

Snake Poisoning

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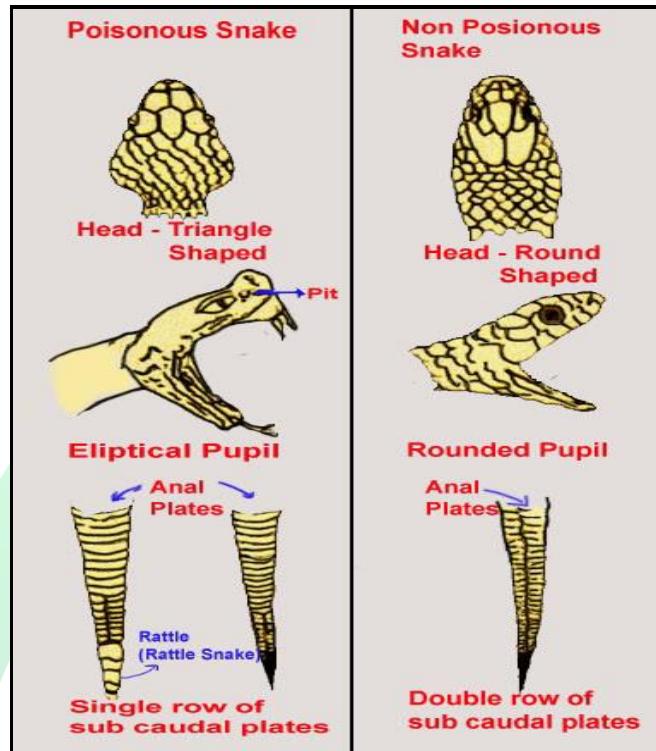
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Introduction

Snake bite is an injury caused by the bite of a snake, especially a venomous snake. A common sign of a bite from a venomous snake is the presence of two puncture wounds from the animal's fangs. Sometimes venom injection from the bite may occur. This may result in redness, swelling, and severe pain at the area, which may take up to an hour to appear. Toxicity depends on the type and species of snake, location of the bite, the quantity of snake venom injected and the proportion between the quantity of venom injected and the body size of the animal to which the venom is injected.

Snake venom is a complex mixture consisting of amino acids, polypeptides, glycopeptides and biogenic amines. The venom also contains an enzymatic portion and a non-enzymatic portion. Toxicity due to snakebite may be of two types – neurotoxicity and cardio or haemo toxicity. The enzymatic portion of the venom produces neurotoxicity. Venoms of snakes contain necrotising, anticogulant, coagulant, neurotoxic, cardiotoxic and haemolytic fractions. Of the 3500 types of snakes available, only 600 types belonging to six families are toxic. Cobra and krait venom is neurotoxic while viper and rattle venom is haemotoxic.



Poisonous snakes fall into 2 classes:

- 1) Elapines, which include the cobra, mamba, and coral snakes.
- 2) Two families of Viperines, (i) True vipers- Russell's viper (ii) Pit vipers- Rattle snakes.

There are 4 common poisonous snakes are found in India.

- (i) Indian cobra (*Nag*),
- (ii) Indian krait (*Bangam*),
- (iii) Russel's viper (*Daboia*) and
- (iv) Saw scaled viper (*Phoorsa*)

1) Elapines snakes- They have short fangs and tend to hang on and 'chew' venom into their victims. Their venom is neurotoxic and paralyzes the respiratory center. Animals that survive these bites seldom have any sequelae.

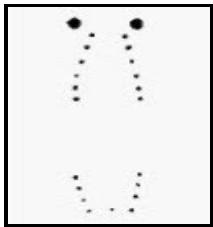
2) Viperine snakes- They have long, hinged, hollow fangs; they strike, inject venom (a voluntary action), and withdraw. Many bites by vipers reportedly do not result in injection of substantial quantities of venom. Viperine venom is typically hemotoxic, necrotizing, and anticoagulant, although a neurotoxic component is present in the venom of some species. Mojave rattle snake (*Crotalus scutulatus scutulatus*).

