Snake bite guidance

September 2022

Snake bite is uncommon in Victoria and envenomation is rare, however it is a dangerous condition and all snake bites need urgent medical attention. Snakes endemic to Victoria include the tiger, brown and red-bellied black snake. Each year in Australia, between one and four deaths are caused by snake bite.

Snake bite is a condition where urgent treatment is essential and the coordination of services (transport, treating facility and antivenom stockholders) is important to ensure the best possible outcome for the patient. Safer Care Victoria recognises the importance of providing information to the sector about how to manage snake bite and has therefore developed guidance for the healthcare sector.

## How to use this guidance

This guidance is aimed at clinicians working across Victoria in emergency departments (ED) and urgent care centres (UCC). The guidance includes:

* clinical guidance and pathways for EDs and UCCs in Victoria for the management of suspected or confirmed community-acquired snake bite in both adult and paediatric patients
* useful tools to support decision making, including flow charts and clinical pathway documents
* information on recommended stock holdings of antivenom for emergency departments and urgent care centres in Victoria.

This guidance **does not** include:

* specific advice regarding bites in snake handlers. Advice for a snake bite from a non-endemic snake should be sought from a clinical toxicologist: Victorian Poisons Information Centre (VPIC) 13 11 26.

**Note:** The Royal Children’s Hospital Snakebite Clinical Guideline is available at <https://www.rch.org.au/clinicalguide/guideline_index/Snakebite/>. The clinical pathway and dosing of antivenom for the management of a suspected or confirmed snake bite in a paediatric patient is the same as for an adult. However total intravenous volume needs to be age appropriate.

#### Updates September 2022

* Changed information on red back spider antivenom stock holdings – removal of recommended stock holdings.
* Added recommendation of age appropriate (paediatric) intravenous volume consideration.
* Changed information for assessing evidence of envenomation- removal of swab recommendation for SVDK testing.

## Management of snake bite or suspected snake bite

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| It is strongly recommended that all confirmed or suspected cases of envenomation are discussed with a clinical toxicologist to guide treatment planning and management (VPIC 13 11 26). |

### Pressure bandage with immobilisation (PBI)

PBI is the recommended initial first aid for a potential snake bite. The preferred bandage is one which is broad (10-15cm) and elasticised. Self-adherent bandages should be avoided as they have the potential to become increasingly constrictive, particularly if there is any swelling. The bandage should be applied to cover the whole limb. Start the bandage distally (toes/fingers) and continue up the limb to include the bite site as high as possible. The bandage should be fitted as firm as if bandaging a sprained ankle. Immobilisation of the limb, as well as the patient in general, are both essential aspects of care.

An example of PBI can be found at <https://docs.remotephcmanuals.com.au/review/g/manuals2017-manuals/d/20325.html?page=46>.

For information on pressure immobilisation technique, refer to Australian Resuscitation Council guideline 9.4.8 at <https://resus.org.au/guidelines/>.

### Victorian endemic snakes

Snakes endemic to Victoria include the tiger, brown, and red-bellied black snakes. Most venomous snake bites in Victoria are from tiger or brown snakes, and both may present with an initial coagulopathy on blood testing. Bites from endemic snakes are managed with tiger and/or brown snake antivenom.

Table 1. Victorian endemic snakes, effects of envenomation and usual antivenom

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Snake | Coagulopathy | Neurotoxicity | Myotoxicity | Systemic symptoms | Cardiovascular effects | TMA | Antivenom |
| Brown | VICC | Rare and mild | - | <50% | Collapse (33%) Cardiac arrest (5%) | 10% | Brown |
| Tiger | VICC | Uncommon | Uncommon | Common | Rare | 5% | Tiger |
| Red-bellied black | Anticoagulant | - | Uncommon | Common | - | - | Tiger |

VICC: Venom-induced consumptive coagulopathy - abnormal INR, fibrinogen very low, D-dimer high

Anticoagulant: APTT 1.5-2.5 x normal ± minor elevation INR, D-dimer and fibrinogen usually normal

TMA: thrombotic microangiopathy - fragmented red blood cells on blood film, thrombocytopenia and a rising creatinine

### Blood tests

Initial blood tests: coagulation screen (INR, APTT, fibrinogen), FBE and film, CK, UEC, quantitative D-dimer.

Serial blood tests in all patients: coagulation screen (INR, APTT, fibrinogen), FBE and film, CK, UEC, quantitative D-dimer.

**Note:** Point-of-care tests are not appropriate for INR and D-dimer as they may give false results in patients with venom-induced consumptive coagulopathy (VICC).

### Role of snake venom detection kits (SVDK)

The choice of antivenom is based on the clinical syndrome and local geographical patterns of snake distribution. SVDKs have a significant misidentification rate. For this reason, stocking and use of a SVDK is no longer clinically recommended in Victoria. Choice of antivenom in envenomed cases where the snake is thought to be non-endemic should be made in consultation with a clinical toxicologist (VPIC 13 11 26).

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### Location of care

All patients with a suspected snake bite should be managed in a facility with access to antivenom, critical care facilities and a 24-hour laboratory for blood tests. If these criteria are not met, inter-hospital transfer is required, even for asymptomatic patients.

Early discussion with a toxicologist will help determine this need (VPIC 13 11 26). Adult Retrieval Victoria (ARV) (1300 36 86 61) can co-ordinate the transfer in consultation with the referring practitioner and the clinical toxicologist.

Patients presenting to Ambulance Victoria (AV) should bypass Urgent Care Centres (UCCs) and be transferred directly to an Emergency Department. If transfer time will exceed 30 minutes, the AV paramedics should contact ARV (1300 36 86 61) to determine if there is a closer anti-venom supply (may be an UCC), or if antivenom can be collected from a health service and transported to meet the patient. ARV can co-ordinate the administration of the antivenom in consultation with the AV paramedics and the clinical toxicologist.

