



Spider bite: a current approach to management

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Summary

Although spider bite is common, most spider bites cause minor effects and do not require treatment. More significant effects result from redback and, less commonly, from funnel-web spider bites. Redback spider envenoming causes local, radiating and regional pain, sometimes associated with local or regional diaphoresis, non-specific systemic features, and less commonly, other autonomic or neurological effects. Antivenom is recommended for severe or persistent pain and systemic effects. Funnel-web spider envenoming can rapidly cause life-threatening effects, but it can be treated effectively with antivenom. Envenoming is characterised by excessive autonomic activity, neuromuscular excitation and pulmonary oedema. Clinical effects attributed to suspected spider bites such as ulcers, should be thoroughly investigated for other causes including infectious, inflammatory, vascular and neoplastic conditions.

Key words: antivenom, envenoming, funnel-web, necrotic arachnidism, redback.

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Introduction

Spider bites are a common problem with numerous calls being made to poisons information centres annually. There is ongoing misinformation about the effects of suspected spider bites, because past information has been based on circumstantial evidence. A definite spider bite is where there is evidence of a spider biting (effects), the spider is seen at the time and it is then identified by an expert. In a study of 750 definite spider bites the majority caused only minor effects and did not require treatment in a healthcare facility. Moderate to severe

envenoming resulted almost exclusively from redback spiders and rarely funnel-web spiders.¹ Pain or discomfort occurs in all spider bites. Other local effects include fang marks or bleeding (larger spiders), erythema or red marks (about two-thirds of cases) and itchiness.

Spider bites are best considered in three medically relevant groups: big black spiders, redback spiders and all other spiders. Big black spiders are any large black-looking spiders that may be a funnel-web spider. Patients bitten by big black spiders must be managed as having suspected funnel-web spider bites until there are no signs of envenoming after four hours. Redback spiders are fairly easy to identify and their bites do not cause rapidly developing or life-threatening effects but many cause significant pain and systemic effects. All other spiders in Australia cause minor effects. If the patient has not been bitten by a big black spider or a redback spider they can be reassured and no further treatment is required.

Necrotic arachnidism and white-tail spider bite

Necrotic arachnidism, or more commonly in Australia white-tail spider bite, has become an entrenched diagnosis despite the

lack of evidence that spider bites cause necrosis or ulcers in Australia. In a prospective study of definite white-tail spider bites there were no cases of necrotic ulcers. The bites caused pain in only 21% of patients, pain and a red mark for 24 hours

in 35%, or a persistent red mark and associated itchiness, pain or lump lasting for about seven days in 44%.² Current evidence suggests that spider bites are very unlikely to cause necrotic lesions and such cases presenting as suspected spider bites should be thoroughly investigated for other causes. A recent series of suspected white-tail spider bites found other causes when appropriately investigated.³

It is important to distinguish patients presenting with clinical effects (usually skin lesions or ulcers) that have been attributed to a spider bite and patients with a clear history of a definite spider bite. Diagnosis and investigation in patients with ulcers must focus on important causes of necrotic ulceration including infectious, inflammatory, vascular and neoplastic conditions.³

Spider bites are very unlikely to cause necrotic lesions

Redback spider bites

Redback spider bites are the commonest cause of significant envenoming in Australia. Severe and persistent pain occurs in a half to two-thirds of cases and may be severe enough to prevent sleep in about a third of cases.⁴ Redback spiders live in dry or dark areas and commonly cause bites when people put on shoes or when they move outdoor furniture, bike helmets, firewood or pot plants. Most bites are by the larger female spider and in most cases the spider is recognised by the patient if it is seen. Redback spider bites occur in the warmer months and peak between January and April.

Envenoming by redback spiders is characterised by local, radiating and regional pain which may be associated with local and regional diaphoresis, non-specific systemic features, and less commonly other autonomic or neurological effects (see box). The bite may not be felt or may only be an initial irritation or discomfort. Pain increases over about an hour and may radiate proximally to the limb or less commonly the trunk. These spiders are small and rarely leave fang marks or cause local bleeding. Local erythema is common and local diaphoresis occurs in about a third of cases. Common non-specific effects include nausea, lethargy, malaise and headache. Numerous other systemic effects are reported less commonly (see box). The effects last about 1–4 days with almost all cases resolving within one week. There have been no deaths since the 1950s. The diagnosis is based on the history, but can be difficult in young children and infants who may present with undifferentiated pain or distress.

Treatment

There has been controversy over the management of redback spider bites, particularly who should be treated with antivenom and the route of administration. Pressure bandaging is contraindicated in redback spider bites. A recent prospective study has suggested that many patients would benefit from antivenom treatment because untreated patients had persistent pain and many were unable to sleep because of it.⁴ Although intramuscular antivenom has been recommended and used for over 40 years there are concerns that it is less effective than intravenous antivenom. A recent randomised controlled trial was unable to demonstrate a difference between intramuscular and intravenous routes, but the trial was small and many patients were lost to follow-up.⁵ A larger ongoing randomised controlled trial hopes to determine the more effective route. Despite concern about the safety of intravenous antivenom, diluted intravenous antivenom appears to have a similar low reaction rate to intramuscular antivenom.

