Short Communication

SNAKE BITE IN NON-DESCRIPT BULLOCK: A CASE REPORT

P.N. Bhagwat[1], P.R. Rathod[2]*, G.R. Gangane[3], N.D. Jadhav[4], G.M. Chigure[5] and M.P. Sakhare[6]

Department of Veterinary Pathology
College of Veterinary and Animal Sciences
Parbhani - 431402
Maharashtra Animal and Fishery Sciences University
Nagpur

ABSTRACT

A non-descript 5 years old male bullock was referred to Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Parbhani, Maharashtra for conduct of post mortem examination. The gross pathological observations in the present case of snake bite were myonecrosis, subcutaneous lodgment of unclotted blood, ecchymotic hemorrhages at the site of bite. Histopathological examination of muscles revealed acute hemorrhages along with multifocal necrosis, spreading of RBCs with homogenization of skeletal muscles. Microscopically, Kidney showed vacuolar degeneration, multifocal necrotic changes, hemorrhagic cystic degenerative changes. Liver, spleen and lungs showed severe congestion. On the basis of history, clinical findings, gross and histopathological examination, the death of the animal was due to severe acute renal failure caused by viper snake bite.

Key words: Forelimb, viper, bullock, histopathology

Received : 05.08.2024 Revised : 01.04.2025 Accepted : 08.04.2025

INTRODUCTION

Out of 3500 species of snakes distributed across the geographical territories of the globe, 236 inhabit India. India is home to more than 60 species of venomous snakes. In India, the most heavily affected country in the world, 1.4 million to 2.8 million snakebites occur every year resulting in at least 46,000 fatalities (Dandona *et al*., 2018). Snakebite in livestock is a major concern.

Venomous snake bites are responsible for more than 1 lakh animal death in the world annually out of which 60,000 cattle were present. Snake bite disproportionally affects agricultural workers, farmers, and cattle herders and is often described as an occupational disease (Gutiérrez *et al*., 2017). Cobra, common krait, Russell's viper and Saw scaled viper are the common venomous snakes of India. Snake venom is a mixture of 20 or more components, including proteins, enzymes, non-enzyme polypeptide toxins, non-toxic nerve growth factors, hyaluronidase, metalloproteinase, lipids and others (Habib and Brown, 2018). By virtue of the composition of toxins, cobra

[1]M.V.Sc. Scholar
[2]Assistant Professor, *Corresponding Author
Email:pravinrathod@mafsu.in
[3]Associate Professor
[4]Assistant Professor, Dept. of Veterinary Pharamacology
[5]Assistant Professor, Dept. of Veterinary Parasitology
[6]Assistant Professor, Dept. of Veterinary Medicine

has neurotoxic, nephrotoxic, and hemolytic fractions in venom. Viper snake venom is composed of hemotoxic, coagulin, cytolysin, and more of necrotizing fractions while kraits have both neurotoxic and hemotoxic fractions (Harms, 2018). Vipers have strong hemotoxic activity by interfering with blood pressure, clotting factors, and platelets and by directly causing hemorrhages (Slagboom *et al*. 2017) and death occurs within 2-4 days (Chandra *et al*., 2020).

The head/face/neck most frequently bitten in dog while in cats it was the limb. Horse, llama and alpaca were mainly bitten on the head/face/muzzle. Besides the head, sheep, goat, pig and cow were also bitten in their limbs. In poultry, several studies pointed to the breast, wings and head were usually bitten (Bolon *et al*., 2019).

Following the World Health Assembly of May 2017, snake bite was finally included in the World Health Organization (WHO) list of Neglected Tropical Diseases and in May, 2019 the WHO launched the official snakebite envenoming road map with the ambition to reduce the number of deaths and disabilities by 50% before 2030 (WHO, 2019).

CLINICAL HISTORY

A non-descript bullock of 5 years old was presented to Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Parbhani, Maharashtra with the history of snake bite and lameness of right forelimb. The clinical examination were recorded 103.5°F body temperature, 31 breaths/min respiration rate and 74 beats/ min heart rate. The bullock was treated by snake anti-venom and supportive treatment. On next day animal collapsed and died. Then, it was referred to Department of Veterinary Pathology, for conduct of post mortem examination.

