

Specific treatment: Antivenom (AV) Therapy

It is never too late to give antivenom provided the indications are present:

Only if features of **systemic** envenoming are present for bites of snakes in the **red box**

Do not give for local envenoming alone, **except for cobra bites** as described below

Do not give for bites of snakes in the **blue box**

Commence antivenom therapy immediately for the bites of the following snakes if the indications listed are present:

Russell's viper:

- If coagulopathy is present: positive 20WBCT; incoagulable blood, spontaneous bleeding.
- If no demonstrable coagulopathy, negative 20WBCT **BUT** proven Russell's viper bite with fang marks, abdominal pain and some local effects such as swelling, or in the presence of any one or more systemic effects such as visual disturbances, dizziness, faintness, collapse, shock, hypotension, cardiac arrhythmias and myocardial damage (reduced ejection fraction) (WHO Guidelines p. 96)

Cobra:

- Any evidence of systemic envenoming **or local envenoming**.
- "Dry bites" are common; in the presence of fang marks without symptoms of envenoming observe for 48 hours. If any swelling appears give the first dose (10 vials) of AV.

Kraits:

- If neurotoxic effects (ptosis, ophthalmoplegia) are present, for bites by either species of krait **OR**
- If severe abdominal pain **in the absence of neurotoxicity**.

Saw-scaled viper:

- Only if coagulopathy is present.

Coagulopathy is most easily detected by performing the 20WBCT as described elsewhere. It is recommended that wherever possible the prothrombin time and International Normalised Ratio (PT/INR) are also estimated.

No benefit will be gained by administering the available Indian manufactured polyvalent antivenom for bites of the following snakes (do not administer):

- Hump-nosed pit vipers**—even if severe local swelling is present (see article [hump-nosed pit vipers and their bites](#))
- Green pit-viper** (see article [green pit-vipers and their bites](#))
- Sea snakes** (see article [sea snakes and their bites](#))



Commence antivenom as soon as the indications are recognised

In view of the high incidence of reactions to the antivenom currently available

Premedication with low-dose adrenaline given just before the commencement of antivenom to prevent or reduce reactions is recommended

However, early detection and vigorous treatment of anaphylaxis continues to be very important.

For adults with no co-morbidities* the dose of adrenaline is 0.25 mg subcutaneously (0.25 ml of 1:1000 solution)

The dose for children is 0.005 ml/kg body weight of 1:1000 solution subcutaneously

- WHO Guidelines 2016, p. 134

* Older patients in whom there is evidence or suspicion of underlying cerebrovascular disease should not be given adrenaline prophylaxis. Monitor the blood pressure (BP) as there can be a rise of BP in both normotensive and hypertensive individuals given adrenaline.

“Use of histamine anti-H1 and anti-H2 blockers, corticosteroid, and the rate of intravenous infusion of antivenom (between 10 and 120 minutes), do not affect the incidence or severity of early antivenom reactions” (WHO Guidelines 2016: de Silva et al., 2011; Isbister et al., 2012).

Antivenom (AV) Therapy

Antivenom dose:

Russell's viper bites - the first dose is 200 ml (20 ampoules); subsequent doses should be 100 ml (10 ampoules) to a maximum total of 40 ampoules.

All other species - the first, and any subsequent doses, is 100 ml (10 ampoules).



In **Russel's viper bites** repeat 20WBCT in 6 hours.
If coagulopathy persists, repeat AV in a dose of 100ml (10 ampoules); repeat 20WBCT in 6 hours, if coagulopathy still persists, repeat AV in a dose of 100ml (10 ampoules) once more making a total of 400 ml (40 ampoules).



In **cobra and krait bites** usually **ONE** antivenom dose is sufficient.

The endpoint of antivenom therapy is reversal of coagulopathy as determined by serial performance of the 20WBCT.

Do not continue antivenom administration for persistent neurotoxicity, provided the coagulopathy has been reversed.



Administer the AV as an intravenous infusion over **ONE** hour, the required dose being dissolved in water and made up to 500 ml with normal saline.

The antivenom dose in children is the same as for adults, as the venom dose would have been the same. But the volume of diluent needs to be adjusted to match the smaller body volume

- see article [Snakebite in Children](#)

CAUTION

Observe the patient carefully for signs of anaphylaxis

MONITOR

Pulse, blood pressure and respiration and observe for the appearance of a rash

Have adrenaline drawn up in a syringe available at the bedside

TREAT ANAPHYLACTIC REACTIONS IMMEDIATELY

“The treatment of anaphylactic reactions to antivenom involves pharmacologic and non-pharmacologic interventions. Non-pharmacologic measures include temporarily stopping the antivenom infusion, airway management and fluid resuscitation. The mainstay of pharmacologic management is adrenaline given intramuscularly, which pharmacokinetic studies have shown to be superior to subcutaneous administration.”

“Antihistamines and corticosteroids are no longer recommended for the treatment of anaphylaxis”

(de Silva HA et al., 2015; Simons FE et al. (2011 & 2013)

The WHO Guidelines 2016 clearly states that the mainstay of treatment of anaphylaxis following antivenom administration is intramuscular administration of adrenaline (of 0.5 mg for adults, 0.01 mg/kg body weight for children). It goes on to say that additional treatment can be given in the following circumstances:

- If bronchospasm is present inhaled salbutamol or terbutaline, and
- Chlorpheniramine maleate (adults 10 mg, children 0.2 mg/kg by intravenous injection over a few minutes).
- Intravenous hydrocortisone (adults 100 mg, children 2 mg/kg body weight) can be given, but it is unlikely to act for several hours.

Patients who remain shocked and hypotensive should be laid supine with their legs elevated and given intravenous volume replacement with 0.9% saline (1-2 litres rapidly in an adult).

Intravenous epinephrine (adrenaline) infusion should be considered (adults 1mg (1.0 ml) of 0.1% solution in 250 ml 5% dextrose or 0.9% saline).

For a summary of reactions and treatment from the WHO Guidelines see article

[Antivenom Reactions - Introduction](#)

For recommendations on treatment scheme see article

[Management of Antivenom Reactions](#)



References

1. WHO (2016) Guidelines for the management of snake-bites, 2nd edition, World Health Organization 2016.
2. de Silva HA, Pathmeswaran A, Ranasinha CD, Jayamanne S, Samarakoon SB, Hittharage A, Kalupahana R, Ratnatilaka GA, Uluwatthage W, Aronson JK, Armitage JM, Laloo DG, de Silva HJ (2011). Low dose adrenaline, promethazine, and hydrocortisone in the prevention of acute adverse reactions to antivenom following snakebite: a randomised, double-blind, placebo-controlled trial. *PLoS Med.* 8(5):e1000435.
3. Isbister GK, Shahmy S, Mohamed F, Abeysinghe C, Karunathilake H, Ariaratnam A (2012). A randomised controlled trial of two infusion rates to decrease reactions to antivenom. *PLoS One.* 7(6):e38739.
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5. Simons FE, Arduzzo LR, Bilo MB, El-Gamal YM, Ledford DK, Ring J, Sanchez-Borges M, Senna GE, Sheikh A, Thong BY (2011). World Allergy O. World Allergy Organization anaphylaxis guidelines: summary. *J Allergy Clin Immunol*; 127: 587–93 e1-22.
6. Simons FE, Arduzzo LR, Dimov V, Ebisawa M, El-Gamal YM, Lockey RF, Sanchez-Borges M, Senna GE, Sheikh A, Thong BY, Worm M (2013). World Allergy O. World Allergy Organization Anaphylaxis Guidelines: 2013 update of the evidence base. *Int Arch Allergy Immunol*, 162: 193–204.