Symptomatic relief is probably only effective in the most minor cases and even parenteral opiates are ineffective in many cases. Antivenom is recommended for systemic envenoming and for

Redback spider bite: clinical effects

Local and regional effects

- increasing pain at the bite site over minutes to hours, which can last for days
- pain radiating from the bite site to the proximal limb, trunk or local lymph nodes
- local sweating
- regional sweating with unusual distributions of diaphoresis, e.g. bilateral below knee diaphoresis
- less common effects include piloerection, local erythema, fang marks (5%)

Systemic effects

- nausea, vomiting and headache
- malaise and lethargy
- remote or generalised pain
- abdominal, back or chest pain
- less common effects include hypertension, irritability and agitation (more common in children), fever, paraesthesia or patchy paralysis, muscle spasms, priapism

severe local or radiating pain. The current recommendation is an initial dose of two vials of antivenom given as an intramuscular injection or as a slow intravenous infusion over 15 minutes. Intravenous antivenom may be preferred for severe envenoming, in children or if there is a poor response to intramuscular antivenom. Antivenom has been safely used in breast-feeding and pregnant women. The use of antivenom 24–96 hours after the bites is reasonable based on the natural course of envenoming and reported response in these cases.

Adverse effects

Early allergic reactions to redback spider antivenom are rare (less than 2%) and premedication is not recommended. Serum sickness is uncommon, but all patients should be warned about it. For moderate to severe cases of serum sickness a short course of prednisone is recommended. Patients who do not require treatment with antivenom can be discharged and told to return if they require treatment for the pain or systemic effects.

Funnel-web spider bites

Funnel-web spiders (Hexathelidae, Atracinae: *Atrax* and *Hadronyche* species) are the most dangerous spiders in Australia. Severe envenoming has only been reported from southern Queensland to southern New South Wales, but it is rare (5–10 cases annually requiring antivenom).⁶ However, funnel-web spider envenoming is an important clinical condition because of the life-threatening effects, rapid onset and the availability of effective antivenom.

Funnel-web spider bites cause immediate local pain, and usually puncture marks and local bleeding. In many cases this is the only effect because severe envenoming develops in only a proportion of cases. In some cases mild envenoming occurs with local neurotoxicity (paraesthesia, numbness or fasciculations) and/or non-specific systemic effects. Severe envenoming is characterised by:

- autonomic excitation – generalised diaphoresis, hypersalivation, lacrimation, piloerection, hypertension, bradycardia or tachycardia, miosis or mydriasis
- neuromuscular excitation – paraesthesia (local, distal and oral), fasciculations (local or generalised, commonly tongue fasciculations), muscle spasms
- non-specific systemic effects – abdominal pain, nausea, vomiting, headache
- pulmonary oedema and less commonly myocardial injury
- central nervous effects – agitation/anxiety, and less commonly drowsiness or coma.

Severe envenoming has been reported for six species, including the Sydney funnel-web spider (*Atrax robustus*), the southern tree funnel-web spider (*Hadronyche cerberea*) and northern tree funnel-web spider (*Hadronyche formidabilis*). The Sydney funnel-web spider causes severe envenoming in 17% of cases, but the two tree funnel-web spiders cause severe envenoming in over half of cases.⁶

Treatment

First aid for funnel-web spider bite is a pressure immobilisation bandage and rapid transport to hospital. The mainstay of treatment is funnel-web spider antivenom, admission to a critical care area and monitoring for 12–24 hours until all evidence of envenoming has resolved. Funnel-web spider antivenom appears to be effective in bites by *Atrax* and *Hadronyche* species. Premedication is not required and early allergic reactions and serum sickness are rare.⁶ The initial dose of antivenom is two vials which can be repeated every 15–30 minutes until envenoming has resolved.

Patients with funnel-web spider bites without symptoms of severe envenoming, or bites by unidentified big black spiders in eastern Australia, should initially be treated as suspected cases of envenoming. These patients should be observed for 2–4 hours and the pressure immobilisation bandage can be removed once funnel-web spider antivenom is available. If there is no evidence of severe envenoming after two hours, it is unlikely to occur⁶, but it is prudent to observe the patient for four hours.

Mouse spider bites can cause local neurotoxic effects (paraesthesia, numbness) and non-specific systemic effects in some cases. However, because they are large black spiders, the bites should be treated as suspected funnel-web spider bites.

A clinical toxicologist can be contacted for advice on managing severe envenoming through the Poisons Information Centre (phone 13 11 26).

References

1. Isbister GK, Gray MR. A prospective study of 750 definite spider bites, with expert spider identification. *QJM* 2002;95:723-31.
2. Isbister GK, Gray MR. White-tail spider bite: a prospective study of 130 definite bites by *Lampona* species. *Med J Aust* 2003;179:199-202.
3. Isbister GK, Whyte IM. Suspected white-tail spider bite and necrotic ulcers. *Intern Med J* 2004;34:38-44.
4. Isbister GK, Gray MR. Latrodectism: a prospective cohort study of bites by formally identified redback spiders. *Med J Aust* 2003;179:88-91.
5. Ellis RM, Sprivulis PC, Jelinek GA, Banham ND, Wood SV, Wilkes GJ, et al. A double-blind, randomized trial of intravenous versus intramuscular antivenom for red-back spider envenoming. *Emerg Med Australas* 2005;17:152-6.
6. Isbister GK, Gray MR, Balit CR, Raven RJ, Stokes BJ, Porges K, et al. Funnel-web spider bite: a systematic review of recorded clinical cases. *Med J Aust* 2005;182:407-11.

Further reading

Meier J, White J, editors. Handbook of clinical toxicology of animal venoms and poisons. Boca Raton (FL): CRC Press; 1995. p. 259-330.

Isbister GK, White J. Clinical consequences of spider bites: recent advances in our understanding. *Toxicon* 2004;43:477-92.

For images of spiders: see Clinical Toxinology Resources website. <http://www.toxinology.com> [cited 2006 Nov 9]

Conflict of interest: none declared

Self-test questions

The following statements are either true or false (answers on page 171)

5. Most patients bitten by redback spiders only need analgesia and do not require antivenom.
6. Pregnant women should not be given spider antivenom.

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