NECROPSY GROSS FINDINGS:

As due to hairs on animal body, multiple hemorrhages, excessive bleeding, fang marks were not detected on affected forelimb. The eyes were dilated with severely congested mucous membrane. The tongue appeared to be protruded from mouth and caught into teeth (Figure1). There was bleeding from eyes and rectum (Figure 2). The sub-cutis of the skin at fetlock was showed multiple hemorrhages from the site of bite up to right brisket region along with tissue spaces filled with unclotted blood (Figure 3). Marked petechiae to ecchymotic hemorrhages were observed in the lumen of trachea. Lungs revealed emphysema, severe congestion and variable sized hemorrhages were observed on the dorsal surface of lung (Figure 5). Marked petechial hemorrhages were observed on epicardium at the base of heart. Internally, on the endocardium surface of heart, extensive suffusion type of hemorrhages were observed (Figure 4). Focal discoloration and suffusion hemorrhages were observed on the liver parenchyma. Spleen showed swelling, cyanotic changes and pinpoint to ecchymotic hemorrhages. Ecchymotic hemorrhages were detected externally on rumen and internally non-penetrating foreign body was detected. Abomasal mucosa were showed red discolouration along with petechial to

ecchymotic hemorrhages. Omasum was filled with dry green feed. However, reticulum did not show any appreciable gross lesion. Externally, multiple pinpoint hemorrhages were observed on kidney. Internally, on the cortex and corticomedullary junction of kidney, multiple petechial to ecchymotic hemorrhages were noticed (Figure 6).

HISTOPATHOLOGICAL OBSERVATIONS:

Histopathological examination of muscles revealed acute hemorrhages in the exposed muscles along with diffused necrosis. Diffused infiltration of RBC in exposed heart muscles was noticed (Figure 7). Homogenization of skeletal muscles with distortion of myofibrillar tissue at places. Bronchiolar epithelial hyperplasia was noticed (Figure 8). Lungs showed severe congestion with acute pneumonic changes (Figure 9). Diffused severe congestion of liver with multifocal hepatic necrosis and severe dilation of sinusoidal spaces (Figure 10). Spleen showed marked congestion with lymphoid depletion. Kidney showed severe vacuolar and hydropic degeneration along with hemorrhagic cystic degenerative changes and multifocal necrotic changes (Figure 11 and 12).

RESULTS AND DISCUSSION

The gross and histopathological observations in the present case of snake bite are in consonance with the gross pathological changes reported earlier in viper bites where hemolysis, myonecrosis, coagulopathy, thrombocytopenia, nephrotoxicity, vasculitis, severe internal hemorrhages, thromboembolism, myocardial necrosis, damage to vasculature causing increased permeability, subcutaneous edema, pan systemic ecchymotic hemorrhages, shock and death (Chandra *et al*., 2020).

The histopathological sections of the skin and skeletal muscles surrounding to the site of bite revealed presence of marked intradermal or hypodermal hemorrhages and coagulative necrosis of the skeletal muscle fibers along with massive hemorrhages respectively. Marked coagulative necrosis and myocardial hemorrhages were also evident in the heart. The liver from the affected animals showed replacement of hepatocytes with massive hemorrhages, marked hepatocellular coagulative necrosis, and vacuolative degeneration in few cases. The histopathological examination of kidneys revealed marked coagulative necrosis of tubular epithelium (Bhikane *et al*., 2020)

At least six toxic actions can result from snake venoms and different snakes have varying combinations of toxins in their venoms. These toxins include necrotizing, anticoagulant, and procoagulant fractions and neurotoxic, cardiotoxic, myotoxic, nephrotoxic, cytotoxic and hemolytic, and hemorrhagic fractions (Baudou *et al*., 2021). In case of bite over the limbs, lameness was a consistent finding in the affected leg (Bhikane *et al*., 2020).

Altug and Isler (2019) reported progressive oedematous swelling on the bitten leg as a result of exudation of serous fluid and inflammatory reaction to venom components extending towards the scapular

and sternal region which are akin with our findings. Wareell (2010) categorized bleeding from site of the bite as localized bleeding, whereas melena, hematuria, and epistaxis have been categorized as mucosal bleeding.

Postmortem examination of a cow presumed to have died from the viper bite showed petechial and ecchymotic hemorrhage to frank hemorrhage in the lung, liver, tracheal lumen, peritoneum, and epicardial and subendocardial surfaces. Pale linear streaks were present in the right ventricular myocardium (Halder *et al*., 2017). These gross and microscopic changes reported by various earlier research workers were also in consonance with the pathological findings observed in the present case.

Regional lymphadenopathy has been reported as an early and reliable sign of systemic poisoning. Secondary infection including tetanus and gas gangrene may also occur. The time of onset of poisoning is same in different species but it varies with difference in snake type. Vipers take slightly longer - the mean duration of onset being 20 minutes (Abhilash *et al*., 2021). However, symptoms may be delayed for several hours. Renal failure may be seen due to bites caused by most species of snakes. It is fairly common following Russell's viper bite and is a major cause of death (Alfred *et al*., 2019).

