



Therapeutic Management of Russell's Viper Snake Bite in a Labrador Dog

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ABSTRACT

A Male Labrador dog of age two years was presented on emergency to Department of Veterinary Clinical Complex, Garividi with the history of Viper snake bite. Clinical examination revealed dull and depression, snake bite marks on right and left forelimbs with swelling and exaggerated respiration. The vitals were normal except for the increased heart rate. Blood clotting time revealed clotting time of more than 20 mins. There weren't any changes in the serum biochemistry and hematology except for the presence of few echinocytes as the dog was presented immediately 15 minutes after the snake bite. Treatment with Polyvalent snake venom antiserum diluted in normal saline, corticosteroid and antibiotic were administered intravenously. The dog recovered eventfully in three days. The hemato-biochemical values were normal post therapy (on day 7).

Key Words: Clotting time, Dog, Snake bite, Treatment, Viper.

INTRODUCTION

Snakebites pose a significant threat to both humans and animals, with vipers, belonging to the family Viperidae, being among the venomous snakes found worldwide. Russell's viper (*Daboia russelii*) is a prominent member of this family, recognized as one of the Big four venomous snakes in India and prevalent across Southeast Asia. Russell's viper venom is a potent cocktail of toxins, featuring biologically active procoagulant enzymes. These enzymes, including activating factors V and X, play a crucial role in the blood-clotting cascade. The venom also contains a metalloproteinase known as "haemorrhagin," which damages vascular endothelium, and toxins that impair platelet function. The combined impact of these elements results in venom-induced disturbances, leading to thrombosis, spontaneous hemorrhages, edema, and shock (Fleseriu, 2017). The history accompanying cases of snake envenomation in dogs varies widely. Some owners witness the strike, while others may only notice their dog's reaction or remain unaware until severe clinical signs manifest. Dogs envenomated by snakes can present with diverse clinical signs, depending on the snake species and the severity of envenomation. Diagnosing snake envenomation in the absence of witnessed incidents

can be challenging due to the range of possible clinical presentations (Wagner, 2017). The effects of Russell's viper venom on dogs can be swift and severe. Recognizing these clinical signs is crucial for timely intervention. The primary approach to managing snake envenomation in dogs involves the timely administration of snake venom antiserum. Additionally, supportive treatments, including intravenous fluid therapy, analgesia, and addressing complications, play a vital role in ensuring a positive outcome (Armentano and Schaer, 2014). Delaying or inadequately treating snake envenomation in dogs can have severe consequences (Klaassen, 2008). Untreated cases may progress to life-threatening complications, emphasizing the importance of swift and appropriate intervention.

History and Observation

Two years old male Labrador dog was presented to Veterinary Clinical Complex, College of Veterinary Science, Garividi on emergency with the history of snake bite by Russell's Viper i.e., locally called as Ulli pamu (Telugu). The dog was presented immediately in a time period of 15 minutes' post snake bite. On presentation the dog was dull, depressed and on lateral recumbency (Fig 1). Clinical examination revealed presence of fang marks on right and left

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forelimbs with swelling of both the limbs (Fig 2, 3). All the vitals were within the range except for elevated heart rate and exaggerated breathing. The blood and serum samples were sent for analyses. No changes were noticed in hemato biochemistry. Blood smear revealed echinocytes (Fig 7). Blood clotting time was more than 20 minutes (Fig 4). During the treatment muscle tremors, shivering of hindlimbs and dilated pupils were noticed (Fig. 5).

Treatment and Discussion

Treatment was initiated with single vial (10ml) of Lyophilized polyvalent snake venom antiserum (®ViNS Bioproducts Limited, Telangana) diluted in 250 ml of normal saline intravenously followed by second dose of another 10 ml of antiserum in another 250 ml of normal saline. Inj. Dexamethasone at the dose of 2mg/kg was administered IV, Inj. Enrofloxacin at the dose of 5 mg/kg IM and Inj. Tetanus toxoid @2ml IM were given. After three hours of therapy the clotting time was less than 20 mins and the dog was normal. However, on the second day the dog evinced severe pain of right forelimb and swelling of right limb alone was noted. Inj. Tramadol was given @ 2mg/kg IM to reduce the pain on 2nd day. On third day no abnormal clinical signs were noticed. The swelling of both the limbs also reduced. The antibiotic therapy was continued for five days and the dog recovered uneventfully.

In the Indian subcontinent the common venomous snakes encountered are the Indian Cobra (*Naja naja*), Russell's viper (*Daboia russelli*) and the Common Krait (*Bungarus caeruleus*) (Hussain *et al*, 2011). Snake bite cases are more common in horses and dogs when compared to other animals such as cattle, sheep and goat (Inbaraj *et al*, 2023).

