EFFICACY OF FLORFENICOL (NUFLOR®) IN TREATMENT OF RESPIRATORY INFECTIONS OF BOVINES*

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Abstract

Florfenicol (Nuflor®) a fluoroanalogue of thiamphenicol was evaluated in the treatment of bovine respiratory tract infections at 20 mg per kg body weight deep intramuscular at 48 h interval in nine animals. There was recovery in eight animals out of nine. Out of 21 bacterial isolates of nasal washings of these animals, nine were Gram positive and 12 were Gram negative organisms. Treatment resulted in a rapid fall in group mean rectal temperature and improved clinical condition of the cases. After therapy the haematological parameters of recovered animals showed significant difference with respect to erythrocyte sedimentation rate and packed cell volume.

Key words: *Florfenicol, Bovine,Respiratory infection*

Respiratory diseases have been extensively documented as one of the most economically important health problems in humid tropics in terms of treatment cost and loss of production. Ordinarily, majority of the cattle diseases (40 to 80 per cent) involve the respiratory system. The diseases can be treated with antibiotics, bronchodilators and non-steroidal anti-inflammatory drugs or prevented by vaccination. However, the random selection and indiscriminate use of antibiotics in the treatment of respiratory tract infections has led to the development of resistance to most of the present day antibiotics which warrants the use of newer therapeutic agents for effective treatment.

This paper describes the treatment of bovines with naturally acquired respiratory infections with a newer antibiotic florfenicol (Nuflor®) that is used exclusively for upper respiratory tract infections (Lockwood *et al.*, 1996). Florfenicol is a flouroanalogue of thiamphenicol which is recommended as a drug of choice in respiratory tract infection in bovines. This is a pioneering research work where the efficiency of florfenicol is assessed in the treatment of respiratory tract infections of bovines in India.

Materials and Methods

Bovines, which were presented, at the University and Government Veterinary Hospitals, Kerala, India with clinical signs of respiratory disease during November 2001 to June 2002 formed the animals for the study. The clinical data were recorded daily during the first four days of presentation and were classified based on a clinical illness index score system into normal (0), slightly ill (1), moderately ill (2) and severely ill (3). Five millilitre of blood of affected animals was collected in dry glass vials on first and fourth day of presentation for haematological evaluation. Parameters and methodology were statistically analysed as per the method of Snedecor and Cochran (1980). Animals were treated with florfenicol (Nuflor®) @ 20 mg/kg body weight deep intramuscular in the neck, two doses at 48 h interval.

Nuflor® - Schering-Plough Animal Healthcare, New Jersey

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Results and Discussion

All the animals exhibited pyrexia and hyperpnoea indicating the infectious etiology of respiratory tract with no involvement of the other systems of the body, which was evident from the history and clinical examinations. Common clinical signs exhibited by the animals included reduced appetite, nasal discharge and cough. Abnormalities in respiration with respect to rate and rhythm could be detected by auscultation. Most of the animals showed inspiratory dyspnoea.

Recovery was noticed in eight out of nine animals with respiratory disease that were subjected to treatment with florfenicol. There was recurrence of disease in two cases. One animal succumbed to death. Recovery was noticed with respect to the clinical data, waning of clinical symptoms and scoring clinical illness index to normal from the other three scores. In response to the treatment with florfenicol there was significant fall in the group mean rectal temperature (103.05 ± 0.55°F and 102.05 ± 0.14°F) during the first 24 h after therapy. A significant reduction in respiratory rate of animals after therapy was also evident in the recovered animals with the mean values of 55.75 ± 12.80/min and 40 ± 6.23/min. Haematological parameters estimated on first and fourth day of treatment are presented in Table. Statistically significant ($P<0.01$) reduction in erythrocyte sedimentation rate (ESR) and increase in the packed cell volume (PCV) ($P<0.05$) was seen. Though non-significant, a favourable elevation in the values of haemoglobin (Hb) and red blood corpuscles (RBC) are also evident from the table.

