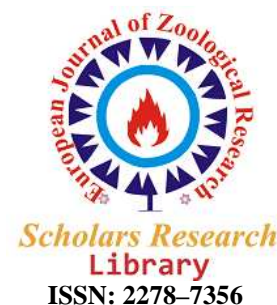




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Survey of Tiamulin+Oxytetracycline in control of CRD complex due to La Sota vaccine in broiler chickens

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ABSTRACT

Mycoplasma gallisepticum (MG) is one of the most important diseases of poultry industry in Iran and all over the world. Mortality, poor weight gain and increasing of feed conversion ratio (FCR) were seen in MG infected flocks. Several drugs are used for prevention and control of MG, the purpose of this study was to investigate oxytetracycline + Tiamulin efficacy on MG, and its role on broilers performance. In this study, 240 Ross 308 broilers divided in 2 groups. In one of the groups, oxytetracycline + Tiamulin were used in days 21 to 30 following La Sota vaccination for controlling vaccination reaction and in the second group, placebo was used and that group mentioned as a control group. Gross lesions, mortality, and growth parameters include body weight gain, feed intake and FCR were calculated in all groups weekly after 21st day. Results showed that in treatment groups mortality percent was significantly ($p < 0.05$) lower than control group and pericarditis, perihepatitis and airsacculitis was sever in control groups in comparison to antibiotic treated groups. Also body weight and FCR was significantly were different between control group and oxytetracycline + Tiamulin group ($p < 0.05$). It can be concluded that usage of these antibiotics simultaneously could prevent vaccination reaction due to La Sota vaccine and also following MG complications, economical losses in poultry and finally it can be improve broilers performance

Key words: Vaccination Reaction, Mycoplasma Gallisepticum, Oxytetracycline, Tiamulin, Ross 308.

INTRODUCTION

Poultry veterinarians have a limited choice of efficacious antimicrobials to alleviate disease outcomes. Non-efficacious use of antimicrobials is not economical or prudent, and such use should be avoided. Ever fewer antimicrobials are practical and effective as water medications for acute respiratory disease in broilers. Chief among them are tiamulin, tylosin, enrofloxacin, oxytetracycline, and sulfadimethoxine. Enrofloxacin is widely believed to be superior to oxytetracycline and sulfadimethoxine for the treatment of illnesses such as colibacillosis (*Escherichia coli* infection) in chickens. Although ample laboratory antimicrobial susceptibility data could be interpreted to support this belief, there is a lack of published clinical data that can help poultry veterinarians make such a choice with confidence (1,3,4,6).

Mycoplasma gallisepticum (MG) is one of the most important pathogens of the broiler chickens, which cause respiratory disease (15). MG infection causes significant economic losses in the poultry industry due to downgrading of carcasses at slaughter because of airsacculitis, treatment costs, and due to its effect on flocks performance (17). Because currently only a few vaccines are accessible, control of MG infection by vaccination is limited (19). Control of MG infection by anti-mycoplasma drugs, is the most practical way to decrease economic losses. Some antimicrobials, such as macrolides and lincosamides (tylosin), tiamulin, and fluoroquinolones, were effective against various veterinary mycoplasmas (6, 7, 13). Tiamulin is the most effective agent against various mycoplasmas (13, 16), but it has a narrow spectrum of activity against the secondary infectious agents.

Abd El-Ghany (2009), indicated that Tilmicosin and tylosin had the lowest MICs than other antimicrobials, and they were recommended these antimicrobials for *invivo* treatment and eradication programs of field MG infection in broilers (1). One of the important factors in the control of MG infections is the precise selection and use of the antimicrobial to reach an effective concentration in the blood of a bird (1). Decrease efficacy of antibiotics against MG is frequently observed in the field conditions, especially in broiler flocks because of antibiotic resistance (24). For many years tetracyclines have been used to treat mycoplasma infections in poultry industry but it seems resistance against tetracyclines was developed (18).

The purpose of the present study was to compare the efficacy of oxytetracycline + tiamulin in controlling morbidity and mortality caused by CRD complex in broiler chickens and its effects on performance and mortality rate of MG positive broiler chickens.

MATERIALS AND METHODS

In this study, 240 Ross 308 broilers that were infected with CRD complex after La Sota vaccination, divided into 2 groups. Each group was more divided into 4 subgroups with 30 birds. In group-1 Tiamulin hydrogen fumarate 2.5% and Oxytetracycline hydrochloride 8%, one gram for 8 kilogram of body weight was used from days 21 to 30, and in control group we used placebo. This study was performed in 42 days period and gross lesions, mortality, and growth parameters include body weight gain, feed intake and FCR were calculated in all groups weekly.

Statistical Analysis: For comparison results between groups the data obtained were compared by Independent t-test at 95% probability.

RESULTS AND DISCUSSION

Mycoplasma infections are important poultry disease that causes economical losses in poultry production, especially in broilers (9). Uses of anti-Mycoplasma drugs in broilers in prophylaxis is recommended (13). Various antibiotics for prevention and treatment of Mycoplasma infections in poultry industry were used. Purpose of this study was to investigate the effects of concurrent use of oxytetracycline and tiamulin in prevention of respiratory infections and also on performance of broiler chickens, which was induced by La Sota vaccine.

