AfriTox Guidelines
Neurotoxic Spider Bite in Southern Africa

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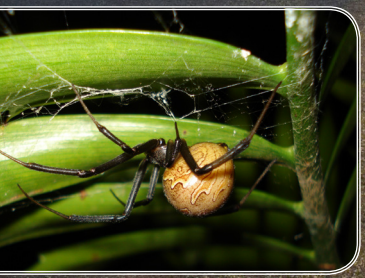

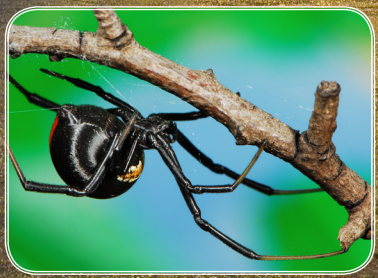

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DO NOT ARCHIVE

Treatment protocols are current only on the day of issue. They are frequently revised and rapidly become outdated. Do not store them for future reference.

Overview

Neurotoxic spiders in South Africa belong to the genus Latrodectus, commonly known as button spiders in Southern Africa and widow spiders elsewhere in the world. Based on the toxicology of their venoms, they can be divided into two groups: the BLACK BUTTON SPIDERS, comprising four species each with a distinct geographical distribution (L. indistinctus, L. renivulvatus, L. cinctus and L. karrooensis) and the BROWN BUTTON SPIDERS, which consists of three species (L. geometricus, L. rhodesiensis and L. umbukwane).

Envenomation by female black button spiders usually causes severe symptoms in humans (latrodectism), which may require antivenom administration, whereas that from the brown button spider is less severe, more localised and has a quicker recovery. Young children, the elderly and those with respiratory or cardiac disease are more likely to show serious effects.

Mode Of Action

Systemic symptoms are due to a neurotoxin (alpha-latrotoxin) which binds to a receptor in the peripheral nerves resulting in a massive release of the neurotransmitters, noradrenaline and acetylcholine. This leads to an initial hyperactive state with stimulation of somatic and autonomic nerve endings, followed by relative paralysis due to neurotransmitter depletion. The central nervous system is not affected as the toxin does not cross the blood-brain barrier. The venom of L. indistinctus has been shown to be four times more venomous than that of L. geometricus.

Latrodectus spiders do not bite readily.

Clinical Features

Female black button spider bites usually cause immediate burning pain at the bite site with subsequent involvement of regional lymph glands within 5 - 15 minutes that may be both palpable and tender. The bite mark can be difficult to locate in 30% of bites or may show as a red macular spot with surrounding

erythema and local paraesthesia. It may have a blanched center.

Systemic symptoms of LATRODECTISM may develop within an hour with severe generalised muscle pains and cramps, particularly in muscles of the abdomen thighs and chest, causing abdominal rigidity and chest “tightness”. The symptoms may be misleading, and diagnosis confused with an acute abdomen, but there is no abdominal tenderness or rebound tenderness and bowel sounds are normal. Limb pain, weakness in the legs and difficulty walking may occur, as well as diffuse paraesthesiae.

The patient may be anxious and sweat profusely. Patients usually have a tachycardia and raised blood pressure, but may also present with bradycardia. Involuntary movements and brisk reflexes are often observed. Patients may have facial grimacing and trismus.

Less commonly, flushing and oedema of the face, especially the eyelids, occurs and the conjunctivae may be red. A slight fever may develop. An erection can occur, particularly in children. Pulmonary oedema and urinary retention have been reported.

A bite from the brown button spider causes localised burning, paraesthesiae and painful regional lymphadenopathy. There may be stiffness of the local muscle groups. In a small percentage of patients, some systemic features may develop (e.g. abdominal and general muscular pain, weakness of legs). Occasionally there is localised sweating and a low-grade fever. Children can present with hyperactivity and restlessness and may develop systemic features of envenomation.

Differential Diagnosis

Other diagnoses to consider when a patient presents with the aforementioned clinical features and no clear history of a spider bite, include scorpion stings, neurotoxic snake bites, acute abdomen, myocardial infarction, alcohol withdrawal and cholinesterase inhibitor toxicity.

Outcome

If not treated with antivenom, the symptoms of severe latrodectism may be protracted and continue for days to a week or more. This may result in patients becoming exhausted and dehydrated. Major complications are rare

and include pulmonary oedema (which responds rapidly to antivenom) and myocardial infarction in patients with preceding ischaemic heart disease.

The symptoms of a brown button spider bite are self-limiting and generally resolve within 1 - 3 days.

Spider Identification

Button spiders have globular abdomens and an average body length of 10 - 15 mm. They range in colour from black/dark brown to shades of brown and creamy yellow. They have long, slender legs with the third pair being the shortest. The legs of black button spiders are uniformly dark whereas brown buttons spider may have faintly banded legs. The black button spider has no markings on the ventral surface of the abdomen whereas the brown button spider has a distinct orange-red hourglass marking on the ventral surface. Please see the Information tab for “Latrodectus species” for full descriptions and photos.

Black button spiders are generally a veld species although increasingly found in suburban gardens, whereas brown button spiders are more commonly found in buildings and built-up areas.

If identification is possible, it is important for management. Attempt to identify from the specimen brought in by the patient or a description of its habitat etc with the aid of any available illustrated reference books, posters or the internet. For help with identification, find contact details of Identification Experts in the Standard Guidelines.

Treatment

Additional advice on the management of spider envenomation and antivenom availability can be obtained from medical spider bite experts. For contact details, see Antivenom and Expert Advice, in Standard Guidelines.

