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Clinicopathological Findings and Therapeutic Management of Secondary Photosensitization caused by *Lantana camara* in Deccani Sheep Flock

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Abstract

A flock of twenty Deccani sheep was admitted to clinics with the history of swellings over face, ears, tail base, head shaking, rubbing head against hard objects, recumbency and death in three female sheep. Clinical examination of ailing flock revealed anorexia, increased rectal temperature and respiratory rate, tachycardia, swellings and crests formation or loss of hairs over ears, around eyes, submandibular area and tail base along with inco-ordination,intense itching and passing yellow to amber coloured urine. Haematological analysis revealed granulocytic leucocytosis. On post-mortem examination of dead animals,yellowish discolouration of conjunctival mucous membranes, sclera, subcutaneous tissue or fat and various organs including heart, liver and kidney was observed. Affected sheep were treated with tentative diagnosis of *Lantana camara* induced photosensitization and complete clinical recovery was observed in all affected sheep on 5th day of treatment. On the basis of history, clinical signs, haematological changes, post-mortem lesions and therapeutic response, the ailing flock was diagnosed for secondary photosensitization due to ingestion of *Lantana camara*.

Keywords: *Lantana camara*, Sheep, Photosensitization, Jaundice, Swelling

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Introduction

Photosensitization is an inflammation of skin surface due to the activation of photodynamic substance in peripheral circulation upon exposure to sunlight leading to affection of body parts which are directly exposed to sunlight. *Lantana camara* is most noxious and invasive weed around the world affecting livestock population as well as loss of agro and forest ecosystem (Palmer*et al.*,2000; Pereira *et al.*, 2003; Day *et al.*, 2003; Sharma *et al.*, 2007). It causes hepatotoxicity and obstructive jaundice in grazing ruminants within few hours of browsing upon Lantana weed (Sharma and Makkar, 1981; Sharma *et al.*, 1988) and is responsible for several outbreaks of photosensitization in large as well as small ruminants leading to heavy economic losses due to high morbidity and mortality in livestock (Sharma *et al.*, 2007, Sharma *et al.*, 2011; Ekambaram *et al.*, 2014).

Lack of awareness among sheep rearing farmers regarding toxic potential of *Lantana camara* might be responsible for several outbreaks of photosensitization in sheep flocks during draught periods or initial period of monsoon season. The present article highlights the clinicopathological findings in acute outbreak of photosensitization in sheep flock and its therapeutic management.

Materials and Methods

A flock of twenty Deccani sheep with the history of swelling over face, ears, tail base, head shaking, rubbing head against hard objects, recumbency and death in three female sheep was admitted to Teaching Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Udgir. Careful enquiry with sheep owner

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revealed accidental access of around 25 sheep to *Lantana camara* shrubs during grazing. Three female sheep with acute syndrome succumbed to death before admission to clinics. The blood samples of five severely affected sheep were obtained from jugular vein for hematology in commercial EDTA vacutainer's on the day of admission (day 0: before treatment) and after clinical recovery (day 5: after treatment). The haematological analysis was performed on semi-automated analyser. The clinical signs and different clinical parameters were noted as per standard routine clinical protocol. The ailing sheep were treated with tentative diagnosis of *Lantana camara* induced photosensitization. The necropsies of dead animals were performed as per routine protocol to note the gross lesions. The data generated from different haematological parameters in present the study were subjected to student's t-test using IBM SPSS software version 20 for windows.

Results

The clinical examination of ailing sheep revealed presence of anorexia, varying degree of swelling and crests formation along with marked loss of hairs over ears, around eyes and nose, submandibular area, tail base, perineum and frequent passage of amber to yellow coloured urine. The marked yellow discoloration of conjunctival and vaginal mucous membranes also evident. The significant increase in body temperature (103.08^{0}F), heart rate (106.12/minute) and respiration rate (38.70/minute) (Table 1) was observed on day 0 (before treatment) as compared to day 5 (5 days after treatment or after clinical recovery). The clinical signs likerubbing offace, tail, lateral abdomen and head pressing against hard object were also observed in ailing flock (Fig.1-3). Three sheep with severe illness were in lateral recumbency.

Table 1. Mean±SE values of vital clinical parameters of sheep affected with photosensitization on day 0 (before treatment) and after clinical recovery (day 5)

Parameter	Day 0 (n=15)	Day 5 (n=15)	't' value
Rectal Temperature (^{0}F)	103.08±0.12	100.52±0.21	10.66**
Heart rate (per minute)	106.12±4.34	88.12±4.71	2.80**
Respiration rate (per minute)	38.70±3.02	25.76±0.34	4.25**

**Level of significance P<0.01, NS: Non-significant



Figure 1. Note the swelling around ear, eye and submandibular area.



Figure 2. Note the presence of swelling, loss of hairs, skin and crusts formation around eyes and nose.



Figure 3. Note the swelling at the base of tail, vulva and icteric mucous membranes.

All the ailing sheep were immediately shifted to sunlight protected area in order to avoid further exacerbation of photosensitization and treated with Inj. Dextrose 5% @ 500 ml/sheep IV twice a day, Inj. Amoxicillin+Cloxacillin @ 10 mg/kg body weight IV once a day, Inj. Chlorpheniramine maleate @ 0.2 mg/kg body weight IM once a day, Inj. Dexamethasone sodium @ 0.02 mg/kg body weight IV once, Liquid paraffin 50 ml orally once, Inj. Vitamin B complex (thiamine, riboflavin,

pyridoxine, B12) @ 3 ml/sheep IM once a day and herbal liver tonic (Livorak) 2 tablets/sheep once a day for five days.