Clinical Signs were investigated daily in all groups and any changes were recorded, according to obtained data in all groups severity of conjunctivitis, nasal discharges, and respiratory reactions after 21 day olds were increased but in antibiotic administered group, the severity of clinical signs were less than Control group, specially in case of Conjunctivitis. Gross lesions include hemorrhage in trachea, air-sacs thickening (airsacculitis) which after 21 days old perihepatitis, pericarditis and purulent airsacculitis were seen in control group, and in treatment groups gross lesions were less than control group, and in treated group conjunctivitis was not observed.

Comparison of mortality rates demonstrated that the mortality percent was statistically different between groups ($p < 0.05$) and it was 6.2% in treated group 8.5% in control group.

Body weight and FCR results demonstrate improvement in groups treated with antibiotics. More detailed body weight, FCR and Feed consumption results were noted in table 1. Body weight of treated groups were significantly higher than control group ($p < 0.01$). Also FCR and feed consumption in oxytetracycline + tiamulin groups was lowest and in control group they were highest, and there was significant statistical difference between groups ($p < 0.05$). Also Production number was calculated based on mean body weight, livability, production days and FCR in both groups. Results showed that treatment of broilers with this antibiotic improves production number (250.01 in treated group versus to 234.93 in control group).

Table1: Body weight, FCR and Feed Consumption (FC) comparison in groups. (Mean±SE)

Group		days				Final
		20	27	34	41	
oxytetracycline+tiamulin	Body weight	640.05±10.14 ^{ab}	1180.01±18.77 ^b	1590.52±21.35 ^b	2070±28.66 ^b	2800±11.25 ^a
	FC	928±45.19	2006.51±70.21 ^b	3036.9±64.43 ^b	4140.98±78.12 ^b	5936.0±57.67 ^a
	FCR	1.45±0.01 ^a	1.7±0.01	1.91±0.02 ^a	2.00±0.03 ^a	2.12±0.02 ^a
Control	Body weight	580.09±10.23 ^a	1050.08±25.07 ^a	1470.51±37.21 ^a	1960.58±53.19 ^a	2700±27.40 ^b
	FC	870±21.94	1785.09±68.37 ^a	2940.07±70.61 ^a	4214.91±83.42 ^a	6237.00±52.65 ^b
	FCR	1.5±0.01 ^b	1.70±0.02	2.00±0.01 ^b	2.15±0.03 ^b	2.31±0.04 ^b