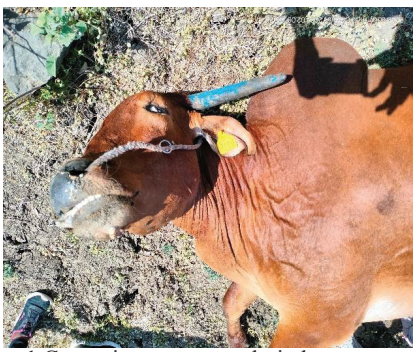

Fig. 1 Cyanotic tongue caught in between teeth

Fig. 2 Bleeding from rectum and its dilation

Fig. 3 Sub-cutis of skin at fetlock showed multiple hemorrhages at the site of bite

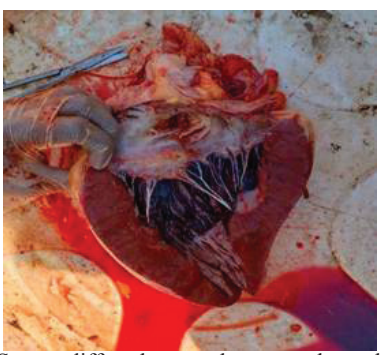

Fig. 4 Severe diffuse haemorrhages on the endocardium of heart

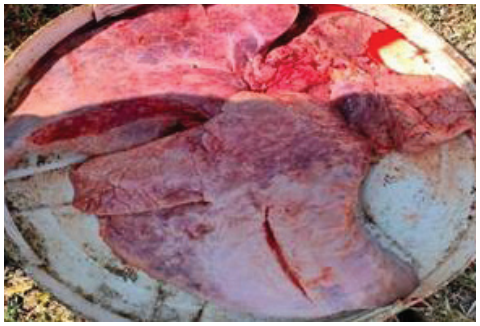

Fig. 5 Emphysematous lung with severe congestion

Fig. 6 Multiple petechial to ecchymotic hemorrhages on cortex and corticomedullary junction

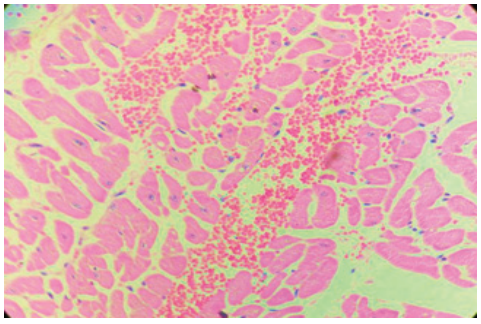

Fig. 7 Diffused infiltration of RBC in exposed heart muscles (H&E, 400X)

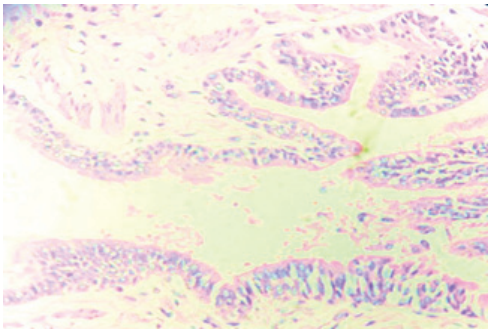

Fig. 8 Bronchiolar epithelial hyperplasia (H&E, 400X)

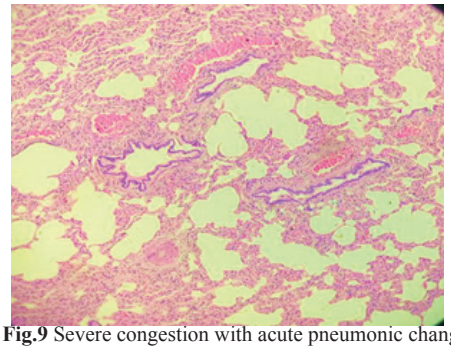

Fig.9 Severe congestion with acute pneumonic changes in lungs (H&E, 100X)

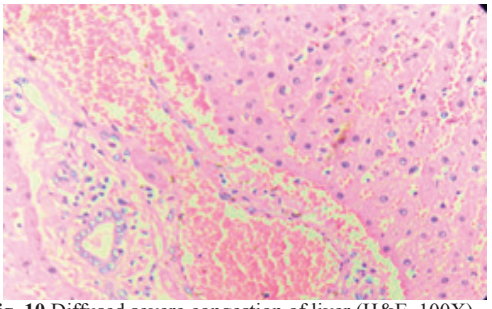

Fig. 10 Diffused severe congestion of liver (H&E, 100X)

