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C Yugandhar
Assistant Professor (Contractual), Department of Veterinary Pathology, Veterinary College, Proddutur, Kadapa, Andhra Pradesh, India

P Shobha
Assistant Professor (Contractual), Department of VAHEE, Veterinary College, Proddutur, Kadapa, Andhra Pradesh, India

S Swethakanthi
Ph.D Student, IVRI, Izatnagar, Uttar Pradesh, India

C Vijaya Kumar
Veterinary Assistant Surgeon, Chapadu, Kadapa district, Andhra Pradesh, India

Corresponding Author:
C Yugandhar
Assistant Professor (Contractual), Department of Veterinary Pathology, Veterinary College, Proddutur, Kadapa, Andhra Pradesh, India

A study on the incidence and management of lumpy skin disease in Andhra Pradesh

C Yugandhar, P Shobha, S Swethakanthi and C Vijaya Kumar

Abstract
Lumpy Skin Disease (LSD) is a viral infection of livestock mainly white cattle. The prominent clinical signs present in most of the animals are presence of cutaneous nodular lesion and in severe cases edema of the dependable parts. The diagnosis based on history and clinical signs is the most reliable method in the field conditions. The present study was conducted in eight mandals representing one each from eight districts of Southern Andhra Pradesh. The results showed that the average morbidity was 17.47 percent, Mortality 0.4 percent and the case fatality rate was 2.29 percent. Among the total deaths the calves aged below 1 year have recorded a death percentage of 75. In spite of vigorous treatment with high antibiotics, anti inflammatory, anti histamines, combination of allopathy and homeopathy the affected animals took a maximum of 60 days to get completely recover from all the lesions.

Keywords: Lumpy skin disease, incidence, mortality, therapeutic approach

Introduction
Lumpy skin disease virus (LSDV) is a contagious viral disease of cattle. LSDV is A double stranded DNA virus belongs to the genus Capri pox virus of family Poxviridae along with Goat pox virus (GTPV) and Sheep pox virus (SPPV) (Schoch *et al*. 2020) [7]. The occurrence of the disease in India was being observed from the year 2019 and was scientifically reported in the year 2020 (Lakshmi kavitha *et al*. 2021) [3]. The major symptoms of LSD are pyrexia or fever, nasal discharge, swelling of the lymph nodes, nodules or nodular lesions covering the skin of entire body, mucus membranes of respiratory and gastrointestinal track (Namazi and Tafti 2021) [4].
Clinically, LSD has been reported in cattle only. The incubation period of the disease is 4–12 days. The clinical picture starts with fever (40–41.5 °C) which persists for 1–3 days (Kumar *et al*. 2021) [2]. The skin nodules appears from day one onwards, which gradually become harder and necrotic thereby inducing severe discomfort, pain and lameness. In 2–3 weeks, the nodules regress resulting in hard, raised areas (sit-fasts) clearly separated from the surrounding skin. Some of the sit-fasts may slough away, leaving a full skin thickness hole in the skin which some times gets converted into abscess due to secondary bacterial infection or becomes liable to myiasis.
The LSD is transmitted mainly through vectors and mechanical means (Paslaru *et al*. 2021) [5]. Both morbidity and mortality rates depend on the factors like age of the animal, its breed, immune status and in case of adult female cattle its production period (Wolff *et al*. 2022) [10]. LSD is of great importance because of its negative impact on economy through production losses and reproductive failure and hence listed as notifiable disease by OIE (Savitha 2023) [6].
In Haridwar district of Uttarakhand, 1025 cattle got infected by LSD as on August 2022 [Tridibesh *et al*. 2022] [9]. The state government of Andhra Pradesh has under taken Live attenuated Goat Pox Vaccination (GPV) during September month of 2022 for all the White cattle in the state to prevent the disease. Inspite of all the precautionary measures to prevent the disease, it entered in to the state and caused a remarkable losses to the livestock owners in terms of productivity and economy of the farmers. Hence this study was taken up in the southern districts of Andhra Pradesh state to assess the impact of the disease.

Methodology
The study was conducted in eight mandals (Chapadu, Rly kodur, VeduruKuppam, Gudipala, Tadipatri, Somandepalli, Gadivemula and Kosigi) selected randomly from eight districts (Kadapa, Annamayya, Balaji, Ananthapuram, Satyasai, Nandyal and Kurnool respectively) of southern Andhra Pradesh state of India.

The data was collected by personal phone calls from the Veterinary Assistant Surgeons working in the respective mandals. Data collected on the following parameters and analyzed as per the standard statistical procedures. Data was also collected regarding the severity of the lesions, time taken for recovery and therapy measures followed to treat the animals.

$$\text{Morbidity (\%)} = \frac{\text{Total number of cases recorded}}{\text{Total no. of animals during the report period}} \times 100$$

$$\text{Case recovery rate (CRR) \%} = \frac{\text{Total no. of treated cases that cured}}{\text{Total no. of treated cases}} \times 100$$

$$\text{Case fatality rate (CFR) \%} = \frac{\text{Total no. cases treated that died}}{\text{Total no. cases treated}} \times 100$$

$$\text{Mortality (\%)} = \frac{\text{Total no. of treated cases that died}}{\text{Total no. of animals during the report period}} \times 100$$