Triage

- Admit all patients with symptoms of systemic latrodectism for at least 24 hours.
- Admit and monitor all patients with confirmed black button spider bites

for 3 - 6 hours.
- Admit all high-risk patients i.e. children, the elderly or patients with respiratory or cardiac incompetence, with suspected black and brown button spider bites.
- Non high-risk patients with confirmed brown button spider bites may be observed at home depending on their symptoms and supportive care required.

Supportive Treatment

- Perform routine wound care.
- Immersion in hot water may relieve symptoms temporarily.
- Give analgesia if required (see below), but DO NOT give opiates or CNS depressants. Do not give routine antihistamines.
- Antibiotics are not routinely recommended and should only be used if secondary infection is suspected. Establish intravenous access and give intravenous fluid replacement if needed.
- Antivenom (see below) may be required.
- Tetanus prophylaxis is indicated for all bites.

Monitor

- Heart rate and blood pressure.
- Breathing and oxygen saturation.
- Acid/base status
- Electrolytes, including calcium.

Analgesia

- Relieve the pain with analgesics, but avoid opiates and CNS depressants.
- Immersion in hot water may relieve symptoms temporarily.
- Muscle pains and cramps may be temporarily relieved with calcium gluconate solution, although the effect only lasts for 20 - 30 minutes and there is a finite amount which can be given. The efficacy of calcium gluconate has been disputed in some reports.
- Give calcium gluconate 10% by slow intravenous injection.
  Adult: 10 ml (1g or 2.2 mmol)
  Child: 0.5 ml/kg (50 mg/kg or 0.13 mmol/kg)

- Both adults and children may have repeated doses several minutes apart up to a maximum total dose of 2g.
- Due to its potential hazards, all patients receiving calcium gluconate should be on cardiac monitoring.

Spider Antivenom

Latrodectus spider antivenom, a monovalent antivenom specific to L. indistinctus and derived from horse serum, neutralises the spider venom and is the only effective treatment for severe latrodectism. Due to the risk of anaphylactic reactions to the antivenom, it should only be used when indicated. In these cases, spider antivenom should be given as soon as possible as it often results in a dramatic improvement in symptoms within 30 - 60 minutes. Spider antivenom can still be very effective even when given a few days after envenomation, according to some reports.

Indications

- Systemic symptoms and signs of latrodectism (particularly a non-tender rigid abdomen, sweating and hypertension).
- Generalised pain or pain distant from the bite site.

How to administer spider antivenom

- Intravenous administration of antivenom is the preferred route. If this is not possible, intramuscular injection can be used.
- Allergic reactions to antivenom are common and facilities to treat anaphylaxis must be available BEFORE antivenom is administered. Antivenom should be given in a setting where the patient can be continuously monitored during administration.
- The use of pre-treatment adrenaline prior to administering spider antivenom is NOT routinely indicated as this may theoretically increase some of the effects on the autonomic nervous system of the spider venom.
- Prophylactic hydrocortisone and antihistamines have NOT been shown to reduce the risk of early allergic reaction to antivenom and therefore should NOT be given routinely. However, if a patient has known or suspected hypersensitivity and needs antivenom, give promethazine

(Adult 10 - 25 mg IV, Child 0.2 mg/kg IV) and hydrocortisone (2 mg/kg IV) before antivenom administration. This however does not always prevent anaphylaxis.
- There is no need to give a test dose (hypersensitivity reaction test) of antivenom as this is unreliable in predicting who will develop an allergic reaction and delays the administration of antivenom.

Dose

- An initial dose of 5 - 10 ml IV for both adults and children is recommended.
- NB Children require the same dose of antivenom as adults.
- Please refer to the package insert to double check the dose you are giving is correct for the antivenom product you are using.
- Intravenous antivenom can be given fairly quickly and does not need to be diluted. Neat antivenom given over 10 - 15 minutes has the same risk of reaction as when given diluted over 30 - 60 minutes. This is useful in children where fluid volumes need to be carefully controlled. However, the antivenom may be quite thick in consistency and therefore some medical practitioners prefer to dilute it in 100 - 200 ml saline.
- Response to antivenom should be monitored and an additional dose of 5 ml may be given after 4 - 6 hours if there is no relief in symptoms.
- Patients must be continuously monitored for 6 - 12 hours after the infusion has been completed.

Reactions to antivenom

Early reactions to antivenom can be mild and include pallor, vertigo, rigors, pain, extensive urticaria, nausea, vomiting and headache.

Severe reactions include hypotension, bronchospasm and angioedema. As anaphylaxis can occur early (within a few minutes) facilities to treat it must be available BEFORE antivenom is administered. For Anaphylaxis Management, see Standard Guidelines. If antivenom is assessed as an essential part of management it should be restarted as soon as possible. Co-administration of an adrenaline infusion may be required for refractory hypotension.

Pyrogens may contaminate antivenom during the manufacturing process, resulting in pyrogenic reactions when administered. This occurs within an hour of antivenom treatment, resulting in fever, rigors and even hypotension. Children can have febrile convulsions. Patients should be managed

symptomatically and given antipyretics, such as paracetamol.

A type of serum sickness, characterised by fever, urticaria and polyarthritis may occur about 5 - 24 days after treatment with antivenom. It is a type III or immune-complex mediated hypersensitivity response to the horse-derived antivenom. It can present more rapidly and severely in patients re-exposed to antivenom, such as snake- handlers. Some authors suggest serum sickness is related to the dose, duration, type of antivenom and prior exposure, but there is no consensus on how to treat it. Some suggest antihistamines and oral steroids if symptoms arise; others recommend prophylactic steroids for those given large doses of antivenom.

Availability of antivenom

Latrodectus spider antivenom is available from South African Vaccine Producers. For contact details, see Antivenom and Expert Advice, in Standard Guidelines under Toxic Groups.