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# Study of Gangrenous Dermatitis Outbreaks in Poultry in Tarai Region of Uttaranchal (India)

Rakesh Kumar, Santosh Kumar Shukla, Rajesh Chandra,
Department of Clinical Medicine, Ethics and Jurisprudence, College of Veterinary and Animal Sciences,
G.B. Pant University of Agriculture and Technology, Pantnagar –263145, India,

**Abstract:** Gangrenous dermatitis (GD) is economically important bacterial disease of poultry commonly associated with deep litter system of rearing. Present study was carried out in Tarai area of Uttaranchal (India) having high density of commercial poultry farming units, where a total of 23 outbreaks were recorded on 13 organized poultry farms. Average mortality rate was found to be 5.05 %. Age group of affected birds was of 7-15 weeks various predisposing factors were also taken into consideration during study of outbreaks

**Keywords:** Outbreak, gangrenous dermatitis, Gd, tarai, India

## INTRODUCTION

Gangrenous Dermatitis (GD), also known as gas edema disease, wing rot and avian malignant edema, is one of the important bacterial disease responsible for severe economic losses to poultry producers due to increased mortality, costly treatment and poor growth[1] It is common in birds reared under deep litter system of housing. It is mainly associated with immunosuppressive infections including chicken anemia virus and other predisposing factors like stress due to vaccination, overcrowding, poor management and cannibalism. Climate of Tarai region of Uttaranchal is characterized by high humidity and temperature, resulting ideal area for growth of various microorganism. The incidence of GD has been reported from different states of India[2,3]. Present study based on several outbreaks of GD in tarai region of Uttaranchal (India) during year of 2004.

## MATERIALS AND METHODS

Study was carried out for a period of one year in tarai area of Uttaranchal from January 2004 to December 2004 comprising 13 organized poultry farms. Each outbreak was recorded along with information regarding farm strength and epidemiology including management and predisposing factors. Sick birds were examined for clinical signs and external gross lesions and some dead birds from each out break were necropsied for internal lesions. Dead birds were also subjected to attempt isolation of the causal agent using standard method involving inoculation on nutrient and blood agar plates for isolation of Staphylococcus from tissue samples of skin,liver and heart. Isolated bacteria were stained by gram's staining technique to demonstrate staining character and typical arrangement of bacteria. Isolated bacteria were confirmed to be pathogenic Staphylococci by catalase and coagulase tests.

## RESULTS AND DISCUSSION

A total of 23 outbreaks were recorded during the study period. All outbreaks were seen in chicks and pullets of BV-300 strain of domestic fowl. Affected birds were of 7-15 weeks of age, commonly upto 10 weeks of age. Mortality ranged from 1.5 % to 12.0 % with an average of 5.05% (Table 1). Duration of disease ranged from 12 to 55 days with an average of 28 days. Bran *et al.*[4] studied 14 outbreaks of G.D. in broilers with 5-20 % mortality rate. Invanico *et al.*[5] also reported that the disease started at 5 weeks of age with an average morbidity and mortality of 1.0 % to 5.0%. Predisposing factors were also taken into consideration during the study and included stress by shifting of birds from deep litter to cage system of housing or cage to cage transfer and vaccination with infection bursal disease virus, LaSota and $R_2B$ strain of NCD virus. At one farm, overcrowding was also an important predisposing factor. Most of the outbreaks of disease were associated with one or other predisposing factor, which might have influenced the severity and duration of illness. The predisposing factors like faulty cages, improper debeaking, overstocking and faulty fowl pox vaccination have been found responsible for increased occasioned of GD[6]. Rosenberger *et al.*[7] reported that subclinical infections of IBD was mainly responsible for vaccination failure and high incidence of opportunistic infection.