Results and Discussion

Results from the table 1 indicates that in the study area, due to the high population of White cattle in Balaji and Chittoor districts the morbidity was high upto 24.86 and 29.45 percent respectively. Even though the morbidity is recorded moderate the mortality was less than 1 percent in all the study areas this was attributed to the early vaccination of the all white cattle with Goat pox vaccine and close supervision of the affected animals by the field staff of veterinary department. The veterinary officers in the study area opined that the Goat pox vaccine has worked very well in controlling the LSDV, even though there were incidences where the vaccinated cattle also affected with the LSDV but the animals recovered very soon due to the immunity generated by the GPV. One more observation in the field was that if we divide the LSD cases into three categories Mild (with skin nodules spread half of the body surface), Moderate (with skin nodules spread throughout the body surface from nose to tail) and Severe (Nodules throughout the body and edema of the dependable parts) there were almost 55 percent mild, 25 percent moderate and 20 percent severe cases recorded. Among the total deaths due to LSDV very young (below 1 year age) age recorded 75% followed by young (1-3 years) 20 % and adult (above 3 years) 5%. In the severe cases where the animals developed edema from jowl to brisket region have gone to recumbency and have struggled hard to recover and only few have survived through this stage.

In the study area the affected animals were treated symptomatically. The most common treatment protocol included use of broad-spectrum antimicrobials (peicillines, Cefalosporins) to mitigate the secondary bacterial infection along with anti-inflammatory (Meloxicam and paracetamol, nimesulide), steroid therapy (Isoflud, Prednisalone), Lasix to reduce edemas, antihistamines and supportive therapy with Becomplex vitamins and minerals orally. The ethno-veterinary treatment alongside allopathic therapy has showed proven results and was commonly recommended by clinicians recently in the study area includes oral application of LSD care homeo medicine, Oral preparation of mixture of Beetle leaves, Pepper, jaggary, salt (Savitha 2023) [6] and External application of Neem oil has proven good results. In addition to above to boost up the Immunity Levamisoleinjecton was given and to reduce the virus load Methylene blue treatment was given orally at the dose of one gram per day for five days. Inspite of heavy therapy some animals showed almost 60 days to get completely recover from the nodules and all the secondary affections associated with LSD. the regressed skin nodules were replaced by scars.

The study area which was situated near to the Veterinary College, Proddutur has got the opportunity to conduct postmortem for the cattle died of LSD and there were well-described gross lesions in the carcass. The size of the skin nodules was not uniform, firm round and raised. Regional lymph nodes specifically bilateral prescapular lymphnodes are grossly enlarged, oedematous and having haemorrhagic foci. Muscle tissue and the fascia shown nodular lesion that are grey-white surrounded by red inflammatory tissue distributed throughout the carcass. Interstitial or bronchopneumonia with nodular lesions spread across the lungs. The necrosed tissue slough away leaving an ulcer. There were round ulcers in mucosa of rumen epithelium, enlarged mesenteric lymph nodes. The nodules were about 10-20 mm diameter in the kidney. Liver- enlargd with grayish white necrotic foci and rib impressions on it. Small nodules on serosa of rumen. Pox lesions on ruminal epithelium. (Al-Salihi, 2014) [1]

Table 1: Incidence of LSD in Southern Andhra Pradesh

Name of the district	**Kadapa**	**Annamayya**	**Balaji**	**Chittoor**	**Ananthapur**	**Satyasai**	**Nandyal**	**Kurnool**	**Total**
Name of the mandal	**chapadu**	**Rly Kodur**	**VeduruKuppam**	**Gudipala**	**Tadipatri**	**Somandepalli**	**Gadivemula**	**Kosigi**	
Population white cattle	3250	4300	18500	16300	2500	5800	5823	11000	67473
Affected	155	450	4600	4800	130	550	480	620	11785
Morbidity	4.77	10.47	24.86	29.45	5.20	9.48	8.24	5.64	17.47
Recovered	143	428	4505	4745	115	530	454	595	11515
CRR	92.26	95.11	97.93	98.85	88.46	96.36	94.58	95.97	97.71
Death	12	22	95	55	15	20	26	25	270
Mortality	0.37	0.51	0.51	0.34	0.60	0.34	0.45	0.23	0.40
CFR	7.74	4.89	2.07	1.15	11.54	3.64	5.42	4.03	2.29

Fig 1: Enlarged prescapular lymphnode

Fig 2: A ongole heifer with severe LSD symptoms

Fig 3: Presence of the nodules in the medulla of the kidney

Fig 4: Necrotic foci and rib impressions on the liver

Conclusion

Education of veterinarians, livestock farmers and workers would be helpful in timely diagnoses of LSD which would be helpful to slow down the spread of disease. Compulsory and regular vaccination is the only effective way to control LSD (Şevik and Doğan 2017) [8]. Animal premises as well as animals should be targeted for vector control (Zafar *et al*. 2023) [11] by spraying the insect repellant which are safe for animals as well as for environment. Controlling and preventing this disease demands strict vaccination based on the previous season of outbreak of the disease. The government should make policies to control this epidemiological and economic significant disease so as to face even worse situations in the days to come.

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