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ScienceDirect
Small Ruminant Research 77 (2008) 75–79
Small Ruminant Research
www.elsevier.com/locate/smallrumres

Short communication

Efficacy of marbofloxacin for naturally occurring contagious caprine pleuropneumonia

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Received 28 May 2007; received in revised form 27 February 2008; accepted 27 February 2008

Abstract

The aim of the present study is to determine the efficacy of marbofloxacin used in goats with naturally occurring contagious caprine pleuropneumonia (CCPP). The study was performed in two groups (consisting of 15 animals in each group) with two different doses of 10% aqueous solution of marbofloxacin injected intramuscularly into the semitendinous muscle. 2 mg/kg BW for 3 days (total dose administered: 6 mg/kg BW) was injected to the first group (group 1) and 3 mg/kg for 2 times every other day (total dose administered: 6 mg/kg BW) was injected to the second group (group 2). Microbiological analyses revealed that the causative agent of the disease was *Mycoplasma capricolum* subsp. *capripneumoniae*. Cure rates for groups 1 and 2 were determined as 100% (15/15 goats) and 93% (14/15 goats), respectively. The results of this field trial suggest that marbofloxacin could be an effective drug against CCPP in goats.

Keywords: Goat; Marbofloxacin; Contagious caprine pleuropneumonia

1. Introduction

Contagious caprine pleuropneumonia (CCPP) caused by *Mycoplasma capricolum* subsp. *capripneumoniae* (formerly *Mycoplasma F38*) has been known for many years and results in major losses in goat herds in many countries of Africa, the Middle East, Eastern Europe and other Asian countries, including Turkey (Thiaucourt et al., 1996; Nicholas, 2002; Ozdemir et al., 2005). CCPP is generally refractory to many commonly used antibiotics like penicilin, streptomycin, tetracyclines, and macrolides (Bergonier et al., 1997; Hernandez et al., 2006). Marbofloxacin, a fluoroquinolone, has been used for the treatment of a variety of microbial infections in animal and human medicine (Neu, 1988; Abadia et al., 1995; Petracca et al., 1993; Schneider et al., 1996; Brown, 1996). It shows a wide spectrum of activity against both gram-negative and gram-positive pathogens and against *Mycoplasma* spp. (Spreng et al., 1995; Dubreuil et al., 1996). Although marbofloxacin is used in different pathological conditions of ruminants like respiratory system infections and neonatal diarrhea (Thomas et al., 1997, 1998, 2001), an evaluation of marbofloxacin therapy in goats with naturally infected CCPP has not been reported.

The objective of the field trial described in this paper is to determine the efficacy of marbofloxacin used in goats

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doi:10.1016/j.smallrumres.2008.02.009

with naturally infected CCPP caused by *M. capricolum* subsp. *capripneumoniae.*

2. Materials and methods

2.1. Field investigation

2.1.1. Study area and animals

One goat (2-year-old) from a flock of 80 goats was presented to the Veterinary Teaching Hospital of Firat University with loss of appetite, dyspnoea, nasal discharge and cough. Two dead goats had also been brought for necropsy. After a tentative diagnosis of CCPP based on the results of clinical and pathological examination of the goats, the remainder of the flock was enrolled in the study. The study was conducted in the province of Elazig, Turkey, during October 2006. The area is characterised by a climate with erratic rainfall. Thirty goats of the herd showing signs of CCPP were admitted to the study. These animals were judged to have CCPP when it presented with a rectal temperature of 40.5 °C or higher, coughing, hyperaemia of conjunctiva, abnormal lung sounds, loss of appetite and tachypnoea. Ages of the animals varied between 2 and 3 years with mean body weights of approximately 40–50 kg. The herd was on pasture in mornings and was housed in a barn at nights. The goats were fed straw, barley and concentrated feed in addition to pasture grass and had access to water *ad libitum*. None of the animals had been vaccinated against CCPP.

