

STATE TOXINOLOGY SERVICES

Toxinology Dept., Women's & Children's Hospital, North Adelaide SA 5006 AUSTRALIA

SNAKEBITE MANAGEMENT OVERVIEW DOCUMENT

www.toxinology.com record number SN0040

Family Scientific name combined

Elapidae *Naja kaouthia*

Common name

Monocellate Cobra , Thailand Cobra , Monacled Cobra , Bengal Cobra

Global region in which snake is found

Indian Sub-continent + North Asia + Southeast Asia

CLINICAL OVERVIEW

Thai cobras can cause both local and systemic effects. Local pain, swelling, blistering and necrosis are all possible and common. Though classed as a non-spitter, this snake can spit its venom over short distances. The major systemic effect is neurotoxic flaccid paralysis, including respiratory paralysis. Both local wound care and respiratory support may be required to supplement antivenom therapy.



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Naja kaouthia

First aid

Section 1: General first aid (for first aid of venom spit ophthalmia (venom in eyes) see Section 2 below).

1. After ensuring the patient and onlookers have moved out of range of further strikes by the snake, the bitten person should be reassured and persuaded to lie down and remain still. Many will be terrified, fearing sudden death and, in this mood, they may behave irrationally or even hysterically. The basis for reassurance is the fact that many venomous bites do not result in envenoming, the relatively slow progression to severe envenoming (hours following elapid bites, days following viper bites) and the effectiveness of modern medical treatment.

2. The bite wound should not be tampered with in any way. Wiping it once with a damp cloth to remove surface venom is unlikely to do much harm (or good) but the wound must not be massaged.

3. All rings or other jewellery on the bitten limb, especially on fingers, should be removed, as they may act as tourniquets if oedema develops.

4. The bitten limb should be immobilised as effectively as possible using an extemporised splint or sling; if available, crepe bandaging of the splinted limb is an effective form of immobilisation.

5. If there is any impairment of vital functions, such as problems with respiration, airway, circulation, heart function, these must be supported as a priority. In particular, for bites causing flaccid paralysis, including respiratory paralysis, both airway and respiration may be impaired, requiring urgent and prolonged treatment, which may include the mouth to mask (mouth to mouth) technique of expired air transfer. Seek urgent medical attention.

6. Do not use Tourniquets, cut, suck or scarify the wound or apply chemicals or electric shock.

7. Avoid peroral intake, absolutely no alcohol. No sedatives outside hospital. If there will be considerable delay before reaching medical aid, measured in several hours to days, then give clear fluids by mouth to prevent dehydration.

8. If the offending snake has been killed it should be brought with the patient for identification (only relevant in areas where there are more than one naturally occurring venomous snake species), but be careful to avoid touching the head, as even a dead snake can envenom. No attempt should be made to pursue the snake into the undergrowth as this will risk further bites.

9. The snakebite victim should be transported as quickly and as passively as possible to the nearest place where they can be seen by a medically-trained person (health station, dispensary, clinic or hospital). The bitten limb must not be exercised as muscular contraction will promote systemic absorption of venom. If no motor vehicle or boat is available, the patient can be carried on a stretcher or hurdle, on the pillion or crossbar of a bicycle or on someone's back.

10. Most traditional, and many of the more recently fashionable, first aid measures are useless and potentially dangerous. These include local cauterization, incision, excision, amputation, suction by mouth, vacuum pump or syringe, combined incision and suction ("venom-ex" apparatus), injection or instillation of compounds such as potassium permanganate, phenol (carbolic soap) and trypsin, application of electric shocks or ice (cryotherapy), use of traditional herbal, folk and other remedies including the ingestion of emetic plant products and parts of the snake, multiple incisions, tattooing and so on.

Section 2: First aid for venom spit ophthalmia.

1. Venom coming into contact with eyes can cause intense conjunctivitis with a risk of corneal erosions, complicated by secondary infection, anterior uveitis and even permanent blindness. All this can occur following venom spat into the eyes from a spitting cobra.

2. Irrigate the eye or other affected mucous membrane as soon as possible using large volumes of water or any other available bland fluid. Never use chemical solutions or petroleum products such as petrol or kerosene. Milk is soothing and can be used, or in an emergency beer or urine are possibilities. Keep irrigating the eyes, hold them under a slowly running tap for a several minutes, while opening the eyelids and rotating the eyeball. The eye will be very painful, so patience, tact and reassurance are needed.

3. The eye should be bandaged using a pad over the eye and dark glasses worn.

4. Don't let the victim rub the eye.

5. Seek urgent medical attention.

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Naja kaouthia

Clinical summary

As a group, cobras present two major clinical profiles; minimal local reaction, but with progressive flaccid paralysis OR significant local reaction (pain, swelling, discolouration, blistering, even necrosis) with, or more usually without even mild flaccid paralysis. Most older textbooks listing snakebite will only mention the first (neurotoxic) profile, but both in Africa and Asia, it is the second profile which dominates. The majority of medically important cobras (ie those causing most bites) cause local tissue injury, ± paralysis. However, there are a few species that seem never to cause significant tissue injury, but only paralysis. Some species can cause either profile, making diagnosis difficult, because purely paralytic snakebite in some areas, such as India & Sri Lanka, is typical of krait bite, with which this type of cobra bite can easily be confused.

Some species of cobra (a subgroup of those causing local tissue injury) can also spit their venom, causing venom spit ophthalmia. *Naja kaouthia* is reported not to spit its venom, though we have seen specimens that do spit, so it should not be assumed to be a "non-spitter".

