

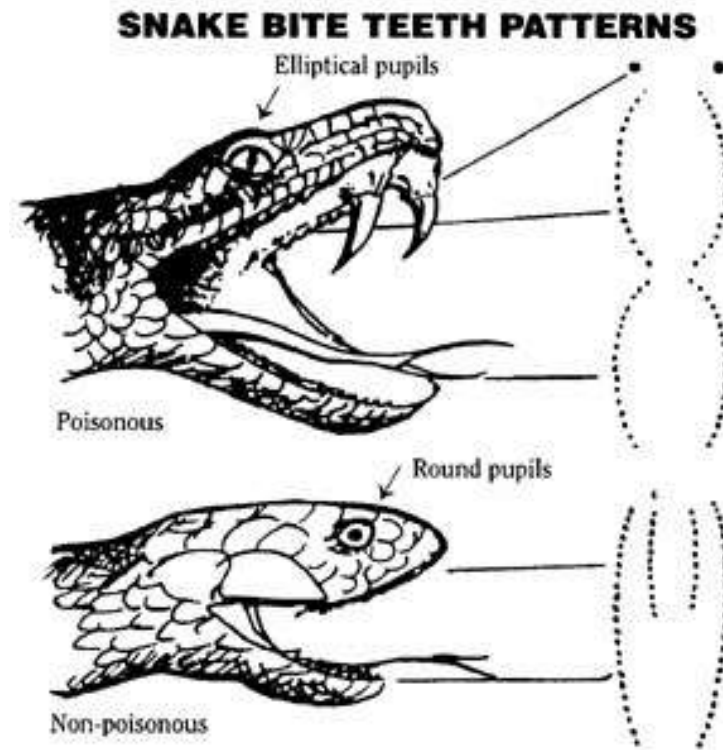
Snake bite and its management



Classification

- In India, poisonous snakes belong to three broad families:
 1. Elapidae: Cobras, Kraits
 2. Viperidae: Vipers
 - Russell's viper, saw scaled viper
 - Pit viper
 3. Hydrophidae: Sea Snakes
- Poisonous snakes can be identified by their characteristic morphology.

Mechanism of bite



Cobra bite

- Encountered Throughout the Day and Night!
- Key Identification Mark is the Spectacled shaped mark behind the hood.
- On a dead snake. It is less distinct but is visible on the back below the head.
- Post synaptic Neurotoxin
- Good Response to Neostigmine

Spectacled Cobra



Krait bite

- Nocturnal
- Victims often present in the morning with signs of paralysis, which can be mistaken for a stroke.
- Key identification feature are PAIRED white bands. Often enters human habitation.
- Pre Synaptic Neurotoxin.
- Limited response to Neostigmine

Banded Krait



General signs and symptoms of elapid envenomation

- Swelling and local pain (Cobra).
- Local necrosis and/or blistering (Cobra) .
- Descending paralysis, initially of muscles innervated by the cranial nerves, commencing with ptosis, diplopia, or ophthalmoplegia.
- The patient complains of difficulty in focusing and the eyelids feel heavy.
- There may be some involvement of the senses of taste and smell but these need further research.
- Paralysis of jaw and tongue may lead to upper airway obstruction and aspiration of pooled secretions because of the patient's inability to swallow.
- Numbness around the lips and mouth, progressing to pooling of secretions, bulbar paralysis and respiratory failure.

elapid envenomation

- Hypoxia due to inadequate ventilation can cause cyanosis, altered sensorium and coma. This is a life threatening situation and needs urgent intervention.
- Paradoxical respiration, as a result of the intercostal muscles becoming paralysed is a frequent sign.
- Stomach pain which may suggest submucosal haemorrhages in the stomach (Kularatne 2002) (Krait)
- Krait bites often present in early morning with paralysis which can be mistaken for a stroke.