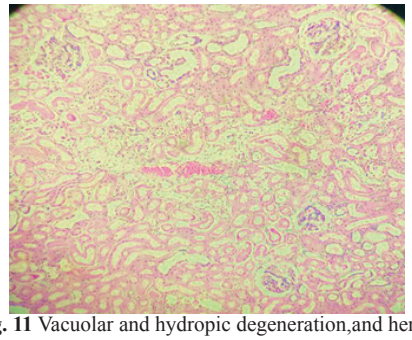

Fig. 11 Vacuolar and hydropic degeneration,and hemorrhagic cystic degenerative changes and multifocal necrotic changes in kidney (H&E, 100X)

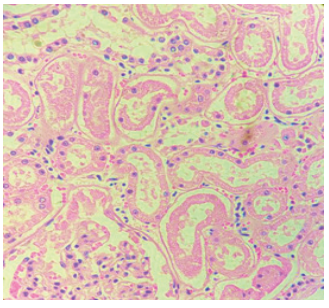

Fig. 12 Multifocal necrotic changes in kidney (H&E, 100X)

REFERENCES

Abhilash, K.P. and Rao, R. (2021). Animal bites presenting to the emergency department: spectrum, seasonal variation, and outcome. *Journal of Mahatma Gandhi Institute of Medical Sciences*, **26**(2):86-91.

Alfred, S., Bates, D., White, J., Mahmood, M.A., Warrell, D.A., Thwin, K.T. and Peh, C. A. (2019). Acute kidney injury following Eastern Russell's Viper (*Daboia siamensis*) snakebite in Myanmar. *Kidney International Reports*, **4**(9):1337-1341.

Altug, N. and Isler, C.T. (2019). Snake envenomation in two cattle: Clinical/ laboratory aspects and treatment using equine-derived antivenin of Viperidae. *Turkish Journal of Veterinary Animal Science*, **43**(6):546-550.

Baudou, F.G., Rodriguez, J.P., Fusco, L., de Roodt, A.R., De Marzi, M.C. and Leiva, L. (2021). South American snake venoms with abundant neurotoxic components. Composition and toxicological properties. A literature review. *Acta Tropica*, **224**:106119.

Bhikane, A.U., Jadhav, R.K., Masare, P.S. and Chavhan, S.G. (2020). Clinical, hematobiochemical, and pathological findings and therapeutic management of viperine snake envenomation in zebu cattle. *Tropical Animal Health and Production,* https://doi.org/10.1007/s11250-020-02376-6

Bolon, I., Finat, M., Harrera, M., Nickerson, A., Grace, D., Schutte, S., Martins, S. B. and Ruiz de Castaneda, R. (2019). Snakebite in domestic animals: First global scoping review. *Preventive Veterinary Medicine*, **170**: 104729. https://doi.org/10.1016/j.prevetmed.2019.104729

Chandra, N., Soni, A.K. and Singh, R.P. (2020). Snake bite in bullocks: a case report. *Journal of Pharmaceutical Innovation*, **9**(11):10-14.

Dandona, R., Kumar, G.A., Kharyal, A., George, S., Akbar, M. and Dandona, L. (2018). Mortality due to snakebite and other venomous animals in the Indian state of Bihar: findings from a representative mortality study. *PLoS one*, **13**(6):e0198900.

Gutiérrez, J.M., Calvete, J.J., Habib, A.G., Harrison, R.A., Williams, D.J. and Warrell, D.A. (2017). Snakebite envenoming. *Nature Reviews Disease Primers*, **3**:17063. https://doi.org/10.1038/nrdp.2017.63

Habib, A.G. and Brown, N.I. (2018). The snakebite problem and antivenom crisis from a health-economic perspective. *Toxicon Journal*, **150**:115-123.

Halder, A., Das, N.K., Mandal, T. and Samanta, A.K. (2017). Study of epidemiology, morphological and histopathological changes of stomach and kidneys in poisonous snake bite. *Journal of Medical Science and Clinical Research*, **5**(2):17898-17902.

Harms, A., Brodersen, D.E., Mitarai, N. and Gerdes, K. (2018). Toxins, targets, and triggers: an overview of toxin-antitoxin biology. *Molecular cell*, **70**(5):768-784.

Slagboom, J., Kool, J., Harrison, R.A. and Casewell, N.R. (2017). Haemotoxic snake venoms: their functional activity, impact on snakebite victims and pharmaceutical promise. *British Journal of Haematology,* https://doi.org/10.1111/bjh.14591

Warrell, D.A. (2010). Guidelines for the management of snakebites. WHO regional office for South-East Asia. Available from: https://apps.who.int/iris/handle/10665/204464