2.1.2. Experimental design

The study was performed in two groups (consisting of 15 animals in each group) with two different doses of 10% aqueous solution of marbofloxacin (Marbocyl®, Vetoquinol, Lure, France) injected intramuscularly into the semitendinous muscle. 2 mg/kg estimated BW for 3 days (total dose administered: 6 mg/kg BW) was injected to first group (group 1) and 3 mg/kg BW for 2 times every other day (total dose administered: 6 mg/kg BW) was injected to second group (group 2).

2.1.3. Clinical and postmortem examination

A detailed physical examination was performed on each selected animal before the treatment. The goats were closely monitored on day 1, 3, 5 (between 8 and 10 a.m.) after the treatment. Rectal temperatures, pulse and respiratory rates and rumen contractions were recorded. Clinical assessment (coughing, nasal discharge, hyperaemia of conjunctiva, injection of scleral vessels, abnormal sounds of lung auscultation, loss of appetite and dehydration) was performed. Clinical assessment of the goats was also carried out on day 1, 3, 5, 15 and 30 after the treatment. The effect of the treatment was evaluated in both groups based on the alterations in the following parameters: rectal temperature (*T*), pulse (*P*) and respiratory (*R*) rates, rumen contractions (Rc), loss of appetite, nasal discharge, hyperaemia of conjunctiva, injection of scleral vessels, abnormal lung sounds, cough and dehydration.

A detailed necropsy was performed on three goats, two which died before treatment and one in group 2 which died after the treatment. Tissue samples were obtained under aseptic conditions from the lungs for microbiological analyses.

2.2. Bacterial culture and PCR

2.2.1. Isolation of the causative agents

Lung and pleural fluid samples were processed according to the method described by Thiaucourt et al. (1992). Shortly, isolation of *Mycoplasma* spp. was done both by serial dilution in modified Hayflick medium (PPLO broth without crystal violet (21 g/l), 20% de-complemented horse serum, 10% fresh yeast extract, 0.2% glucose, 0.4% sodium pyruvate, 0.04% ampicillin) and by streaking onto solid agar (PPLO agar) of the same medium, simultaneously. Solidification of the broth media was done by adding 1% agar noble (Difco, Detroit, USA) to the medium. Samples were diluted by five subsequent 10-fold dilutions. The lung samples (1 cm^3) were added to the first broth medium tube (5 ml) and were mixed properly. Then, 300 μl broth was taken from each tube and mixed respectively. The samples were incubated at 37 °C in 5% CO_2 for 7–10 days. The broths were checked daily and the samples with growth, indicated by turbidity in the broth cultures were sub-cultured onto agar plates from the last turbid tube. Turbidity was assessed by visual inspection. The plates were checked daily for the appearance of colonies. The isolated colonies were inoculated to the stock suspension (%50 broth/%50 horse serum) and were kept in deep-freeze. Inoculations from a loopful of pleural fluid samples were also carried out following the above procedure.

2.2.2. Polymerase chain reaction (PCR)

After DNA samples were extracted from the specimens, PCR was performed in a TC 512 Temperature Cycling System (Techne, Staffordshire, UK). A primer pair specific to *M. capricolum* subsp. *capripneumoniae* (Mccp-spe-F 5′-ATCATTTTTAATCCCTTCAAG-3′ and Mccp-spe-R 5′-TACTATGAGTAATTATAATATATGCAA-3′) was used in the PCR (Woubit et al., 2004). PCR products with a molecular size of 316 bp were considered indicative for *M. capricolum* subsp. *capripneumoniae.*

2.3. Statistical analysis

Data were analyzed according to the different days of the study, by using one-way analysis of variance (ANOVA). *T*-test was used to compare *P*, *R*, *T* and Rc parameters between groups 1 and 2.

3. Results

The predominant clinical findings observed in both groups were coughing, hyperaemia of conjunctiva, wheezes and crackles at lung auscultation, loss of appetite, nasal discharge, injection of scleral vessels and dehydration. Few of them displayed signs of mouth breathing and lying down behind rest of the flock.