Russell's Viper bite

- Although nocturnal, encountered during the day, sleeping under bushes, trees and leaf particularly coconut leaf litter.
- Key identification feature is the black edged almond or chain shaped marks on the back.
- Haemotoxic venom BUT can also present neurotoxic symptoms such as ptosis, ophthalmoplegia and possibly respiratory failure.
- Neurotoxicity is believed to be Pre Synaptic and Krait like.
- Responds poorly, if at all to Neostigmine.
- Major Renal Failure Effect

Russell's Viper



Hump-nosed Pit Viper bite

- Major Renal Failure Effect
- Small arboreal and terrestrial **Pit viper**. Encountered under bushes and leaf litter or in bushes. Haemotoxic venom. Often confused with the **Saw scaled Viper** but has large plate scales on the head. Causes Renal failure
- Often causes late onset envenoming, with symptoms taking many hours to present.
- No effective anti venom

Hump-nosed Pit Viper



General signs & symptoms of Viperine envenomation

- Swelling and local pain. Tender enlargement of local lymph nodes as large molecular viper venom molecules enter the system via the lymphatics.
- Bleeding from the gingival sulci and other orifices
- Epistaxis.
- Vomiting (Kalantri SP et al. 2006).
- Acute abdominal tenderness which may suggest gastro-intestinal or retro-peritoneal bleeding.
- Hypotension resulting from hypovolaemia or direct vasodilation.
- Low back pain, indicative of a early renal failure or retroperitoneal bleeding, although this must be carefully investigated as many rural workers involved in picking activities complain of back pain generally.

Viperine envenomation

- The skin and mucous membrane may show evidence of petichae, purpurae and ecchymoses
- The passing of reddish or dark-brown urine or declining or no urine output.
- Lateralising neurological symptoms and asymmetrical pupils may be indicative of intra-cranial bleeding
- Muscle pain indicating rhabdomyolysis.
- Parotid swelling, conjunctival oedema and sub-conjunctival haemorrhage

Late-onset envenoming

- The patient should be kept under close observation for at least 24 hours.
- Many species, particularly the Krait and the Hump-nosed pitviper (Joseph et al, 2006) are known for the length of time it can take for symptoms to manifest. Often this can take from 6 to 12 hours.
- This is also particularly pertinent at the start of the rainy season when snakes generally give birth to their young
- Juvenile snakes 8 to 10 inches long tend to bite their victim lower down on the foot in the hard tissue area and thus any signs of envenomation may take much longer to appear.

Snakes of Medical Significance based on WHO model (1981)

- **Class I:**
 - **Commonly cause death or serious disability**
RUSSELLS VIPER/COBRA/SAW SCALED VIPER
- **Class II:**
 - **Uncommonly cause bites but are recorded to cause serious effects (death or local necrosis)**
KRAIT/HUMP-NOSED PIT VIPER/KING
COBRA/MOUNTAIN PIT VIPER
- **Class III:**
 - **Commonly cause bites but serious effects are very uncommon.**

Initial First Aid - “Do it R.I.G.H.T.”

- **R. = Reassure the patient.**
 - 70% of all snakebites are from non- venomous species. Only 50% of bites by venomous species actually envenomate the patient
- **I = Immobilise in the same way as a fractured limb.**
 - Use bandages or cloth to hold the splints, not to block the blood supply or apply pressure. Do not apply any compression in the form of tight ligatures, they don't work and can be dangerous!
- **G. H. = Get to Hospital Immediately.**
 - Traditional remedies have NO PROVEN benefit in treating snakebite.
- **T= Tell the doctor of any systemic symptoms**
 - such as ptosis that manifest on the way to hospital.

Snake Bite Treatment Protocol

- **Patient Assessment Phase: On arrival.**
- Deal with any life threatening symptoms on presentation. i.e. Airway, Breathing and Circulation.
- If there is evidence of a bite, where the skin has been broken, give Tetanus Toxoid
- Routine use of anti-biotic is not necessary, although it should be considered if there is evidence of cellulitis or necrosis

Diagnosis Phase: General Principles

- Where possible identify the snake responsible.
- Have the victim carefully bring the snake to hospital if it has been killed.
- **All patients will be kept under observation for a minimum of 24 hours.**
- in India bite marks are of no use in identifying if a species is venomous or not. Many non venomous species leave just two fang-like marks e.g. Wolf Snakes.
- Some species like the Krait may leave no bite mark at all.
- Many venomous species have more than two fangs, as they grow reserve fangs in case the main ones break off.

