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## Recent therapeutic approaches to the treatment of snakebite in dog: A case study

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### Abstract

A seven years old male German Spitz dog weighing 9.5 kg was presented to the Teaching Veterinary Clinical Complex (TVCC), CV Sc. and A.H., OUAT, Bhubaneswar on dt. 20. 12.2018 with fang marks above the anterior nares. There was an incidence of bite of Viper's Russell in the previous mid night. The dog was anorectic, dehydrated and lethargic with profuse salivation and respiratory distress with a roaring sound. The dog was treated symptomatically that recovered after the therapeutic regimen.

**Keywords:** Dog (German Spitz), snakebite, therapeutic regimens

### Introduction

Snake bite in animals generally occurs during grazing or hunting or while playing in the garden. It is a common medical emergency with significant morbidity and mortality in small animal practice in southern Africa. In Australia, a country with similar climatic conditions to southern Africa, snakebite is also reported as a common presentation [3, 4]. The viper family includes 223 species of venomous snakes that are divided into four subfamilies: pit vipers (subfamily *Crotalinae*), true vipers (subfamily *Viperinae*), Fea's viper (subfamily *Azemiopinae*) and night adder (subfamily *Causinae*). Vipers are characterized by a pair of long, hollow, venom-injecting fangs. They feed on small animals and hunt by striking and envenomation their prey. Envenomations were reported in people, dogs, cats, horses and a ram [1, 2, 5], otherwise delayed and inadequate treatment may lead to untoward consequences. Snake bite with envenomation requires immediate attention and treatment is must in such cases [6].

### History

A seven years old male German Spitz dog weighing 9.5 kg was presented to the Teaching Veterinary Clinical Complex (TVCC), CV Sc. and A.H., OUAT, Bhubaneswar on dt. 20. 12.2018 with fang marks above the anterior nares. There was an incidence of bite of Viper's Russell in the previous mid night followed by haematuria and malena. The dog was having frothy salivation, dull, depressed, abnormal gait and with recumbent position.

### Clinical signs and symptoms

The dog was anorectic, dehydrated and lethargic with profuse salivation and respiratory distress with a roaring sound. The affected area was inflamed and swollen. There was cyanosis of tongue and palpebral conjunctiva. The pupil was dilated. The dog was having sub-normal rectal temperature (99°F) with pulse rate @60/min. and respiration rate @20/min based on the history and physical examination. The affected dog was also showing of haematuria condition. Based on the history and physical examination of the dogs, the cases were suspected for snakebite.

The blood samples were collected with ethylene diamine tetra acetic acid (EDTA) for hematological parameters like haemoglobin, packed cell volume, total leukocyte count estimation, differential count and biochemical parameters such as ALT, AST, BUN, total plasma protein, creatinine, total Bilirubin, glucose and albumin.

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**Table 1:** Haematological alterations during treatment

Parameter	Value	
Haemoglobin	8.4gm/dl	
Packed Cell Volume	38%	
Total Leucocyte Count (TLC)	18700/cubic mm	
Differential Count (DC)	Neutrophil	79%
	Eosinophil	1%
	Basophil	Nil
	Lymphocyte	19%
	Monocyte	1%

**Table 2:** Serum biochemical alterations during treatment

Parameter	Value
Alanine Aminotransferase (ALT)	98 IU/L
Aspartate Aminotransferase (AST)	86 IU/L
Blood Urea Nitrogen (BUN)	mg/dl
Total Plasma Protein	3.8g/dl
Creatinine	2.2mg/dl
Total Bilirubin	.80mg/dl
Glucose	160mg/dl
Albumin	1.5g/dl

**Table 3:** Haematological alterations after recovery

Parameter	Value	
Haemoglobin	11gm/dl	
Total Leucocyte Count (TLC)	8900/cubic mm	
Differential Count (DC)	Neutrophil	67%
	Eosinophil	25%
	Basophil	Nil
	Lymphocyte	30%
	Monocyte	1%

**Table 4:** Serum biochemical alterations after recovery

Parameter	Value
Alanine Aminotransferase (ALT)	28IU/L
Aspartate Aminotransferase (AST)	26IU/L
Blood Urea Nitrogen (BUN)	22mg/dl
Total Plasma Protein	5.8g/dl
Creatinine	1.6mg/dl
Total Bilirubin	.60mg/dl
Glucose	90mg/dl
Albumin	2.5g/dl

**Fig 1:** Blood showing no signs of clotting, collected from the dog bitten by snake**Treatment**

- Fluid therapy-Dextrose 5% @20 -30 ml/kg bwI/V twice daily
- Lacted Ringer(R.L)@30-40 ml/kg bwt I/V twice daily
- Haemacel@20ml/kg bwtI/V twice daily

- Broad spectrum antibiotic –Ceftriaxone- Tazobactam @ 15 mg-25 mg/kg bwt I/V twice daily
- Dexamethasone @2-4mg/kg bwt I/V
- Anti-emetic drug-Ondencetron@2-5 mg/kg I/V bwt twice daily
- Atropine sulphate @ of 0.04mg/kg I/M.
- Anti-hemorrhagic- Vitamin –K (Kaplin) @ 5mg/kg bwt twice daily
- Lyophilized Polyvalent Anti Snake Venum 10 mlI/V slowly with fluid therapy
- Tetanus Toxied 5000IU-10000 IU (1 ml)I/M
- Mannitol 100 ml I/V 8 hourly for 2 days
- Vitamin B complex

**Discussion**

Snake venoms are complex mixture of proteins and peptides, consisting of both enzymatic and non-enzymatic compounds. Snake venoms also contain inorganic cat ions such as sodium, calcium, potassium, magnesium, and small amounts of zinc, iron, cobalt, manganese, and nickel. The other components of snake venoms are glycoproteins, lipids, and biogenic amines, such as histamine, serotonin and neurotransmitters (catecholamines and acetylcholine) (Klaassen, 2008). Clinical signs such as frothy salivation, dullness muscular weakness with abnormal gait observed in the present study can be attributed to the enzymatic and non-enzymatic compounds in the snake venom. Hyaluronidase cleaves internal glycoside bonds in certain acid mucopolysaccharides resulting decreased viscosity of connective tissues allowing other fractions of venom to penetrate the tissues. The cyanotic edema observed at the site of bite may be attributed to enzyme hyaluronidase which acts as a spreading factor.

**Post-therapeutic management**

Multivitamin, Verol syrup@5ml twice daily after food, Ferimin syrup@5ml twice daily after meal, Immunol@5ml twice daily, Silzyme syrup@5ml twice daily before food and Alkapro@5ml twice daily after food were given.

**Conclusion**

Poisoning from snake venom in animals is an emergency which requires immediate attention or otherwise delayed and inadequate treatment may lead to untoward consequences. Approximately 80% of pets survive snake bite if treated quickly. In the present study, a dog bitten by a snake was treated successfully.

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