The highly significant lowering in the mean values of ESR in the recovered animals noticed with all other variables being constant during the treatment period suggest that the therapy was beneficial and helps the physiological parameters to regain normally. A significant increase in the packed cell volume and though not statistically significant an apparent increase in the mean value of haemoglobin were noticed in animals after treatment. An overall reduction in the PCV, Hb and total erythrocyte count were observed in bovines with respiratory tract infection with a concomitant rise of ESR. But this finding is not in accordance with Benjamin (1985) who reported almost a steady haematology in bovines with respiratory disease.

Only a few literature is available regarding the haematological findings of respiratory disease in bovines which make it difficult to correlate. But hypoalbuminaemia and hyperglobulinaemia with significant rise in $\alpha 1$ and $\alpha 2$ globulins reported in acute bovine respiratory disease (Nasser and El-Sayed, 1997) could be attributed as the reason for elevation in ESR. Treatment with florfenicol could lower the ESR of the animals to the normal range. Diseased animals showed a slight elevation in the mean value of TLC and neutrophil count (11.18 ± 0.42 x 10^3/mm^3 and 23.90 ± 6.20 per cent). After therapy PCV significantly increased from 32.50 ± 4.87 to 33.38 ± 4.93.

Eventhough there is lack of information on the sensitivity analysis on florfenicol, this drug being a congenor of chloramphenicol with an *in vitro* antibiotic sensitivity of 76.92 per cent on the bacterial isolates, the results of *in vivo* studies prove florfenicol to be potentially effective in treatment of bacterial infections of respiratory tract. This has the added advantage that in bovines it may not lead to aplastic anaemia. Further there will be increased susceptibility of the organisms that are resistant to chloramphenicol by inhibition of acetylation of these drugs with chloramphenicol acetyl transferase (CAT) enzyme due to the nitro group present in the structure (Sams, 1994).

Florfenicol, being long acting antibiotic is advantageous in that it results in less distress to the animals by reducing the number of repeat injections and handling of sick animals. But a controversy still exist that good results in any acute respiratory disease needs frequent re-evaluation of the animals and further treatment when necessary. In the present study, in one post-operative condition, florfenicol was not found to be effective.

Better success rate with the same antimicrobes may be achieved if the treatment aimed not only eradicates the pathogen but also reduces the associated in flammatory or hypersensitivity reaction aiding in the control of pyrexia and depression as observed by Kaymaz *et al.* (2001).

Table. Haematological parameters of pre and post-treatment group of animals treated with florfenicol (n = 8)

Sl. No.	Parameters	Treatment with florfenicol	
		Before Treatment	After treatment
	Haemogram		
1	ESR mm/24 h	11.88 ± 2.03	6.88 ± 1.96**
2	PCV(percent)	32.50 ± 4.87	33.38 ± 4.93*
3	Haemoglobin (g/dl)	11.43 ± 1.62	11.75 ± 1.37^{NS}
4	RBC x 10^6/mm^3	6.78 ± 0.67	6.89 ± 0.86^{NS}
	Erythrocyte indices		
1	MCV (fl)	48.55 ± 3.41	48.74 ± 5.27^{NS}
2	MCH(pg)	16.80 ± 1.18	16.89 ± 1.33^{NS}
3	MCHC (g/dl)	34.64 ± 1.33	35.08 ± 2.89^{NS}
	Leukogram		
1	Total leukocyte count x 10^3/mm^3	11.18 ± 0.42	10.73 ± 0.52^{NS}
	Differential leukocyte count		
1	Neutrophil	23.90 ± 6.20	24.10 ± 7.50^{NS}
2	Lymphocyte	72.50 ± 7.50	72.40 ± 7.40^{NS}
3	Monocyte	1.50 ± 1.40	1.60 ± 1.20^{NS}
4	Eosinophil	1.90 ± 1.50	2 ± 1.10^{NS}

NS Nonsignificant (P≥ 0.05)

* Significant (P≥ 0.05)

** Highly significant (P≥ 0.05)

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