Out of 20 affected sheep 15 showed complete recovery after 5 days treatment while two with severe clinical signs and jaundice succumbed to death on second day of treatment. The clinical examination of recovered sheep revealed restoration of all vital clinical parameters in normal range including feed and water intake. Highly significant ($P < 0.01$) decrease in body temperature, respiration rate and heart rate was observed on 5th day of treatment as compared to day 0 (Table. 1). The marked reduction in icteric discoloration of mucous membranes, facial swelling and itching also observed in all treated sheep.

The haematological analysis revealed increased average values of total leukocyte (TLC=13.49 x 10^9/L) and granulocyte (TGC=10.97x10^9/L) count before treatment (day 0) as compared to the values of respective parameters (TLC= 13.18x 10^9/L and TGC=8.35x 10^9/L) after treatment (day 5). The average values of total erythrocyte count (TEC=8.79x10^{12}/L), haemoglobin concentration (Hb=10.10 gm/dL) and packed cell volume (PCV=22.36%) found decreased on day 5 of treatment as compared to day 0 (before treatment, TEC=9.56, Hb=12.30, PCV=27.54). This decrease might be attributed to hemo-dilution effect of fluid therapy or normalization of feed and water intake.

The post-mortem examination of five sheep died of *Lantana camara* toxicity revealed yellowish discolouration of conjunctival mucous membranes, sclera, subcutaneous tissue or fat and various organs including heart, liver and kidney indicating icterus along with presence of copious icteric froth in tracheal lumen and marked distension of gall bladder. At necropsy, affected animals also showed marked hepatomegaly along with yellow orange discoloration (Fig. 4-6).



Figure 4. Necropsy: Note the icteric discoloration of sclera and conjunctival mucous membranes.



Figure 5. Necropsy: Note the hepatic enlargement and yellow orange discoloration of liver (cut open).



Figure 6. Necropsy: Note the yellowish green discoloration of renal cortex (cut open).

So the history, clinical signs, haematological changes, therapeutic response and necropsy findings confirmed the *Lantana camara* induced secondary photosensitization in ailing sheep flock.

Discussion

The severity and progression of clinical signs of *Lantana camara* induced photosensitization varies with respect to nature and amount of toxic agent ingested, environmental conditions, species, age, size and body condition of the animal (Gopinath and Ford, 1969; Sharma *et al.*, 2007). Lantadenes {Lantadene-A (LA) and Lantadene-B (LB)} are most important toxic compounds present mainly in the leaves of these plants responsible for causing hepatotoxicity, photosensitization and jaundice (Sharma *et al.*, 2007). So the variable degree of clinical signs observed in ailing flock in present report are in agreement with the findings of above mentioned research workers.

Cattle, buffalo and sheep are highly susceptible to *Lantana camara* induced photosensitization among ruminants while goats are little resistant (Sharma *et al.*,

2007). Kumar *et al.* (2009) reported outbreak of lantana poisoning in 76 hogget's of Nellore breed of sheep in month of August with clinical signs of pyrexia, dullness, anorexia, diarrhea, dyspnoea, erythema, edema of oral mucosa, lips, ear and tail with development of corneal opacity and dermatitis with hair fall, sloughing of skin around ears, eyes, tail and perineal region in later stages in 35 hogget's.

Kumar and Patel (2013) reported Lantana induced photosensitization in five male buffaloes clinically characterized by sudden itching, red burn like patches on dorsum and hump region and treated successfully by protecting from sunlight and supportive treatment. Srikanth and Kumar (2013) also reported Lantana induced photosensitization in eight crossbred Jersey cows clinically characterized by dullness, inappetance, constipation, conjunctivitis, epipohra, corneal opacity and dermatitis of body areas exposed to sunlight. Hence, the clinical signs reported by various earlier workers in different species due to *Lantana camara* induced photosensitization are in consonance with clinical signs observed in present report.

The outbreaks of photosensitization are commonly observed during draught period or monsoon. Scarcity of green fodders is major cause of Lantana toxicity in grazing animals (Sharma and Makkar, 1981). In Maharashtra, sheep are being purely reared on grazing and draught since last three years in the Marathwada region might have been predisposed the present sheep flock to Lantana induced photosensitization. The present outbreak was reported during onset of monsoon season (July) after severe draughts for continuous three years in Marathwada region of Maharashtra state. The season and environmental conditions predisposing the animals for occurrence *Lantana camara* induced photosensitization outbreak in present outbreak are also in agreement with the findings of Kumar *et al.*(2009) and Ekambaram *et al.*(2014).

The haematological findings like reduction in haematocrit, granulocyte count and increase in platelet count after treatment as compared to pre-treatment values observed in present study are also in agreement with the haematological findings of Seawright (1963) in experimental *Lanatana camara* induced secondary photosensitization.

Seawright (1964) conducted a study on pathology of experimental *Lantana camara* poisoning of sheep and reported that, most of the affected sheep showed jaundice along with swollen, mottled ochrecoloured livers, distension of gall bladders with pale green to colourless bile and moist kidneys. These gross postmortem findings are also in consonance with gross postmortem findings in present outbreak.

In conclusion, the obligatory protection of ailing sheep from sunlight, supportive therapy in the form of laxative, parenteral fluids, antibiotics, B complex vitamins, antihistamincs and steroids along with oral liver tonics for the period of 5 days proved ideal treatment protocol for management of outbreaks of *Lantana camara* induced photosensitization in sheep.

Conflict of Interest: None Declared

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