

Pathomorphological Study on Lantana Toxicity in A Jersey Cattle: A Case Report

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Abstract

A year-6-month-old Jersey cow was presented to Veterinary Clinics Complex (VCC) DGCN COVAS, CSKHPKV, Palampur with a history of anorexia, decreased urination, defecation, and ingestion of Lantana foliage for a week. After the death of the animal, necropsy examination has revealed yellowish discoloration of the liver as a result of bile stagnation, cholecystitis, gelatinization of cardiac fat with yellow discoloration of almost all the internal organs including the peritoneal wall and subcutaneous tissue. The histopathological examination has shown profound bile duct hyperplasia, hemosiderin deposition, and extrahepatic bile pigment accumulation in association with necro-hemorrhagic lesions in the liver. The present case recorded the death in a Jersey cow as a result of Lantana camara induced liver damage.

Keywords: Jersey cow, *Lantana camara*, Icterus, liver damage

Introduction

Lantana camara belonging to family Verbenaceae is an ornamental plant and an intractable weed found in many parts of world (Sharma *et al* 1988). It is found approximately in 50 countries and is considered a noxious weed in 12 countries (Holm *et al* 1979). Ingestion of lantana foliage is a main cause of hepatotoxicity and causes huge mortality in areas infested with lantana foliage (Sharma *et al* 1981). The severity of *Lantana camara* effects varies by species and is dependent upon the nature, amount, and type of toxic component consumed as well as factors like species, age, sex and condition of the animal (Kumar *et al* 2016). Jaundice refers to the yellowish discoloration of the skin, sclera, and visible mucous membranes along with the deposition of bilirubin in the tissues (Chaudhury *et al* 2010). Abnormal hemolysis, impaired liver function, liver, and bile duct disorders along with excess biliary excretion of bilirubin are the outcomes of jaundice (Stephen *et al* 2003). Lantana is known to cause the release of toxins in the soil and thus inhibiting the growth of neighboring plant populations with the phenomenon known as allelopathy and thus contributing to its widespread growth in the ecosystem (Ferguson *et al* 2003). The major compounds found in the *Lantana camara* belong to the group of triterpenoids, flavonoids, iridoide glycosides, oligosaccharides, phenylpropanoid glycosides, and naphthoquinones. The major constituents of *Lantana camara* are lantadene A and lantadene B and are found to be most toxic to cattle (Hart *et al* 1976). After ingestion of lantana, there is ruminal stasis within 4-6 hours due to which an increased concentration of toxins in the rumen occurs (Pass *et al* 1991). Intrahepatic cholestasis leads to photosensitization because retention of phylloerythrin (degraded product of chlorophyll) occurs, thereafter (Rimington *et al* 1934; Quin *et al* 1934). This type of photosensitization is called hepatogenous photosensitization or type III photosensitization is the most common form observed in domestic animals and jaundice due to lantana poisoning occurs due to bilirubin accumulation in the body due to impaired bile secretion not because of inability to metabolize bilirubin (Pass *et al* 1978). The toxicity of lantana leads to decreased Na⁺, K⁺-ATPase activity in the liver resulting in decreased bile flow thereby cholestasis and cholesterol enrichment (Sharma *et al* 1984; Dawra *et al* 1984).

History and Observations

A Jersey heifer (18 months of age) cow was brought to the clinics with a history of ingestion of lantana foliage (Fig.1) seven days ago resulting in anorexia, decreased urination, and defecation in association with the icteric sclera and visible mucous membranes.

Materials and Methods

The animal collapsed on the same day and was sent for necropsy examination to the Department of Veterinary Pathology, DGCN COVAS, CSKHPKV, Palampur. Representative tissue samples of approximately 0.5 cm thickness were collected in 10% Neutral Buffered Formalin (NBF) for histopathological examination. The fixed tissue sections were dehydrated in ascending grades of alcohol, cleared in benzene, and impregnated in molten paraffin. The paraffin blocks containing tissue sections were cut into 4–6-micron thickness and were stained with haematoxylin and eosin (H&E) stain as per the standard protocol (Luna *et al* 1968).

Results and Discussion

During necropsy examination, all internal organs were found to be icteric, and the liver was fragile (Fig. 3 & 4). On the cut section of the liver bile ducts exhibited cholangitis along with cholecystitis. The stained tissue sections were evaluated and micro photographed (Olympus BX40). On the histological evaluation of stained tissue sections, hepatocytes showed cellular swelling, hydropic degeneration, bile duct hyperplasia, increased Kupffer cells activity, and hemosiderosis as a result of erythrophagocytosis (Fig. 5 & 6). The cases of lantana toxicity are more often recorded during the periods of green fodder scarcity. There is no specific treatment available for *Lantana camara* toxicity in animals. Hence, causes profound economic losses to farmers in terms of mortality and decline in production. The present study signifies the need for the generation of rational treatment against lantana toxicity using biotechnological and immunological research.