If a patient presents directly to an UCC, an emergency ambulance transfer should be arranged at an early stage to a facility with critical care facilities and a 24-hour laboratory for blood tests (Attachment 1 – Urgent Care Centre Snake Bite Envenomation Clinical Pathway).

If a clinical assessment undertaken by an UCC practitioner suggests that envenomation is likely, then it is recommended that urgent discussion with a toxicologist (VPIC 13 11 26) occurs. If antivenom is available at the UCC and administration of antivenom is recommended by the toxicologist but no prescriber is available to authorise administration, the UCC staff should contact Adult Retrieval Victoria (1300 36 86 61) early for assistance.

If patients deteriorate or become unstable, admission and transfer to a tertiary level ICU may be necessary.

All decisions should be made in consultation with a clinical toxicologist (VPIC 13 11 26).

### Clinical assessment guide

Circumstances, symptoms or examination on their own are not indicators for antivenom. Consider all aspects when assessing for evidence of envenomation.

This table details information to seek when assessing if envenomation has occurred.

Table 2. Assessing for evidence of envenomation

|  |  |  |
| --- | --- | --- |
| Circumstances | Symptoms | Examination |
| * Confirmed or witnessed bite versus suspicion that bite might have occurred
* Are there multiple bites?
* When?
* Where?
* First aid?
* Past history?
* Medications?
* Allergies?
 | * Headache
* Nausea or vomiting
* Abdominal pain
* Blurred or double vision
* Slurred speech
* Muscle weakness
* Respiratory distress
* Bleeding from the bite site or elsewhere
* Passing dark or red urine
* Local pain or swelling at the bite site
* Pain in lymph nodes draining the bite area
* Loss of consciousness and/or convulsions
 | * Evidence of a bite or multiple bites
* Evidence of venom movement (such as swollen or tender draining lymph nodes)
* Neurotoxic paralysis (ptosis, ophthalmoplegia, diplopia, dysarthria, limb weakness, respiratory distress)
* Coagulopathy (bleeding gums, prolonged bleeding from venepuncture sites or other wounds, including the bite site)
* Muscle damage (muscle tenderness, pain on movement, weakness, dark or red urine indicating myoglobinuria)
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#### Treat as envenomed if there is:

Neurotoxic paralysis (for example, ptosis, ophthalmoplegia, limb weakness, respiratory failure).

Coagulopathy (for example, blood not clotting, INR > 1.3, prolonged bleeding from wounds and venepunctures).

History of unconsciousness, collapse, convulsions or cardiac arrest.

Go to Attachment 2 (Emergency Department Snake Bite Envenomation Clinical Pathway) and seek advice from a clinical toxicologist (VPIC 13 11 26).

### Possible evidence of envenomation

There are several relative indications for antivenom that require expert interpretation.

Early discussion with a clinical toxicologist (VPIC 13 11 26) is strongly recommended in the following instances to determine if antivenom is required:

* any patient with significant symptoms (especially headache, vomiting or early collapse) OR any patient with symptoms following a witnessed snake bite
* any abnormality of INR, APTT, fibrinogen, D-dimer, full blood count (leucocytosis, evidence of thrombotic microangiopathy) or CK > 1,000 IU/L.

The assessment and management of an envenomed patient is complex and requires clinical toxicology input to advise which antivenom(s), if any, and dosage of antivenom(s) to be administered.

Antivenom administration can result in allergic reaction or anaphylaxis. Treating clinicians must be prepared to treat these reactions and have the patient appropriately monitored and observed during and after the administration of antivenom. Guidance on management of anaphylaxis is at <https://www.bettersafercare.vic.gov.au/clinical-guidance/emergency/anaphylaxis-adults>.

## Stockholdings of snake antivenom

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| It is strongly recommended that all health services conduct regular audits of their snake antivenom for both stock levels and expiration status. |

### Defining the minimum stock holding for tiger and brown snake antivenom?

Tiger snake antivenom: 2 doses (2 vials).

Brown snake antivenom: 2 doses (2 vials).

### Who should stock the minimum stock holdings for tiger and brown snake antivenom?

#### Emergency department

All EDs should have minimum antivenom stock holdings as listed above.

#### Urgent care centre

Where the UCC is medical practitioner led and maintains stable medical practitioner coverage for the majority of their operating hours, the minimum antivenom stock holdings are recommended as defined above.

Where the medical coverage at the UCC is not stable and does not cover the majority of the service hours, then no recommendation on minimum antivenom stockholding is made. Instead, first aid measures and early ambulance transfer to a referral service should be prioritised.

### Service levels and stock holding for polyvalent antivenom

It is recommended that the minimum stock holding of polyvalent is maintained at:

* the geographically-isolated, border health service at Mildura
* large regional health services (Geelong, Ballarat, Bendigo, Shepparton, Traralgon and Albury-Wodonga)
* metropolitan toxicology services (Austin and Monash)
* Royal Melbourne for provision of service to Melbourne Zoo.

The recommended minimum stock holding of polyvalent at the above mentioned services is 1 dose (1 vial).

### Other antivenom

Specific antivenom for unique/novel/non-endemic snakes (not covered by the polyvalent) should not be a routine stock holding and should be based on local risk. For example, the proximity of the Royal Melbourne Hospital to the Melbourne Zoo requires specific antivenom storage for non-endemic snakes in addition to the minimum stock holding requirement.

## Review

This guidance was last reviewed in September 2022. The next review is due in September 2023.

Revisions of the guidance are undertaken annually by the Snake Bite Expert Working Group which was established in December 2020.

## Contributions

We wish to thank the team of clinical experts who contributed to the most recent guidance review:

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