Cobras causing both extensive local effects, ± flaccid paralysis, such as *Naja kaouthia*, generally cause a painful bite, with progressive swelling and if necrosis develops, then there is often discolouration of the skin and/or blistering first. This may progress to full thickness skin necrosis over 3-7 days. Such wounds may be extensive, sometimes involve underlying tissues and be difficult to heal. There is a potential for both secondary infection and long term morbidity. Squamous cell carcinoma can develop in such long-term sores. In addition to these unpleasant local effects, there may be systemic symptoms, such as headache, nausea, vomiting, abdominal pain and less commonly, evidence of mild, sometimes moderate to severe flaccid paralysis. This may develop within a few hours or be delayed >12 hrs. Ptosis is usually the first sign, followed by ophthalmoplegia, then if it progresses, dysarthria, dysphagia, poor tongue extrusion, drooling, limb weakness, lastly respiratory paralysis. Relative rates of necrosis versus paralysis for *Naja kaouthia* vary between studies, but it appears necrosis will develop in about 10-40% of cases, while paralysis occurs in >50% of cases. Infection of the bite area is also common, as high as 58% of cases.

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Naja kaouthia

Treatment summary

Cobra bites vary from species to species. Many in both Africa and Asia cause major local effects, including swelling, pain, blistering and necrosis. Some of these also cause flaccid paralysis in a minority of cases. Other species cause flaccid paralysis without major local effects.

For all cases, admission to an ICU, urgent triage and assessment are required. If there is evidence of respiratory distress or paralysis, intubation and ventilation takes precedence. Establish an IV line, give an initial IV fluid load, take blood for routine tests, monitor fluid input/output. The local wound, if significant, should be managed as for bites by other snakes causing local tissue injury. Blisters should be drained with a syringe. If necrosis develops, surgical debridement is appropriate. Compartment syndrome is unlikely to develop, but if it is suspected, ensure it is confirmed by direct manometry or Doppler US before considering fasciotomy. The extensive wounds possible following snakebite necrosis are subject to secondary infection and if chronic, later development of squamous cell carcinoma. Both for functional reasons and to avoid the latter complication, surgical repair is required, even just skin grafting being useful. If there is evidence of infection, ensure a swab is performed for culture & sensitivity prior to commencing any antimicrobial therapy.

The role of antivenom in cobra envenoming is not entirely clear. For cases developing significant paralysis, it is the treatment of choice, though the correct antivenom must be used, where available, as there are considerable differences between species. For paralysis, in addition to antivenom, it is appropriate to try the tensilon test and if positive, to use neostigmine + atropine as an adjunct to antivenom. The initial and (if required) subsequent doses of antivenom will vary from antivenom to antivenom, but in all cases it must be given IV. The choice of antivenom for *Naja kaouthia* envenoming will depend on geographic origin of the snake and availability of antivenom. In most cases, the snakes will be from SE Asia, often Thailand, and the Thai Red Cross Cobra Antivenom is the most appropriate, with an initial dose of at least 8 vials (the TRC brochure recommends only 2 vials, but this is unlikely to be adequate; one author recommends starting with 10 vials). Further doses may be required. There are other producers of antivenoms with specific activity against *Naja kaouthia*. For bites by Indian or Bangladesh specimens, consider the Indian CRI Cobra Antivenom (initial dose uncertain, probably 12+ vials). For bites by Burmese specimens, consider the Burmese bivalent or monovalent antivenoms (may be hard to source; initial dose uncertain, possibly 8-10 vials). The Vietnamese also produce an antivenom against *Naja kaouthia* (initial dose 3+ vials).

For local tissue injury, the role of antivenom is less certain, but it is generally accepted it may be useful, especially if used early. Again, it must be used IV, not IM and definitely not injected locally.

Snake venom spit ophthalmia, caused when venom is spat into the eyes, can cause both intense local pain and more severe problems, including conjunctivitis, corneal erosions, anterior uveitis, secondary infection and even blindness. Spitting venom has been recorded for *Naja kaouthia*. However, this appears to be rare and this species is generally considered a "non-spitter". The first step in treatment is to thoroughly irrigate the eye using large volumes of water. The eye should then be examined under a slit lamp, with fluorescein staining, to detect corneal abrasions. Unless these are absent, the eye should then be treated with a topical antibiotic, such as occ. tetracycline or chloramphenicol. Topical adrenaline 1:1000 may relieve the intense pain. Topical antivenom is not appropriate. Ongoing treatment should be the same as for corneal injury/ulceration. If extensive damage is apparent, early referral to an ophthalmologist is appropriate.

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Available antivenoms

Cobra Antivenin
Science Division, Thai Red Cross Society
Queen Saovabha Memorial Institute
1871 Rama IV Road
Pathumwan
Bangkok 10330
Thailand
Phone: ++66-2-252-0161 (up to 0164)
Fax: ++66-2-254-0212
Email:
Website: www.redcross.or.th/index1ee.html

Cobra Antivenom
Thai Government Pharmaceutical Organisation
75/1 Rama VI Road,
Ratchathewi
Bangkok 10400,
Thailand
Phone: ++662-644-8851
Fax: ++662-245-9949
Email:
Website: www.moph.go.th/GPO

Monovalent Cobra Venom Antiserum
Central Research Institute
Kasauli (H.P.) 173204
India
Phone: ++91-1-792-72114
Fax: ++91-1-792-72049 / ++91-1-792-72016
Email: director@crikasauli.com
Website: www.crikasauli.com

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Naja kaouthia

Management Flowchart

