

## Histopathology of Snake Bite Cow in Islamabad, Pakistan

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### Abstract

The pathology of gross and histological lesions in a cow infected with a snake bite is described. The lesions were hemotoxic, as demonstrated by sludging of blood in the heart, lungs, and trachea, and were symptomatic of a Viperidae snake bite.

**Keywords:** Hemorrhage; Muscle Degeneration; Sludge Blood; Viperidae Family

### Introduction

Venomous snake bites kill more than 1 million animals per year around the world [1]. The Viperidae family (which includes the Russell's viper, rattle snake, and puff adder), the Elapidae family (which includes the cobra, krait, mamba, and coral snakes), the Crotalinae family (pit vipers), the Hydrophinae family (sea snakes), and the Colubridae family (which includes the Boomslang) are the venomous snake families [2]. The venom of snakes in the families' Viperidae, Crotalidae, and Colubridae is predominantly hemotoxic, causing local pain, swelling, edoema, and blood oozing from the bite site [3,4], and death usually occurs within 2-4 days [3,5]. The venom of snakes in the Elapidae family is primarily neurotoxic, causing paralysis and death from respiratory failure within 20 to 6 hours [5-7].

### Materials and Methods

A cow with a history of snake bite was brought to the Veterinary Clinic at Islamabad, for necropsy. Along with

the cow, the owner discovered a snake in a crushed state. Before any treatment, the cow was treated by a local veterinarian, where it succumbed to a snake bite. Following a comprehensive necropsy, tissue samples of the lung, trachea, buccal mucosa, heart, and liver were taken in 10% formalin for histological investigation. The tissue samples were processed for regular Hematoxylin and Eosin staining technique as per Lunab LG, et al. [7] standard protocol after being cut into 5 thick slices.

### Results

On the ventral buccal mucosa in the oral cavity, a necropsy revealed a pair of 2 mm elliptical, red puncture wounds that were 0.8cm apart (presumed snake bite wounds) (Figure 1). The petechial haemorrhages were also visible in the buccal mucosa's sub-cutis. On the peritoneum, epicardial (Figure 2) and sub endocardial surface of the heart, there were multifocal petechial to ecchymotic haemorrhages, as well as numerous pale linear streaks on the right ventricular myocardium. On the lung (Figure 3) and liver parenchyma,

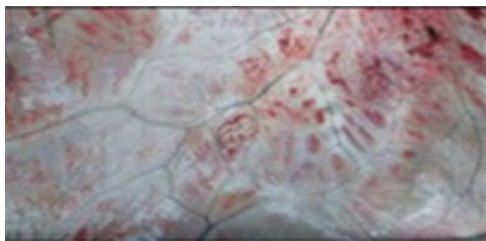
various sized hemorrhages were seen. The lumen of the trachea indicated substantial ecchymotic to suffusive hemorrhages as well as frothy contents. The histological examination of the buccal mucosa indicated a degradation of the buccal epithelium (Figure 4), which was visible in the mucosa as an area in the shape of an inflicted tooth (cast). There was a lot of widespread hemorrhage in the sub epithelial tissue (Figure 5). Evidence of sludged blood in the vessels, as well as smearing of RBCs to the vessel wall, was a distinctive lesion in the buccal mucosa. Skeletal muscle degradation was also seen in the location of the snake bite, with homogenization of skeletal muscles and modest focal areas of mixed cell types (neutrophils and macrophages) infiltration (Figure 6). A section of the heart revealed areas of myocardial degeneration, with muscle loss of striations and homogeneity. There was indications of vascular compromise with alveolar capillary congestion, multifocal bleeding in the lung parenchyma, and lung edoema. Histopathology confirmed marked multifocal petechial hemorrhages in the trachea and peritoneum, as seen on clinical histopathology.



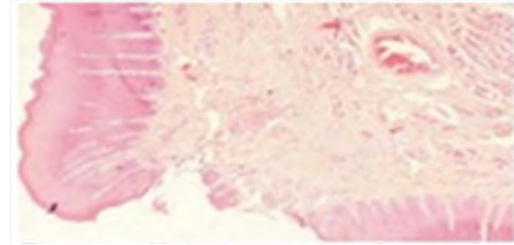
**Figure 1:** Snake bite lesions on the ventral buccal Mucosa in the cavity.



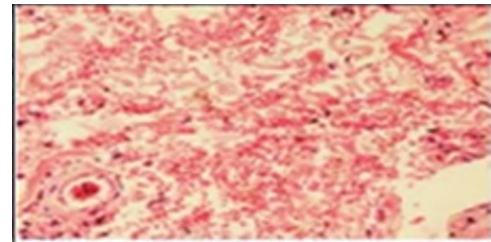
**Figure 2:** Multifocal petechial to ecchymotic hemorrhages on the epicardium of heart.



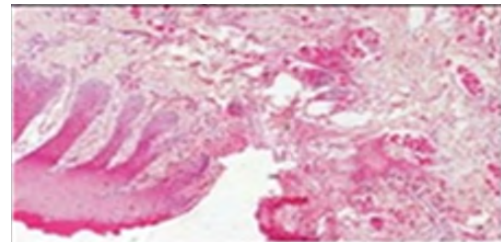
**Figure 3:** Marked hemorrhages on the lung.



**Figure 4:** Skeletal muscle degeneration characterized by homogenization of skeletal muscle and by mild focal areas of infiltration of mixed cell types (neutrophils and macrophages). H&E150.



**Figure 5:** Submucosal areas showing marked diffuse hemorrhages. H&EX.



**Figure 6:** Buccal epithelium evident as an area of the shape of inflicted tooth (Cast) in the mucosa. H & EX75.

## Discussion

The clinical findings reported previously in viper bites include hemolysis, myonecrosis, coagulopathy, thrombocytopenia, nephrotoxicity, vasculitis, severe internal haemorrhages, thromboembolism and myocardial necrosis, damage to vasculature causing increased permeability, subcutaneous edoema, and pan systemic edoema. The potential effects of a snake bite are determined by the size and species of the snake, the size of the animal bitten, and, most importantly, the location of the bite, which is determined by the thickness of the hair coat and the amount of subcutaneous fat [3]. According to Leisner S, et al. [8] farm animals are more prone to be bitten on the jaw, which was also seen in this investigation. Except when bitten on the head (muzzle/ lips/ neck), cattle and horses rarely die due to their big size [4].

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