Clinical signs

- Snake bite mostly occurs when animal graze, hunt and play in infested areas. Most of the bites are found on the head, body, extremities, muzzle and legs.
- Salivation, hyperexcitability, mydriasis, asphyxia, gasping, recumbency and convulsions. Regurgitation of ruminal contents, paralysis of the tongue, oesophagus and larynx are noticed in ruminants.
- Vomiting, blurred vision, tingling of the limbs, and sweating may result. Fear following a bite is common with symptoms of a racing heart and feeling faint. The venom may cause bleeding, kidney failure, severe allergic reaction, tissue death around the bite or breathing problems. Bites may result in the loss of limbs or other chronic problems.
- Severe pain, anxiety, excitement followed by incoordination of movement and lameness. Hypotension, tachycardia, septicaemia, pulmonary oedema, diarrhea, renal failure, shock, respiratory failure followed by death. Death usually occurs within 6 hours in elapine and 2-4 days in viperine snake bite

Diagnosis

- Diagnosis is based on sudden death, fang marks, local swelling and oozing of blood from the site of bite.

**Fang Marks****(Poisonous snake: No Teeth marks)****Fang Marks****(Non-poisonous snake:
Two rows of Teeth marks)**

- Typical pit viper bites are characterized by severe local tissue damage that spreads from the bite site. The tissue becomes markedly discoloured within a few minutes and dark, bloody fluid may ooze from the fang wounds if not prevented by swelling. Frequently, the epidermis sloughs when the overlying hair is clipped or merely parted. Hair may hide the typical fang marks. Sometimes, only one fang mark or multiple punctures are present.
- In elapine snakebites, pain and swelling are minimal; systemic neurologic signs predominate.

Treatment

- Snake bite is an urgent emergency. In some cases, it is lethal; in many it can cause prolonged and disfiguring injury. Although the animal should receive veterinary care as soon as possible, this should be done while keeping the animal as quiet as possible.
- Even if the snake is killed for identification purposes, caution must be exercised in handling it after death. Envenomation is possible even after a poisonous snake has been decapitated.
- Objectives of therapy are to neutralize the venom, prevent shock, and prevent secondary infections; and sometimes to prevent the further spread of toxins, and remove the venom.
- It includes administration of the specific anti-venom if the species of snake is known and administration of polyvalent anti-venom if the species of snake is not known and symptomatic. A polyvalent horse-serum-origin antivenin is available against all cases of substantial pit envenomation. If required 0.5-1 ml of 1:1000 adrenaline should be administered subcutaneously.

- Broad-spectrum antibiotics should be given to prevent wound infection and other secondary bacterial infections including *Pseudomonas aeruginosa*, *Clostridium species*, and *Staphylococci species*.
- Respiratory assistance (ventilator) may be needed for 48 - 72 hours for animals with coral snake poisoning. The maintenance of a patent airway is critical. Large diameter tubing or opened syringe cases are commonly placed in the nostrils of horses bitten on the face to keep the airways open. Emergency tracheostomy may be required.
- Fluid therapy: Generally indicated in small animals to control shock in pit viper venomation.
- Corticosteroids: Use is controversial. Useful in treating shock but increases in mortality have been reported with their use. They can also alter results of laboratory tests that are otherwise useful in monitoring an animal's progress. Generally used for prevention of shock and hypotension. May not affect local swelling.
- Transfusions: Commonly indicated in dogs, if necessary, to treat anemia and hemorrhage.
- Tetanus antitoxin should always be given to the affected horse. Analgesics should be used to control severe bite pain.
- Antihistamines have been reported to be contraindicated, but diphenhydramine hydrochloride is frequently given along with antivenin to treat snakebite in humans. Tranquilization in horses may be required.

Therapies generally contraindicated

- Tourniquet - The use of tourniquets is controversial and usually they are avoided. When used they are most effective in first 30 minutes. Tourniquets increase local tissue damage due to hypoxia. The general location of snake bites (e.g., face) may prevent use. Recommended only for animals in which the tissues below the tourniquet will be sacrificed to save the animal's life.
- Incision and suction - Also controversial. Requires restraint of animal to be effective. Minimal benefit with regards to the local removal of venom. Not recommended unless pocket of venom will clearly be removable.

- Cryotherapy - Commonly associated with increased tissue damage. Not recommended.
- Surgical debridement - Use has not been substantiated. May result in serious scarring and loss of function. May not prevent systemic signs. Not recommended early in course of treatment for envenomation.
- The use of alcohol to clean the wound is contraindicated because of its vasodilatory effect, which would promote uptake and spread of venom.