**Corresponding Author**: Rakesh Kumar, Department of Clinical Medicine Ethics and Jurisprudence, College of Veterinary & Animal Sciences, G.B. Pant University of Agriculture and Technology, Pantnagar –263145 (India) Teaching Associate
Tel: 05944 233283. 09412037921

Table 1. Epidemiology of Outbreaks of Gd During 2004 in Tarai Region of Uttaranchal

| Farm | No of outbreaks | Age weeks | Flock strength | Mortality (%) | Predisposing Factors |
|---|---|---|---|---|---|
| 1 | 2 | 8-12 | 21080 | 5.05 | $R_2B$ Vaccination |
| 2 | 1 | 6-8 | 20070 | 9.19 | IBD Vaccination |
| 3 | 2 | 10-15 | 9120 | 2.10 | Lasota Vaccination |
| 4 | 4 | 7-11 | 62089 | 3.12 | $R_2B$ vaccination |
| 5 | 2 | 7-9 | 13814 | 12.00 | Shifting |
| 6 | 1 | 9-10 | 31015 | 7.6 | $R_2B$ Vaccination |
| 7 | 2 | 11 | 11336 | 1.74 | IBD Vaccination |
| 8 | 1 | 9 | 3397 | 2.83 | Shifting |
| 9 | 2 | 11-13 | 8927 | 1.50 | Overcrowding |
| 10 | 1 | 12 | 11219 | 2.21 | Shifting |
| 11 | 2 | 14 | 4950 | 4.31 | $R_2B$ Vaccination |
| 12 | 1 | 12 | 536 | 7.62 | $R_2B$ vaccination |
| 13 | 2 | 13 | 7890 | 6.36 | IBD Vaccination |

Shukla *et al.*[1] also mentioned that IBD precipitated GD, due to damage to bursa of Fabricious and resultant immunosuppression maked the birds more susceptible to normal inhabitants like *staphylococcus aureus*, IBD and IBH have also been found to be involved in GD outbreaks by several researchers.[7-9] . Immunodeficiency and environmental factors such as over crowding and high humidity as contributing factors in outbreaks of GD. It was also suggested that periodic occurrence of GD may be due to a dose related relation ship as consequently intensive cleaning/ specific housing units might limit the occurrence of GD when other environmental factors can not be altered. In the present investigation, the G.D. outbreaks were mostly seen after stress by shifting of birds or by vaccination. As infectious bursal disease is prevalent in India even in subclinical form the immunocompromised situation might be the main factor in disease outbreaks.

The clinical signs seen in affected birds particularly the predominant ones such as varying degree of depression, in-coordination, inappetence droopy wings, leg weakness and ataxia have also been recorded by other workers in GD outbreaks [1-10] Gross lesions at necropsy consisted of dark and moist areas of skin usually devoid of feathers such as overlying wings, breast, abdomen and legs. Similar changes have also been recorded by other investigators[10,11]. The skin was soft with tendency to slough off on handling subcutaneous oedema with accumulation of serosanguinous fluid over pectoral, rump and a wing muscle was also seen. Haemorrhages and blood tinged exudates were noticed in the breast and scapular muscles. Bursa of fabricious was small and flaccid in most of the cases. In some birds, enlargement of liver with focal necrosis, hemorrhages at the junction of proventiculus and gizzard and petechial hemorrhages on heart muscles were seen. Shukla *et al.*[1] also reported similar lesions including blood tinged exudates in the breast and scapula muscles.

Isolated Staphylococcus as per the standard method was subjected to staining. Gram's staining revealed typical arrangement of cocci in grape like clusters. Staphylococci isolated from all the outbreaks were found positive for catalase and coagulse tests. Shukla *et al.*[1] isolated *Staphylococcus aureus* and Clostridium species from cases of GD and reported that mixed infections with two bacteria resulted increased mortality,

Affected flocks were treated with different antibiotics. The ampicillin and cloxacillin alongwith oxytetracycline or chlortetracycline were found highly effective in minimizing the severity of disease and mortality in the flocks, as observed by several workers [12,13]. In contrast, Rajeshwari *et al.*[14] did not observed any successful therapy on farm. This might be because of higher immunosuppression, improper dosage and use of drugs against which the invading bacteria were not sensitive

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