Fig. 1. Foliage of *Lantana camara*

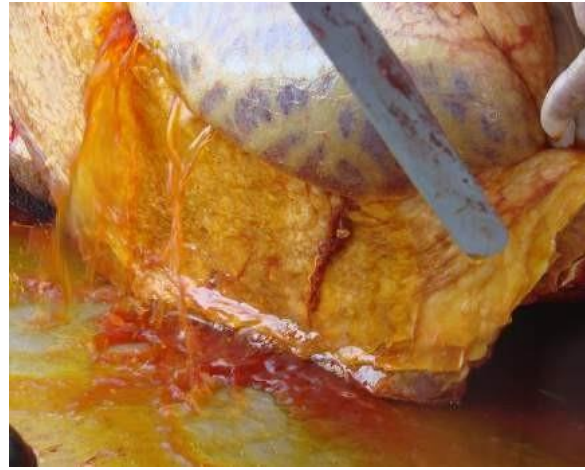


Fig. 2. Dark yellowish discoloration of subcutaneous tissue

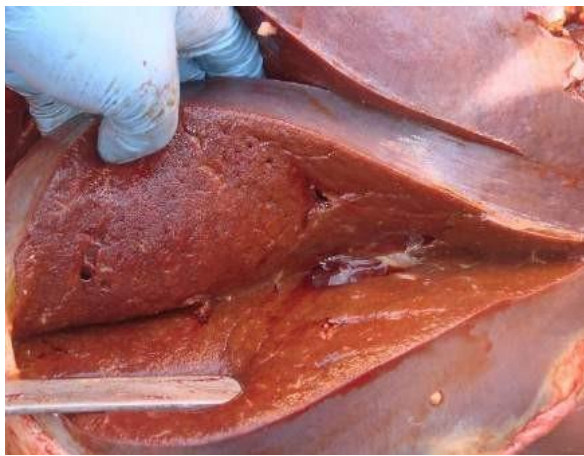


Fig. 3. Orange to yellowish discoloration of cut section of liver

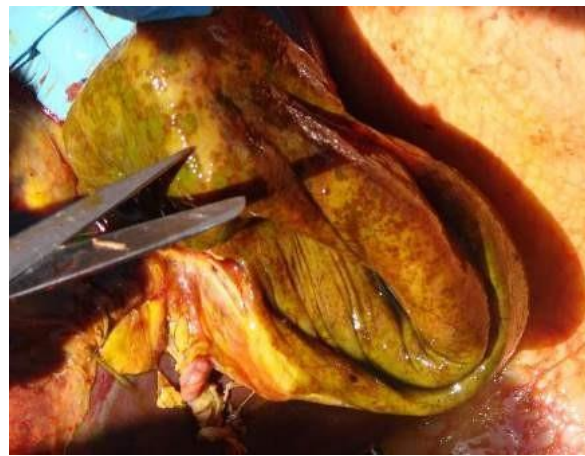


Fig. 4. Thickened gall bladder and bile stasis leading to erosive cholecystitis

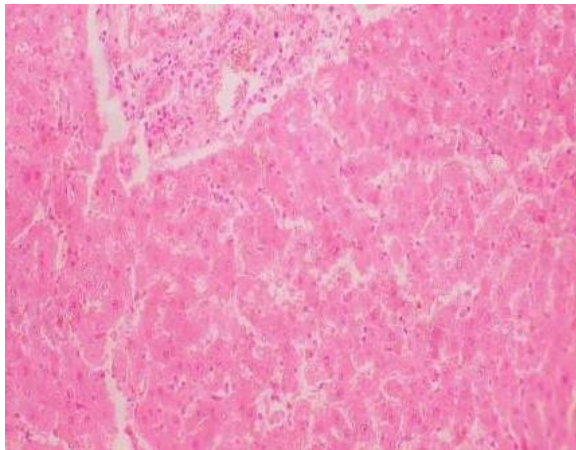


Fig. 5. Cellular swelling and degeneration in association with hemorrhages in the liver. H & Ex100

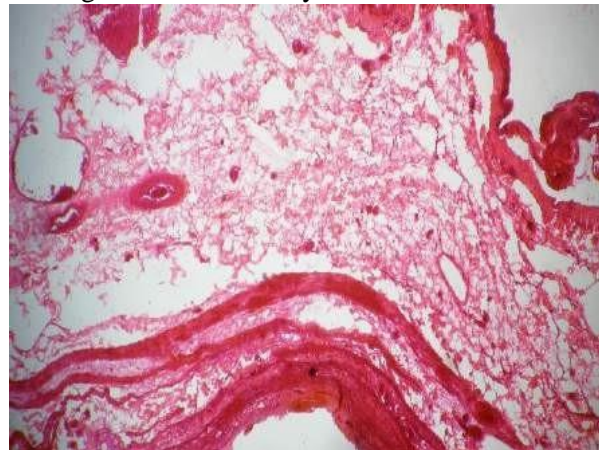


Fig. 6. Thickened muscular layer of gall bladder. H & Ex100

Conflict of Interests

There is no conflict of interest.

Contribution of Authors

During the writing of the manuscript, all of the authors contributed equally. They read the final manuscript and gave it their approval for publishing.

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