

Popular Article

SNAKE BITE AND MANAGEMET

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Snake bite with envenomation is a common and true medical emergency. Rapid examination and appropriate treatment are paramount as timely treatment can reduce the mortality and save precious lives.

Fatality due to snake bite is due to wide species variation, shortage of anti-snake venom (ASV), poor compliance with treatment protocols, lack of public education and clear policy to deal with the problem. There is relative paucity of credible information on snakes and on dealing with emergencies in case of snake bite, lack of experience in handling such cases and non-compliance with the existing guidelines.

I. POISONOUS SNAKES OF INDIA

There are nearly 3150 species of snakes in the world and around 600 species are venomous. In India, out of the 216 species of snakes, 60 are considered poisonous. The most poisonous, medically important species of India distributed widely throughout the country are

1. Cobra (*Najanaja*)
2. Common Krait (*Bungaruscaeruleus*)
3. Russell's viper (*Daboiarusselii*)
4. Saw-scaled viper (*Echiscarinatus*)

The above four are called as “Big Four” and are responsible for the most number of envenomation in India. There are other venomous snakes which are variedly distributed throughout the country.

A snake venom is either neurotoxic (Cobra & Common Krait) or hemotoxic (Russell's viper & Saw-scaled viper).

Neurotoxic snakes

Common krait



Indian cobra

Hemotoxic snakes

Russell's viper



Saw scaled viper

II. SNAKE BITE IN ANIMALS

Animals are bitten by snakes during grazing or playing. Fatal snakebites are more common in dogs than in other domestic animals. Because of the relatively small size of some dogs in proportion to the amount of venom injected, the bite of even a small snake may be fatal.

- ✓ Dogs and cats are most often bitten around the head and limbs.
- ✓ In dogs and cats, mortality is generally higher in bites to the thorax or abdomen than bites to the head or extremities.

Because of their larger sizes, horses and cattle seldom die as a direct result of snakebite, but deaths may follow bites on the muzzle, head, or neck when dyspnoea results from excessive swelling.

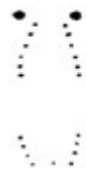
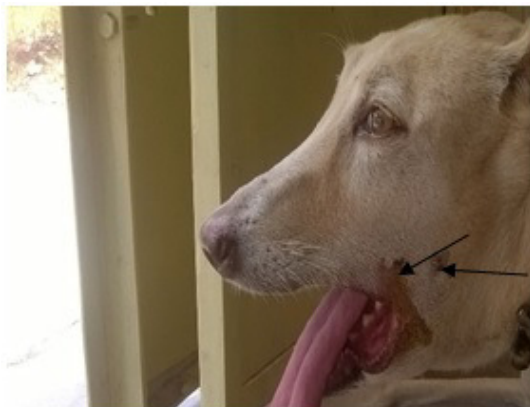
Venomous bite vs Non-Venomous bite**Fig. 1****Fig. 2**

Fig.1: The two prominent dot marks indicate the fang marks which is the characteristic sign of the poisonous snake bite. **Fig. 2:** there is no such marking as non poisonous snakes lack of the fang marks.

FANG MARKS**LOCAL SWELLING AT THE SNAKE BITE**

III. CLINICAL SIGNS

Elapid snakebites (Cobra & Krait)	Viperine snakebites (Russell's viper & Saw-scaled viper)
1. Pain and swelling are minimal 2. Systemic neurologic signs predominate 3. Viscid saliva 4. Difficulty in swallowing 5. Pupillary dilatation 6. Pharyngeal paralysis 7. Ptosis of eyelids 8. Tachypnea 9. Shallow/abdominal breathing 10. Depressed gag reflex 11. Ataxia 12. Muscle fasciculation 13. Decreased spinal reflexes will be seen. 14. In krait envenomation, there will be violent abdominal pain and convulsions may precede death. Death is due to respiratory paralysis.	1. Severe local tissue damage 2. Severe pain 3. Restlessness 4. Excitement and incoordination of movement 5. Marked discolouration of tissue 6. Dark, bloody fluid may ooze out from the fang wounds 7. Dilated pupil 8. Failure to respond to external stimuli 9. Hypotension and Tachycardia 10. Vomiting and diarrhoea 11. Hematemesis and Melena 12. Convulsions 13. Local suppuration and Sloughing 14. Gangrene formation Death is due to respiratory failure or circulatory failure.

IV. DIAGNOSIS

The diagnosis can be made based on the history, clinical signs and laboratory investigations

1. History

Based on the history given by the owner and identification of the snake. If not sure about the species of the snake, take the expert advice.

2. Clinical features

Feature	Cobra	Krait	Russell's viper	Saw scaled viper
Local Pain/ Tissue damage	Yes	No	Yes	Yes
Ptosis, Neurological sign	Yes	Yes	No	No
Haemostatic abnormality	No	May occur	Yes	Yes
Renal Complication	No	No	Yes	No
Response to Anti Snake Venom	Yes	Yes	Yes	Yes

3. Laboratory investigations: 20 Minute Whole Blood Clotting Test (20 WBCT)

Considered the most reliable test of coagulation and can be carried out in the most basic settings.

Procedure:

1. Place 2 ml of fresh venous blood is placed in a new, clean and dry, glass vessel and leave at ambient temperature for 20 minutes.
 2. The glass vessel should be left undisturbed for 20 minutes and then gently tilted, not shaken.
 3. If the blood is still liquid then the patient has incoagulable blood.
- ✓ The vessel ideally should be a small glass test tube.
 - ☒ The use of plastic bottles, tubes or syringes will give false, readings and should not be used.

