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Evaluation of therapeutic efficacy of oxytetracycline against caprine respiratory mycoplasmosis using clinical score card method[#]

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Abstract

Mycoplasmosis in goats is one of the challenging and continuous threats to small ruminant farming causing huge economic losses. This study was carried out to evaluate the therapeutic efficacy of oxytetracycline against caprine respiratory mycoplasmosis. Nasal swabs collected from fourteen goats showing clinical signs like cough, nasal discharge and abnormal breath sounds were screened for the presence of *Mycoplasma* spp. by polymerase chain reaction. The severity of the disease as well as the clinical improvement was recorded using a clinical score card. Oxytetracycline was administered intravenously at 15 mg/kg/day for 5 days along with supportive medications. Significant reduction in clinical score was observed after treatment and complete recovery was attained in 62.5 per cent animals.

Keywords: *Mycoplasma, Oxytetracycline, Goat*

Running title: Therapeutic efficacy of oxytetracycline against caprine respiratory mycoplasmosis

Mycoplasma spp. are small, cell-wall less bacteria and they have been implicated to cause various diseases in goats, especially respiratory diseases (Razin, 1992). The practise of rearing goats in groups, their tendency to huddle and stressors like adverse weather conditions predispose them to respiratory mycoplasmosis. The mortality and morbidity associated with

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pneumonia due to *Mycoplasma* spp. have caused huge economic loss to goat-keepers all around the world. The fastidious nature of the organism makes it difficult for *in vitro* isolation and cultivation. For rapid diagnosis of mycoplasmosis, molecular techniques like Polymerase Chain Reaction (PCR) can be used. Treatment of mycoplasmosis mainly involves macrolide antibiotics or tetracyclines.

Materials and methods

Fourteen goats presented to Teaching Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Pookode, with clinical signs like cough, nasal discharge and abnormal breath sounds were selected for the study. All the animals in the study group were subjected to physical and clinical examination after collecting detailed signalment and anamnesis. The assessment of severity of clinical condition associated with caprine respiratory mycoplasmosis was performed using a clinical score card prepared by Love *et al*. (2014) and modified by Gupta (2015). Score card was prepared in such a way that scores from 0 to 3 were assigned to the progressive variants of clinical signs like cough, nasal discharge, respiratory distress and ocular discharge. The scores obtained for each sign were added up to get the final score for a particular animal. The clinical assessment of the final score was carried out as per the interpretations attached which varies from healthy to severe illness (Table 1).

Nasal swabs were collected and kept in 0.5 mL sterile normal saline for DNA extraction. PCR was performed using primers specific for 16S rRNA of *Mycoplasma* spp. (Botes *et al*., 2015). Goats positive for *Mycoplasma* spp. by PCR were treated using intravenous injection of Oxytetracycline @ 15 mg/kg/day (mixed in equal quantity of Normal Saline). Supportive therapy included Flunixine meglumine @ 1.1 mg/kg/day intramuscularly, Chlorpheniramine maleate @ 0.5 mg/kg/day intramuscularly and inhalation with Tr. Benzoin @ 10 mL/L of hot water twice daily. All the treatments were continued for five days. Comparison of clinical scores before and after treatment was done using Wilcoxon Signed Rank Test (Rangaswamy, 1995).

Results and discussion

In the present study, *Mycoplasma* spp. was detected in 71.4 per cent (10 out of 14) of goat nasal swabs tested by PCR. Among the goats with respiratory mycoplasmosis five (50 per cent) had mild illness, three (30 per cent) had moderate illness and two (20 per cent) had severe illness. On the completion of treatment, complete recovery was observed in seven out of ten goats (70 per cent) animals. Of the three animals that did not recover fully, two had mild illness with slight respiratory distress, small amount of watery nasal discharge and single cough when induced and the other had small amount of watery nasal discharge and single cough when induced. On statistical analysis, significant reduction in

Table 1. Clinical score card for assessment of severity of clinical condition associated with caprine respiratory mycoplasmosis.

Clinical condition	Score			
	0	**1**	**2**	**3**
Cough	None	Single induced	Multiple induced	Multiple spontaneous
Nasal discharge	None	Small amount of unilateral/bilateral watery discharge	Unilateral/bilateral cloudy or excessive mucus discharge	Copious bilateral mucopurulent discharge
Respiratory distress	None	Mild	Moderate	Severe
Ocular discharge	None	Small amount	Moderate	Heavy
Interpretations *0 = Healthy, 1-4 = Mild illness, 5-8 = Moderate illness, 9-12 = Severe illness*				

Table 2. Comparison of clinical scores before and after treatment

Sl. No.	Clinical score before treatment	Severity of disease	Clinical score after treatment	Z value (P-value)
1	2	Mild	0	-2.803 (0.0051**)
2	2	Mild	0	
3	3	Mild	0	
4	5	Moderate	0	
5	7	Moderate	0	
6	4	Mild	0	
7	3	Mild	0	
8	9	Severe	3	
9	9	Severe	3	
10	8	Moderate	2	

*** Significant at 0.01 level*

clinical scores were observed after the therapy (Table 2). Complete recovery was observed in 70 per cent goats. Hence, oxytetracycline can be used as the effective treatment regimen for Caprine respiratory mycoplasmosis. Tetracyclines generally act as bacteriostatic antibiotics and inhibit protein synthesis by reversibly binding to 30S ribosomal subunits of susceptible organisms, preventing binding to those ribosomes of aminoacyl transfer-RNA (Plumb, 2018). Recent studies have shown that oxytetracycline have additional mechanisms of action including antioxidant, anti-inflammatory and immunosuppressive activity (Olszewska, 2006). Moreover, the broad spectrum activity of oxytetracycline must have effectively neutralised any concurrent secondary bacterial infection associated with mycoplasmosis. Giadinis *et al.* (2008) reported that oxytetracycline was highly effective in reducing mortality and morbidity associated with caprine respiratory mycoplasmosis. This finding is comparable to the results of the present study. Use of anti-inflammatory, anti-pyretic, analgesic and anti-allergic drugs along with anti-microbials helps in reducing severity of mycoplasmosis and facilitates early recovery (Yatoo *et al*., 2018).

Conclusion

Based on the results of the study, it can be concluded that oxytetracycline can be used to effectively treat caprine respiratory mycoplasmosis. Since recent studies have shown that oxytetracycline has additional mechanisms of action including antioxidant, anti-inflammatory and immunosuppressive activity, they can be used in reducing severity of the disease.

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Conflict of interest

The authors declare that they have no conflict of interest.

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