A COMPARISON ON THE EFFECT OF STEROIDAL AND NON-STEROIDAL ANTI-INFLAMMATORY DRUGS WITH ANTIBIOTIC TREATMENT OF RESPIRATORY DISEASES IN CALVES.

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ABSTRACT

The aim of this study was to compare the effect of steroidal (flumethasone) and non-steroidal (meloxicam) anti-inflammatory drugs combination with long acting oxytetracycline on clinical and immunological parameters of calves suffering from bovine respiratory disease (BRD). The study was performed on fifteen newly born calves, 3-5 month old with clinical signs of bronchopneumonia and high rectal temperature in addition to five clinically healthy calves which considered as control group. The diseased calves were divided randomly into three equal groups which respectively, treated with: Group 1: long acting oxytetracycline (single I/M injection of 20 mg/kg b. wt.), Group 2: oxytetracycline and flumethasone, (single dose of 2.5 mg/ calf I/M) Group 3: oxytetracycline and meloxicam (single I/M injection of 0.5 mg/kg b. wt.). Blood and serum samples were collected from all calves just before treatment, 3, 7 and 14 days post treatment for hematological and immunological studies in addition to estimation of some inflammatory markers. Treatment of calves with the combination of oxytetracycline and meloxicam (Group 3) caused a significantly faster, improvement in the clinical illness index score (CIIS: cough, nasal discharge, dyspnea, depression and anorexia) and a faster normalization of body temperature. In the blood of the calves which received oxytetracycline and flumethasone (Group 2), leukocytosis, neutrophilia and eosinophilia with concomitant lymphopenia were observed. Moreover, the calves treated with flumethasone exhibited a decrease in gamma-globulin concentration, lymphocyte transformation rate (LTR), phagocytic % and phagocytic index. On the other hand, no adverse reactions related to meloxicam were reported during the experimental period and all the studied parameters were returned to their normal levels at the end of the experiment. These results suggest that the combination of meloxicam with the antibiotic in calves suffering

from bovine respiratory disease was superior to the antibiotic alone and also to the combination of the antibiotic with flumethasone.

INTRODUCTION

Enzootic bronchopneumonia of calves, which is also called bovine respiratory disease (BRD) complex or shipping fever, is a complex disease of feedlot young cattle that causes major economic losses to the livestock industry. The disease is characterized by depression, lack of appetite, fever, cough, nasal discharge and dyspnea. The etiology is multifactorial and generally believed to be an interaction between viruses, bacteria, mycoplasmas, in addition to physiological, physical, and environmental stress factors **(Griffin, 1996).**

Conventional treatment for BRD usually consists of antimicrobial therapy with the application of mucolytics and bronchodilators **(Smith, 1996).** As the inflammatory response that occurs in BRD forms a significant part of the disease process in the early, and especially chronic, stage, steroidal (SAIDs) and non-steroidal (NSAIDs) anti-inflammatory drugs have been recommended recently **(Lekeux, 1996).**

SAIDs have potent anti-inflammatory properties, but they are also potent suppressers of the immune system; so their use in calves with BRD is controversial **(Smith, 1996; and Sustonck et al., 1997).** NSAIDs also have an anti-inflammatory effect, but are not immunosuppressive. Some of them have been used with therapeutic success in naturally occurring BRD. For example, flunixin meglumine or ketoprofen combined with an antibiotic have been used with therapeutic success in naturally occurring BRD **(Lockwood et al., 1996; Balmer et al., 1997).**

Meloxicam is a new NSAID of the oxicam class exerts potent anti-inflammatory, analgesic, antitoxic, antipyretic, and anti-exudative activity by inhibiting modulators and mediators of the inflammatory process. It was indicated for use in acute febrile respiratory infection with appropriate antibiotic therapy to reduce clinical signs in cattle **(Friton et al., 2005).**

This experiment was conducted to determine the effect of flumethasone (SAID) or meloxicam (NSAID) in a combination therapy with antibiotic on calves suffering from naturally occurring bronchopneumonia on: clinical illness scores; hematological parameters in peripheral blood and on some parameters of humeral and cellular immunity. Moreover, some inflammatory markers were also estimated.

MATERIALS AND METHODS

1- Drugs:

1) Oxytetracyclin (Terramycin/LA)®:

It is an injectable solution produced by Pfizer Company, Egypt. Each ml solution containing 200 mg oxytetracycline base. The recommended therapeutic dose is a single intramuscular injection at a dose of 20mg/kg of body weight **(Bednarek et al., 2003)**

2) Flumethasone (Flucort) ®

It is a solution for injection contains 0.5 mg/ml flumethasone obtained from Wyeth Animal Health, Canada. The recommended dose is a single dose of 2.5 mg/ calf by intramuscular injection **(Bendnarek et al., 2003).**

Meloxicam (Metacam) ®

Solution for injection contains 20 mg/ml meloxicam produced by Boehringer Ingelheim Vetmedica Company, Germany.