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 is then be adopted to test for the requirement for repeat doses of ASV.

4. Degree of envenomation

Types of signs/symptoms	Minimal	Moderate	Severe
Local	Swelling, erythema or ecchymosis confined to bite site	Progression of swelling, erythema or ecchymosis confined to bite site	Rapid swelling, erythema or ecchymosis involving entire part of the body
Systemic	No systemic signs or symptoms	Non-life threatening signs or symptoms (nausea/vomiting, mild hypotension, perioral paresthesias)	Markedly severe signs or symptoms (marked hypotension, tachycardia, tachypnea and respiratory distress)
Coagulation	No coagulation abnormalities	Mild coagulation profile without significant bleeding	Abnormal coagulation profile significant bleeding

V. MANAGEMENT OF SNAKE BITE

- ✓ Treatment should be given at the earliest to increase the survival rate.
- ✓ Owners should be advised to seek veterinarian advice as early as possible and not to spend time on first aid other than to keep the animal quiet and limit its activity.
- ✓ The management of snake bite mainly involves neutralizing the venom in circulation, pain management and preventing infections.

VI. DON'T DO AFTER SNAKE BITE:

The following commonly touted measures are ineffective and can be potentially harmful:

- ☒ Do not apply a tourniquet.
- ☒ Do not wash the bite site with soap or any other solution to remove the venom.
- ☒ Do not make cuts or incisions on or near the bitten area.
- ☒ Do not use electrical shock.
- ☒ Do not freeze or apply extreme cold to the area of bite.
- ☒ Do not attempt to suck out venom with your mouth.

VII. TREATMENT

1. Antisnake venom (ASV)

Antivenom is the only direct and specific means of neutralizing snake venom. The corner stone of management is administration of ASV which is raised against the four common species of snakes found in India. ASV is given only in patients with evidence of systemic envenoming (coagulopathy, neurotoxicity) or severe local envenomation. In India polyvalent ASV is only available. It is effective against all the four common species; Russells viper (*Daboia russelii*), Common Cobra (*Naja naja*), Common Krait (*Bungarus caeruleus*) and Saw Scaled viper (*Echiscarinatus*).

Administration of Antisnake venom: ASV is administered at a constant rate of 2ml/min as slow intravenous (IV) injection. All ASV to be administered over 1 hour at constant speed. The number of ASV vials is based on the severity of envenomation. In general, in veterinary practice use of two vials of ASV is ideal but the number of vials of ASV increases in case of severe envenomation. Administration of ASV at the site of bite is not advised as it is not effective and causes pain.

NOTE:

ASV is derived from the horse or sheep serum, as it is a protein which can cause anaphylactic reaction in other species. Administering the lyophilized form of ASV, it will be diluted with the diluent given by manufacturer. One should mix the diluent with lyophilized drug, without making frothiness or agitation which causes denaturation of protein. The diluted ASV should be injected into a 5 – 10 ml/kg normal saline or 5% dextrose solution and should be given by slow intravenous administration.



Repetition of ASV

Hemotoxic bite: One should check 20 minutes whole blood clot time every 6 hours after treatment. If it is positive one should go for the same number of vials used previously. The treatment is repeated until the result is negative.

Neurotoxic bite: One should check for the change in the symptoms like regression of ptosis of eyelids, increased in the depth of respiration and others. If the symptoms are not reduced one can continue the initial dose of vials. If the animal is not recovering even after two doses, there might be less chance of recovery.

1. Neostigmine test: Neostigmine is an anticholinesterase drug, which helps in the delay of destruction of cholinesterase enzyme and aid in the transmission of the impulses. It involves administration of

- ✓ Neostigmine - 0.05 mg/kg, IV
- ✓ Atropine - 0.04 mg/kg, IM (followed by Neostigmine)

This will be more effective in cobra envenomation.

2. Antisnake venom carries risks of anaphylactic reactions and should not therefore be used unnecessarily. Patients should be observed carefully for at least 2 h after they are given antivenom.

➤ 0.5–1 mL of 1:1,000 Epinephrine S.C. or I.V. should be given at the first sign of anaphylaxis.

Additional treatment: After epinephrine (adrenaline), an antihistaminesuch as

1. Chlorpheniraminemaleate should be given followed by
2. Dexamethasone (2 mg/kg) through intravenous route.

The corticosteroid is unlikely to act for several hours, but may prevent recurrent anaphylaxis.

Treatment of late (serum sickness) reactions: Late (serum sickness) reactions may respond to a 5 day course of oral antihistamine. Patients who fail to respond in 24-48 hours should be given a 5-day course of prednisolone.

2. Analgesics

The pain arising due to snake bite can be controlled with analgesics.

- ✓ Tramadol: 4 mg/kg, twice a day

3. Fluid therapy

DNS or Normal Saline intravenous fluids should be given to correct hypovolaemia.

4. Antibiotics

The fangs and teeth of snakes contain many bacteria that may cause infection. The following antibiotics can be used to prevent and control the infections.

1. Penicillin
2. Amoxicillin
3. Cephalosporin
4. Enrofloxacin

DRUGS CONTRAINDICATED IN SNAKE BITE

- Heparin
- Botropase
- NSAIDs
- Antihistamines
- Glucocorticoids

NOTE: Antihistamines and glucocorticoids should be used only if anaphylactic reactions develop.