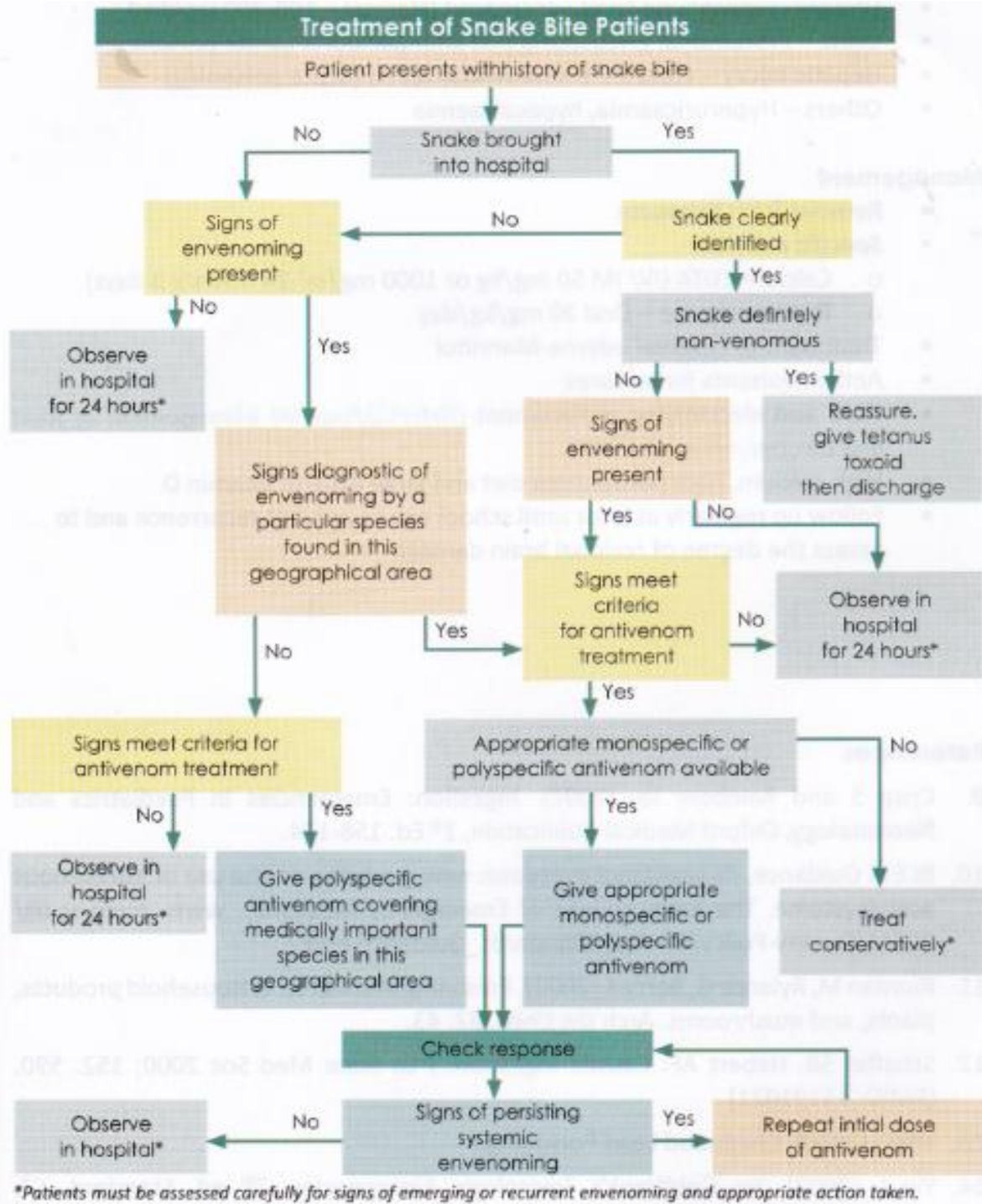


# Snake Bites

Rapid clinical assessment and resuscitation

Initial resuscitation and rapid clinical assessment can be done according to the following algorithm.



## Management

First aid should be carried out immediately and transport to the nearest hospital as quickly, but as safely and comfortably as possible.

***Rapid clinical assessment and urgent resuscitation should be done if required.***

Caution: Release of a tight tourniquet or compression bandage may result in the dramatic development of severe systemic envenoming.

- After stabilization, precise history of the circumstances of the bite and the progression of local and systemic symptoms and signs are very important.

## Physical examination

- Examination of the bitten part
- Species identification and time of bite

Two close-set puncture marks would indicate that the snake has fangs and is venomous, By contrast, a ragged bite mark means the snake lacks fangs, which only non-venomous snakes have.

Observe the typical features of common poisonous snakes of a particular region.



If the biting species is unknown, the patient should be observed closely to allow recognition of the emerging pattern of symptoms, signs and results of laboratory tests "the clinical syndrome", together with other evidence, which may suggest which species was responsible.