Diagnosis Phase: General Principles

- Determine if any traditional medicines have been used, they can sometimes cause confusing symptoms.
- Determine the exact time of the bite. This can give indications as to the progression of any symptoms.
- Ask questions as to what the victim was doing at the time of the bite. Some activities such as grass cutting or feeding stock animals in the evening can be suggestive of snakebite.
- **Pain**
- Snakebite can often cause severe pain at the bite site.
- Treat with paracetamol. Adult dose of 500-1000mg 4-6 hourly. Pediatric dose 10mg/kg every 4-6 hourly orally.

Diagnosis Phase: Investigations

- **20 Minute Whole Blood Clotting Test (20WBCT)**
 - A few mls of fresh venous blood is placed in a new, clean and dry glass vessel and left at ambient temperature for 20 minutes. The vessel ideally should be a small glass test tube.
 - The glass vessel should be left undisturbed for 20 minutes and then gently tilted, **not shaken**. If the blood is still liquid then the patient has incoagulable blood.
 - The test should be carried out every 30 minutes from admission for three hours and then hourly after that.
 - If incoagulable blood is discovered, the 6 hourly cycle will then be adopted to test for the requirement for repeat doses of ASV

Diagnosis Phase: Investigations

- Haemoglobin/ PCV/ Platelet Count/ PT/ APTT/ FDP/ D-Dimer
- Peripheral Smear
- Urine Tests for Proteinuria/ RBC/ Haemoglobinuria/ Myoglobinuria
- Biochemistry for Serum Creatinine/ Urea/ Potassium
- Oxygen Saturation/ PR/BP/ RR/ Postural Blood Pressure
- ECG/ X-Ray/ CT/ Ultrasound (The use of X-Ray and ultrasound are of unproven benefit, apart from identification of bleeding in Viperine bites).

Specific Rx - ASV

- Polyvalent antivenin is available in a lyophilized form (as liquid antivenin is unstable at room temperature).
- Active against the four common poisonous snakes in India – cobra, krait, Russel's viper and saw scaled viper (Echis).
- Average potency of the antiserum available is that 1 ml will neutralize 0.6mg cobra, 0.45mg krait, 0.6mg Russel's viper and 0.45mg saw scaled viper venom
- Reconstitution involves the addition of 10ml of distilled water to an ampoule and shaking till the solution is clear.
- It should be administered intravenously as early as possible. It is essential to enquire about allergy (specially to horse serum). It is well to be prepared for an anaphylactic reaction during the antivenin administration

Specific Rx - ASV

- **Standard High Dose:**

loading dose of 100ml followed by 50ml every 6 hours till the clotting time became normal.

- **Low Dose:**

- The basis of low dose therapy is that the venom is absorbed only gradually into the systemic circulation and the low dose is sufficient to neutralize the absorbed quantity of venom.
- The low dose is given over a longer period as absorption of venom continues into the systemic circulation.

Specific Rx - ASV

- 20 ml over 1 hour followed by 10ml over 4 hours repeated till clotting is normal and then 10ml over 24 hours.
- loading dose of 30 – 70 ml of antivenin followed by a 30 ml infusion over 6 hours, given every 6 hours and continued till the clotting time was normal when done twice, 6 hours apart. This is then followed by an infusion of 30ml over 24 hours.

No change in dose for children as the amount of venom injected may be the same as in an adult.

Supportive Rx

- ***Analgesics*** for pain – Tab PCM
- ***Antibiotics*** for infection. The choice should cover for anaerobic infection.
- ***Anti-tetanus*** prophylaxis
- Replacement of ***coagulation factors / platelets*** if there is active significant bleeding or bleeding into a vital organ

Mgmt of complications

- **Respiratory failure**

- Edrophonium / atropine 10mg / 0.6mg as a test
- Neostigmine / atropine 0.5mg/0.6mg every 30 – 60 min
- Mechanical ventilation

- **Shock**

Treat as appropriate

- **Renal Failure**

Dialysis