Pathology of Snake Envenomation in a Dog

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In India, more than 200 species of snakes were identified, amongst which 52 are poisonous species. Of the 52, the majority of bites and consequent mortality is attributable to 4 species. The ‘big fours’ are Indian cobra (Naja naja), Common krait (Bungarus caeruleus), Russell’s viper (Daboia russelii) and Saw-scaled viper (Echis carinatus) (Meenatchisundaram et al., 2009). This is a record of the pathological features of snake bite in a dog.

Materials and Methods

A seven month old male Weimaraner dog was presented for necropsy with the history that the animal was playing in the garden and it suddenly developed abnormal restless behaviour, facial swelling, salivation and died. A thorough necropsy was conducted and the tissue samples of the swollen muscle from the face region, lung, trachea, liver, kidney, spleen and heart were collected for routine histopathological examination.

Results and Discussion

The carcass revealed cyanotic conjunctival mucous membrane in the right side of the face just below the eye a punctured wound with oedema and haemorrhagic borders of surrounding area was observed. On reflection of the skin, the subcutaneous muscle showed extensive oedema and haemorrhage. The tracheal mucosa was severely congested. The lobes of the lung revealed oedema and subpleural ecchymosis. Liver was enlarged and congested. Spleen showed diffuse haemorrhages. Kidneys were enlarged and the cortico-medullary junction was dark brown in colour. Meningeal blood vessels showed congestion.

On histological examination, the skin and muscle around the site of the bite showed diffuse degeneration, oedema and necrosis with neurophilic infiltration. Lung parenchyma and the alveoli showed congestion and haemorrhages. Liver revealed fatty degeneration and necrosis of the hepatocytes. Kidney showed interstitial nephritis associated with lympho-plasmocytes infiltration, tubular epithelial cell necrosis and focal areas of calcification. Heart showed myocardial congestion.

Snake bite generally occurs in the animals during grazing or hunting or while playing in the garden. Most the cases of snake bite have been reported in dogs and horses. The site of bites of dogs were recorded as 64 percent in head- muzzles, tongue, lips and 13 percent in neck, 11 percent in forelimbs and prescapular areas, 7 percent in thorax/abdomen and 5 percent in hindlimbs (Willey and Shaer, 2005). The dog in this report had bite marks in the face and forelimb region.

In the present case, swelling and haemorrhages at the site of bite with the clinical signs like pain, ptyalism, cyanosis and abnormal behaviour were noticed. Venom alters

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the capillary membrane permeability and facilitates fall in effective blood volume which results in multi-system organ failure (Nuri Mamak 2009, Peterson, 2006), as observed in the present case.

Interstitial oedema and cellular infiltration, degeneration and necrosis of the tubular epithelial cells in the kidney were observed in haemotoxic snake bite. Tubular necrosis is the more common cause of acute renal failure in snake bite (Visith Sitprija, 2006). Focal areas of calcification observed in this case might be an incidental findings. The pathological changes reported in viper bites were hemolysis, myonecrosis, coagulopathy, thrombocytopenia, nephrotoxicity, vasculitis, severe internal haemorrhage, thromboembolism, myocardial necrosis, damage to vasculature causing increased permeability, subcutaneous oedema, pansystemic ecchymotic haemorrhages, shock and death (Vani Prasad and Koley, 2006).

Based on the history, gross pathology and histopathology, this case was diagnosed as bite by a snake belonging to Viperidae family.

References