**Table 15.3 clinical Syndromes of Snake-bite in South East Asia**

	<b>Clinical features</b>	<b>Species of snake</b>
Syndrome 1	Local envenoming (Swelling etc.) with bleeding/clotting disturbances	<ul style="list-style-type: none"> <li>• Viperidae (all species)</li> </ul>
Syndrome 2	Local envenoming (swelling etc.) with bleeding, clotting disturbances	<ul style="list-style-type: none"> <li>• Shock or acute kidney injury (Russell's viper)</li> <li>• Conjunctival oedema(chemosis) and acute pituitary insufficiency (Russell's viper, Myanmar and South India)</li> <li>• Bilateral ptosis, external ophthalmoplegia facial paralysis etc. and dark brown urine (Russell's viper, Sri Lanka and South India)</li> </ul>
Syndrome 3	Local envenoming (swelling etc.) with paralysis	<ul style="list-style-type: none"> <li>• Cobra or king cobra</li> </ul>
Syndrome 4	Paralysis with minimal or no local envenoming	<ul style="list-style-type: none"> <li>• Bitten on land while sleeping on the ground with, without abdominal pain (Krait)</li> <li>• Bitten in the sea, estuary and some freshwater lakes (Sea snake)</li> </ul>
Syndrome 5	Paralysis with dark brown urine and acute kidney injury	<ul style="list-style-type: none"> <li>• Bitten on land with bleeding/ clotting disturbance (Russell's viper, Sri Lanka or South India)</li> </ul>

Look for local and systemic envenoming and presence of indications for antivenom\*\*There may be considerable overlap of clinical features caused by venoms of different species of snake.

**Early clues that a patient has severe envenoming:**

- Snake identified as a very dangerous one or a large specimen

- Widely spaced fang puncture marks or evidence of multiple strikes
- Rapid early extension of local swelling from the site of the bite
- Early tender enlargement of local lymph nodes, indicating spread of venom in the lymphatic system
- Early systemic symptoms: Collapse (hypotension, shock), nausea, vomiting, diarrhoea, severe headache, "heaviness" of the eyelids, inappropriate(pathological) drowsiness or early
- Ptosis/ophthalmoplegia
- Early spontaneous systemic bleeding
- No urine passed since the bite
- Passage of dark brown/black urine

**Note:** Do not assume that the snake-bitten patients are unconscious and irreversibly brain death just because their eyes are closed, they are unresponsive to painful

stimuli, are areflexic or have fixed dilated pupils. They may be severely paralysed and lack motor responses and spontaneous eye movements mimicking coma (Lock-in syndrome). check pulse, heart sounds and if possible ECG)

#### Investigations

- 20 minute whole blood clotting test (20 WBCT)-2 ml of blood in clean, dry sterile bottle and keep for 20 minutes and then check at 20 minutes) (The recycled glass antibiotic bottles should be cleaned by washing with "normal 0.9% saline" for intravenous infusion, without any added detergent or other cleansing agent, followed by hot air drying)
  - 2 hourly for first 12 hour
  - 4 hourly for 2<sup>nd</sup> 12 hour
- International Normalized Ratio (INR) based on prothrombin time (PT). activated partial thromboplastin time (aPTT), fibrinogen related antigens(fibrin degradation products-FDP) or D-dimer.
- Plasma creatinine, urea/blood urea nitrogen and potassium concentrations raised in acute kidney injury

- Haemoglobin concentration/haematocrit, thrombocytopenia, neutrophil leucocytosis, fragmented red cells ("Helmet cell", schistocytes) signifying microangiopathic haemolysis.
- Urine examination for albuminuria and haematuria

### **Antivenom Treatment**

Indications for antivenom

Antivenom treatment is indicated when patients with proven/ suspected snakebite develop one or more of the following signs:

Systemic envenoming:

- Haemostatic abnormalities (Spontaneous systemic bleeding, coagulopathy positive non-clotting 20WBCT, INR >1.2, or prothrombin time >4-5 seconds longer than control) or thrombocytopenia
- Neurotoxicity (Bilateral ptosis, external ophthalmoplegia, paralysis etc)
- Cardiovascular abnormalities (hypotension, shock, cardiac arrhythmia. abnormal ECG)
- Acute kidney injury (Oliguria/anuria, rising blood creatinine/urea)
- Haemoglobinuria/myoglobinuria (Dark brown/black urine, +ve urine dipsticks, other evidence of intravascular haemolysis/generalized rhabdomyolysis)
- Supporting laboratory evidences

**Local envenoming:**

- Local swelling involving more than half bitten limb (in absence of tourniquet) within 48 hours of the bite
- Swelling after bites on digits
- Rapid extension of swelling beyond wrist/ankle within few hours of bites on hand/foot);
- Enlarged tender lymph node draining bitten limb

