual and is found in less than 30% of cases. It is typical to find redness and local inflammation around the bite site, if found. Suspicion of a spider bite is thus dependant on features of latrodectism, which include typical symptoms such as a burning pain at the bite site which immediately spreads to the regional lymph nodes and then leads to generalised muscle cramps within an hour.² Increased muscle tone can be evident clinically. This increased tone may be interpreted as a tightness in the chest with difficulty in breathing, board-like abdominal rigidity mimicking an acute abdomen, difficulty in walking or the presence of an erection.¹ Nausea and vomiting may occur. Vitals signs may reveal a raised blood pressure, heart rate and temperature with sweating, anxiety and flushing (usually facial and periorbitally). Envenomation can be classified as mild, moderate or severe. Mild includes local pain and redness at the site only, moderate being local cramping and sweating in the extremity involved and severe being systemic symptoms with tachycardia and high blood pressure.⁴

Laboratory and imaging investigations are of little assistance in making a diagnosis, but should be done to exclude differential diagnoses. Mimics of black widow envenomation may include scorpion and snake bites, an acute abdomen, myocardial infarction, alcohol withdrawal, organophosphate poisoning and tetanus. Most of these differentials may be suggested on patient history and a detailed account of events leading up to the current symptoms should be taken. Should the patient clearly report an incident he/she thinks to be a bite, scorpion and snake bites should be considered. Features in keeping with latrodectism that may suggest a snake bite include necrosis and severe swelling at the bite site (cytotoxic spider bite) or neurological symptoms such as visual disturbances, muscle weakness, dysphagia and ptosis. These neurological manifestations may also occur with scorpion bites.² Should abdominal pain be the prominent symptom, causes of an acute abdomen (appendicitis, cholecystitis, renal colic, pancreatitis and perforated peptic ulcer) should be sought with the necessary blood workup and imaging. In a patient who is sweaty and anxious, a myocardial infarct or alcohol withdrawal may be present. Organophosphate poisoning is very common in certain areas of South Africa and should be excluded if cholinergic symptoms predominate. Tetanus and rabies should be considered if symptoms of muscles spasms, sweating and fever occur several days to weeks after a bite or injury.^{1,4,5}

Drawn-out symptoms may lead to exhaustion and dehydration, which may have consequences. Treatment of a black widow spider bite includes fluid rehydration, analgesia, relief of muscle cramps and antivenom, when indicated. Anti-tetanus toxoid should be administered. Opioids and benzodiazepines have good anecdotal evidence for the treatment of muscle spasms and may provide effective pain relief,^{4,6} although some authors advise that caution be exercised if a patient's respiration is already compromised by symptoms.¹ Calcium gluconate, although theoretically thought to decrease the amount of neurotransmitter release in nerve endings that are made more permeable to calcium by the spider venom, has clinically shown to be of short-term benefit only.⁶

Antivenom is the only specific therapy available and is highly effective in severe cases of latrodectism in reducing the duration of symptoms to less than 24 h.⁶ The locally produced spider antivenom is refined equine anti-*Latrodectus indistinctus* serum globulin, available in 5 ml ampoules.¹ Indications include severe envenomation not responding to traditional analgesia in a patient who gives no history of allergies or asthma.⁶ In addition, it is recommended to be used in children where venom to body surface area may result in severe symptoms, as well as the elderly and patients with co-morbid conditions that are prone to complications. Anaphylactic reactions to the serum may occur and therefore preclude the use in patients with mild or moderate latrodectism, where symptoms can be treated with other supportive management. If antivenom is indicated and used, it would be of benefit to administer this in a high-care or ICU setting, and to consider using antihistamines and corticosteroids in addition in an attempt to prevent a possible anaphylactic response. Despite the serious potential for anaphylaxis, there has only been one reported death from black widow antivenom. This occurred in a 37-year-old male with a history of asthma.⁷ Prophylactic adrenaline is controversial as it may worsen adrenergic symptoms.¹

In summary, this case highlights the typical presentation of latrodectism and reinforces the supportive and specific management that is required. If unusual features are present, it is important to consider other differential diagnoses. Black widow spider bites are treatable and patients have a good outcome in the large majority of cases.

Teaching points:

Black widow spider bites are rarely lethal in adults.

Envenomation results in symptomatology called latrodectism: pain around bite site, generalised cramps and hypertonia, as well as facial flushing, sweating and anxiety.

Antivenom is not indicated in the majority of cases that are mild to moderate, but may be considered in severe envenomation, children and the elderly.

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