

Toxicology LEC 9

Animal Toxins

1- Snake venoms:

Snake bites are one of the most common forms of poisoning by natural toxins worldwide. Many snake venoms are being mixtures of proteins or polypeptides. The proteins may be enzymes, especially hydrolytic enzymes. Some of the more important are proteinases, phospholipases, ribonucleases, deoxyribonucleases, phosphomonoesterases and phosphodiesterases, and ATPases.

Venom characteristics:

It is thought that neurotoxin consists of two active principles, 1--cause paralysis of the respiratory system and the other 2-----causes the failure of the cardiac movement.

Mechanism of action: At least four toxic actions can result from snake venom. Different snakes have different combinations of toxins in their venom. The toxins consist 1-necrotizing coagulant fractions as well as 2--neurotoxic and 3--haemolytic fractions.

The effect of snake bite is dependent on the size and species of snakes, the size of bitten animal and the location of the bite particularly with reference to the thickness of the hair coat and the quality of subcutaneous fat. The neurotoxins cause initial stimulation of the CNS followed by paralysis. Effect of the other toxins cause local tissue necrosis, capillary damage and haemolysis.

Clinical signs:

a)) Large animals: snake bites cause a local swelling, severe pain, excitement and anxiety. The bites in the head causes severe swelling that cause difficult respiration. Other symptoms include pupil dilatation, excessive salivation, hyperesthesia, tetany, depression, recumbency leading

to paralysis. Cobra bite causes excitement with convulsion and death due to asphyxia.

b)) Dogs and cats: clinical signs manifested 1--- in cats, bitten by tiger snake are dilated pupil, dyspnoea, hypothermia, hind ataxia and glycosuria.

2---In dogs, vomiting, tachypnoea, hyperthermia and paralysis has been observed.

Treatment:

a) Local treatment: application of a tourniquet above the bite to restrict the venom but not the arterial circulation. The bitten area should be removed through incision (0.5 inch length \times 0.5 inch depth). The incised wound should be squeezed and suction applied for 10-30 minutes. The oral suction is not recommended.

b) Systemic treatment:

1) Antivenin: It greatly reduces the tissue necrosis. It is best administered if diluted with 500-1000 ml of 5% dextrose solution i.v.

2) Antibiotic: Broad spectrum antibiotics are indicated to combat bacterial infections.

3) Antitoxin: Clostridial bacteria have isolated from the snake mouth. The dose of antitetanus serum 1500-3000 I.U. .

4) Anti-inflammatory: Cortisone is valuable drug and renders a protection against possible anaphylaxis after the treatment.

c) Supportive therapy:

- Fluids are indicated to combat shock and dehydration.
- Epinephrine is also effective in combating shock.
- Pethidine may be used to alleviate pain or excitement.
- Vitamin C and calcium gluconate are useful in preventing haemolysis.
- Blood transfusion and haemodialysis.

2- Bee stings:

Bee stings are multiple in nature and cause severe local swellings in animal. Bee sting in horses cause excitement due to pain and may also include diarrhea, haemoglobinuria, jaundice, tachycardia, and prostration.

Treatment:

- a) Local application of a weak solution of ammonia or sodium bicarbonate.
- b) If prostration is severe nervous stimulants may be given.

3- Toads:

Toads are not containing poisonous apparatus like snakes. However glands present in their head secrete various toxins e.g., steroids, bufogenine and butotoxin which act like digitalis.

Symptoms:

Dogs and cats that generally attack toad show symptoms of distress and excessive salivation.

Treatment:

Treatment depends upon species of toads. In case of *Bufo vulgaris* no specific treatment is essential and animal recovers quietly. In case of *Bufo marinus* which cause prostration, convulsion and death within 15 minutes. The following treatment is adopted:

- a) Wash the mouth with fresh water.
- b) Atropine as a specific antidote s/c.
- c) Sodium pentobarbitone is given to control convulsions.
- d) Leptazole i.m. be given to control depression.

- e) Oxygen therapy may be given in severe cases.