**Administration of antivenom**

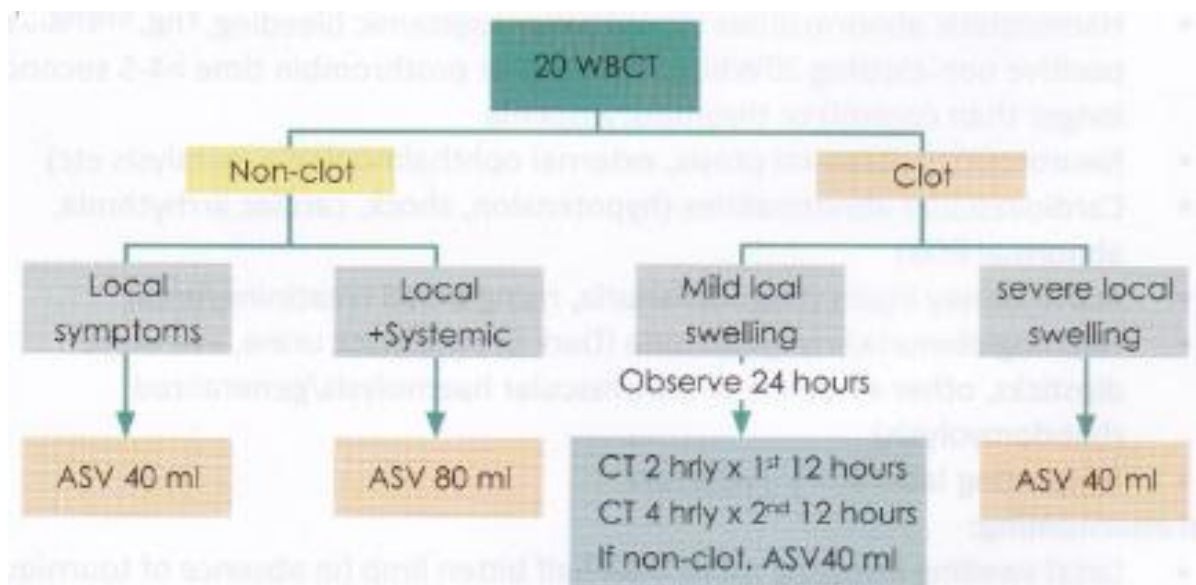
- Adrenaline should always be drawn up in readiness before anti venom is administered.

- It should be given at the very first sign of a reaction, even when only a few spots of urticaria have appeared or at the start of itching, tachycardia or restlessness.
- It must be given intramuscularly (ideally into the upper lateral thigh) in an initial dose of 0.01 mg/kg body weight for children.
- The dose can be repeated every 5-10 minutes if the reaction persists or the symptoms become worse.
- Support with 2 mg/kg Hydrocortisone and Chlorpheniramine maleate 0.2mg/kg by intravenous injection
- After the patient has recovered from the early anaphylactic or pyrogenic reaction, the indications for antivenom therapy should be critically reexamined.
- If antivenom is still indicated, intravenous administration should be cautiously resumed.
- Antivenom should be given by the intravenous route.
- Patients should be closely observed for at least one hour after starting intravenous antivenom administration to detect early anaphylactic reactions.

### Dose of antivenom

There is little reliable evidence to guide initial dosage. Therefore, observation of the response to antivenom is critical in managing patients.

### For Viper bite



**Note:** Check leaflet of products before deciding the ASV dosage because above recommendation are used for 1 ml of ASV can neutralize the 2 mg of venom.

### **For Cobra Bite or Those with Neurotoxic Signs**

- ASV dose is **40-80 ml of monovalent (Cobra) antsnake venom (MPF) IV or 6 vials Myanmar Bivalent ASV** (Cobra antivenom 10 ml can neutralize the 6 mg of venom (dried))
- If not available, Thai Cobra antivenoms (Initial Dose 10 vials) may be used
- Indian polyvalent antivenoms are NOT effective
- Check rate and depth of respiration in every 30 minutes or more frequent if necessary.

### **Observation of the response to antivenom**

If an adequate dose of appropriate antivenom has been administered, the following responses may be seen.

- General: the patient feels better
- Spontaneous systemic bleeding stops within 15-30 minutes
- Blood coagulability (as measured by 20WBCT) is usually restored in 3-9 hours
- In shocked patients, blood pressure may increase within the first 30-60 minutes and arrhythmias such as sinus bradycardia may resolve
- Neurotoxic envenoming (cobra bites) may begin to improve 30 minutes after antivenom
- Active haemolysis and rhabdomyolysis may cease within a few hours and urine colour returns to normal.

### **Criteria for repeating the antivenom**

40 ml of ASV can be repeated if the following indications are present

- If the blood remains incoagulable six hours after the initial dose of antivenom
- If a patient continues to bleed (repeat in 1-2 hours)
- In patients with deteriorating cardiovascular signs like hypotension, shock and arrhythmia (repeated in 1-2 hours)
- In case of deteriorating neurotoxicity (repeated in 1-2 hours)

### **Treatment of the bitten part**

- Proper wound management, antibiotics and immunization for tetanus if required.

### **Supportive treatment**

- The severely envenomed patient may require life support systems such as treatment of shock, assisted ventilation and renal dialysis.

Rehabilitation and treatment of long term complications accordingly.