Pets, driven by curiosity, often unknowingly mishandle snakes, leading to fatal bites and even death. In the present case, the owner saw the dog bitten by the snake (Russel's Viper) but remained helpless. Russell's Viper venom comprises various components, with notable ones including proteases, hemorrhagins, amino acid esterases, phospholipase A2, phospholipase B, and neurotoxins. The venom's diverse activities result in endothelial cell damage, high vascular permeability, bleeding, and fluid extravasation into inflamed tissues (Shiloah *et al*, 1973).

Clinical signs following envenomation may be delayed, and the severity is influenced by factors such

as bite location, victim body mass, and snake size (Gilliam and Bruncker, 2011). Canine viper envenomations commonly occur in the head and neck area (80%), leading to local signs like swelling, edema, hematoma, and acute lameness, where as in the present case it is seen in forelimbs. Systemic signs may include shock, tachypnea, tachycardia, lymphadenomegaly and cardiac arrhythmias (Peterson, 2008).

Complications of Viper envenomation in dogs range from bacterial infections and local necrosis to tremors, dilated pupils, weakness, paralysis, bleeding, respiratory obstruction, acute renal failure, and coagulation disorders, including venom-induced consumptive coagulopathy (VICC). Despite reported complications, the mortality rate in dogs with viper envenomation is relatively low, ranging from 3.7% to 6% (Wagner, 2017).

Diagnosis is primarily based on observational history, owner reports, and the presence of bite marks. A field test, such as the whole blood clotting time test, can confirm envenomation, with prolonged clotting time indicating hypofibrinogenemia (Achara *et al*, 2020). Treatment relies on supportive therapy, antivenom administration, correction of coagulation deficits, analgesia, and meticulous nursing care. A snake bite severity score system aids in the quantitative assessment of the patient and monitoring treatment response (Peterson, 2013). The dosage of antivenom varies based on the dog's size and envenomation severity. The use of glucocorticoids in snake envenomation cases is debated. While some studies suggest no effect or even negative consequences, glucocorticoids may be beneficial in treating hypersensitivity reactions caused by antivenom (Rao *et al*, 2008). Antibiotics are recommended for extensive tissue necrosis and abscess formation (Carr and Schultz, 2015). Prognosis depends significantly on the timeliness of appropriate treatment. The more time that elapses between envenomation and receiving appropriate care (fluids, antivenom) the worse the prognosis (Peterson, 2013).

In conclusion, Russell's Viper envenomation in dogs poses a serious threat, necessitating prompt and comprehensive veterinary intervention. Understanding the clinical manifestations, complications and treatment strategies is crucial for improving outcomes in affected animals.

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Fig. 1 Labrador dog on lateral recumbency due to Viper snake bite



Fig. 2&3 Bite marks at Right and left forelimbs



Fig. 4 Unclotted blood (clotting time > 20 min)

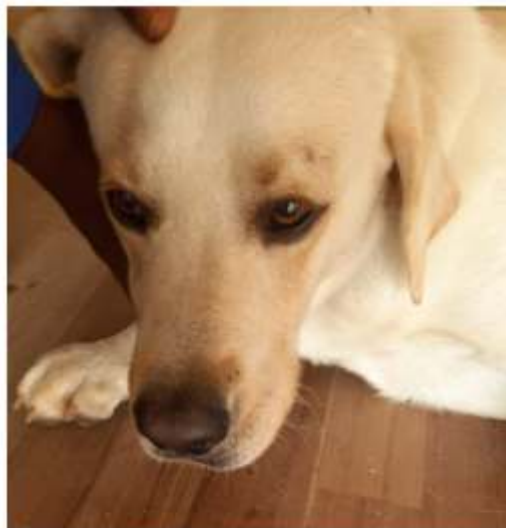


Fig.5 Dilated pupil in the dog with viper snake bite



Fig.6 Dog after polyvalent snake venom antiserum

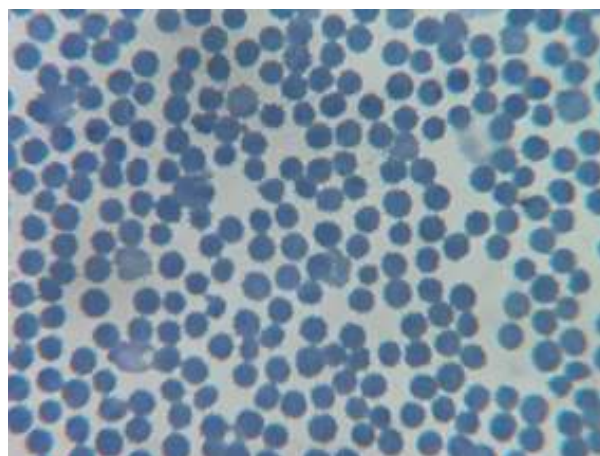


Fig. 7 Echinocytes in the blood smear of the dog with snake envenomation

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