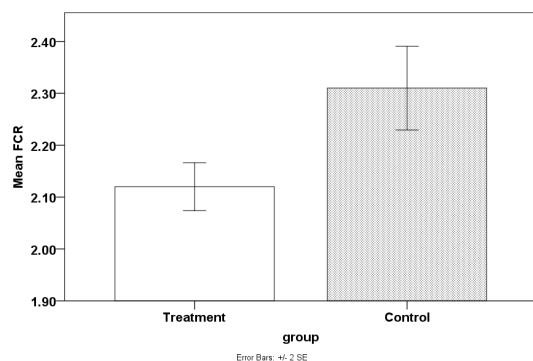


Fig1: Comparison of FCR mean between two groups

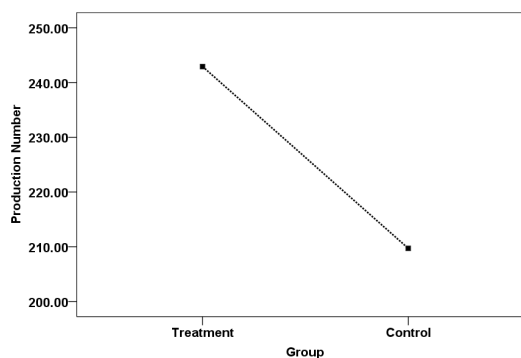


Fig4: Comparison of Production Number mean between two groups

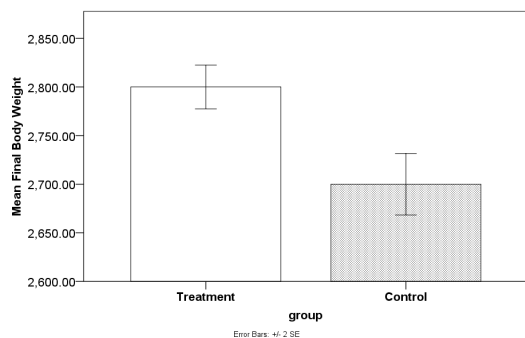


Fig2: Comparison of Body weight mean between two groups

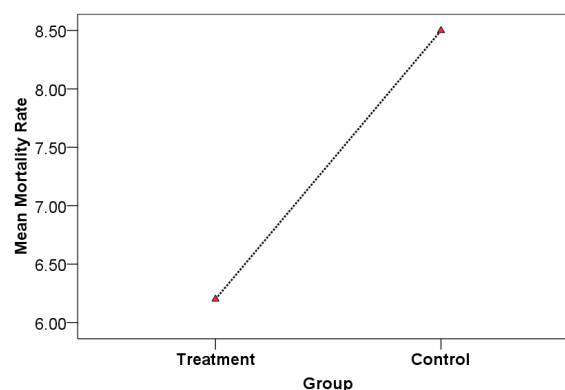


Fig5: Comparison of Mortality percent between two groups

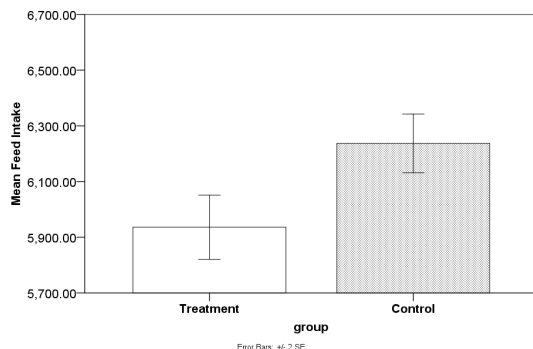


Fig3: Comparison of Feed Intake mean between two groups

Antibiotics like Macrolides, Lincosamides, Tetracyclines and Tiamulin which inhibits protein synthesis, are used to treat MG infection (2). Also antibiotic treatment in infected flocks and newly hatched chicks is essential in control of *Mycoplasma gallisepticum* and *Mycoplasma synoviae* infections (3). Nevertheless antibiotic treatment could not eliminate this organism from flocks, but it can reduce clinical signs and gross lesions and economical losses due to low quality of carcass, and correct antibiotic therapy could reduce *Mycoplasma gallisepticum* and *Mycoplasma synoviae* population in respiratory system(10). In some countries in prevention and eradication programs anti Mycoplasma drugs in use, yet(4). Results of Bradbury, et al., (1994) showed that tylosin had best effects on *Mycoplasma gallisepticum* and after that lincomycin, oxytetracycline, and spectinomycin was effective on MG. also erythromycin has lowest effect, but *in vitro* results showed that lincomycin-spectinomycin was effective against MG(6). Aivlosin, lincomycin-spectinomycin (2:1), tylosin, tiamulin, enrofloxacin and lincomycin generally very effective on fields isolates of MG (10). AbdW1-ghany (2009), mentioned that chicks infected with Mycoplasma and treated with tiamulin and tilmycosin in comparison to control group had lower clinical signs, mortality and lesions in air sacs, and re-isolation rate of MG in treated groups were lower than control group, and body weight was significantly improved in treated groups (1). The highest MIC level of tiamulin against MG in recent years is 16 times lower than that of lincomycin and 5 times lower than enrofloxacin, also tiamulin is a low inducer of resistance in mycoplasma over the last 25 years in comparison with tylosin and slower than oxytetracycline(20).

Moreover, Jordan *et al.* (1998) comparison of the different anti-mycoplasmal drugs with tiamulin showed that the lowest MICs were with tiamulin, followed by tylosin, enrofloxacin and a relatively high MIC for lincomycin/spectinomycin(12).

In addition, comparison of the MICs ranges of various antibiotics against the different *Mycoplasma* species demonstrates that the tiamulin was superior to tylosin, oxytetracycline, lincomycin and enrofloxacin(21). *In-vitro* studies showed that efficacy of tiamulin, doxycycline and danofloxacin against almost all the isolates of both MG and MS was highest (21). Also *in vitro* investigation results demonstrates high MICs for tylosin and tilmicosin and tiamulin, respectively (11). Treatment of broilers inoculated by *Mycoplasma gallisepticum* showed that tiamulin is choice for treatment and followed by tylosin and oxytetracycline, respectively (14). Evaluation efficacy of tiamulin, tylosin, spiramycin, oxytetracycline and dihydrostreptomycin at different dosages in layers infected with *Mycoplasma gallisepticum*, demonstrates that the treatment rate was statistically different ($p < 0.05$) in treated groups than in un-treated group (4). In Experimentally infected chickens and turkeys with avian *Mycoplasma*, tiamulin was more effective than other ones in preventing and eradicating airsacculitis caused by MG(5, 8).

In vitro and *in vivo* comparisons of valnemulin, tiamulin, tylosin, enrofloxacin, and lincomycin/spectinomycin, indicated that mortality, clinical signs, and gross lesions were reduced significantly in the uninfected control group and infected treated groups in comparison to infected un-treated groups(12).

Evaluation of adding tiamulin and chlortetracycline in broiler feeds to control of chronic respiratory disease (CRD) denotes that mortality due to complicated CRD was lower in the tiamulin and chlortetracycline groups in comparison with the tylosin and the control group(22). Study on tiamulin and pulmotil effects in preventing and controlling of CRD in broilers and layers indicated that these antibiotics decrease mortality and gross lesions due to CRD, and improve performance parameters in broilers and improve egg lay percent in layers (23).

CONCLUSION

Our results indicated that in treated group severity of clinical signs and gross lesions were less than control group. Also mortality rate, body weight gain and FCR was significantly different ($p < 0.05$) between control group and treated group. The results of our study in agreement with previous studies and also our results indicated that oxytetracycline + tiamulin was effective in treatment and prevention of CRD in flocks conditions.

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