The recommended therapeutic dose is a single intramuscular injection at a dose of 0.5 mg/kg of body weight **(Friton et al., 2005).**

2-Animals and experimental design:

Twenty newly born calves, 3-5 month old belonging to a private farm in Sharkia province, were used in this study. Five of these animals were apparently healthy and free from any internal or external parasites and kept as a control group. The remaining fifteen calves were suffering from bronchopneumonia (fever over 40 °C, cough, nasal discharge from mucous, mucopurulent to purulent, dyspnea, and anorexia). The diseased calves were randomly divided into three equal groups (five animals each). The first group was treated with long acting oxytetracycline; the second group received oxytetracycline and flumethasone (SAID) while the third group received oxytetracycline and meloxicam (NSAID).

3- Quantification of Clinical Illness Index Score (CIIS):

The following clinical observations were recorded every day post treatment until complete recovery in the form of the clinical illness index score (CIIS): body temperature (°C), breathing (breaths/min) and heart rate (beat/min), nasal discharge (mucous, mucopurulent, purulent), soft coughing, dyspnea, appetite (anorexia), signs of depression or mortality.

4- Blood samples:

Two blood samples were collected from the jugular vein of each animal just before treatment, 3, 7 and 14 day post treatment. The first one was taken on heparin for hematological examination, plasma fibrinogen estimation and cellular immunity tests. The second blood sample was left to clot at room temperature for

about 2 hours, stored overnight in a refrigerator at 4 °C and centrifuged at 3000 rpm for 15 min. Serum samples were drawn in dry clean capped tubes and kept in deep freeze at – 20 °C for protein electrophoresis and estimation of serum haptoglobin.

5- Hematological studies:

The erythrocytic count (RBCs) hemoglobin concentration (Hb %) and packed cell volume (PCV%) were determined.

The erythrocytic indices {mean corpuscular hemoglobin (MCH), mean corpuscular volume (MCV) and mean corpuscular hemoglobin concentration (MCHC)} were calculated. Moreover, the total leukocytic and differential counts were conducted **(Coles, 1986).**

6- Proteinogram:

Total protein was measured according to **Peters, (1968).** Electrophoretic analysis was carried out for determination of serum albumin, alpha (α), beta (β) and gamma (γ) globulins according to previously described technique **(Davis, 1964).**

7- Inflammatory makers:

Plasma fibrinogen concentrations were measured according to a previously described method **(Becker et al., 1984).** Serum haptoglobin was determined photometrically as described by **Makimura and Suzuki (1982).**

8- Cellular immunity:

A) Lymphocyte transformation test (LTR):

The test was performed according to **Rai El-Balhaa et al., (1985).** Briefly, equal volumes of heparinized blood were layered onto Ficol-hypaque in a sterile plastic tube then centrifuged at 2400 rpm for 40 min. the buffy coat layer was aspirated and washed three times with Rose well institute 1640 (RPNI-1640). Lymphocyte viability as assessed by trypan blue stain should be greater than 95%. The cells were distribute in sterile microtitre tissue culture plates and the mitogen phytohaemagglutinin (PHA) was added. The plates were incubated for 24 hour at 37oC in an incubator supplying 5% Co2. The MTT stain was added then the samples were incubated at 37 oC. The lysing buffer was added then the plate was incubated overnight for complete cell transformation then read by ELISA reader at 750 nm wave length filter.

B) Phagocytic activity and phagocytic index:

According to **Woldehiwet and Rowan (1990),** the heparinized blood samples were treated with 0.83% ammonium chloride to lyse the red blood cells. After washing by phosphate buffer solution, they suspended in MEM to give final concentration of 108 viable polymorph-

nuclear (PMN) cell/ml. A strain of coagulase-positive Staph. aureus suspension was adjusted to give final concentration of 5X108 bacteria/ml. 200 µl of this suspension was then added to one ml of the PMN suspension to give a ratio of bacteria to PMN of 1:1. cell culture media. using ultraviolet light microscope. Phagocytic activity: was considered as the percentage of phagocytic cells by microscope field. Phagocytic index: the mean number of Staphylococcus aureus, ingested by one phagocytic cell

9- Statistical analysis:

The data obtained from this investigation wee statistically analysed by Student's t-test **(Snedecor and Cochran 1980).**

RESULTS & DISCUSSION

fifteen calves showing the clinical symptoms of bronchopneumonia were used in this study. Within the first 24 h after the initiation of the therapy, the mean body temperature in Groups 2 and 3 was significantly lower than in Group 1 (fig. 1). Treatment with the combination of oxytetracycline and meloxicam (Group 3) was also associated with a significantly faster improvement in CIIS (cough, nasal discharge, dyspnea, depression and anorexia), especially on the 3rd day of treatment (fig. 1). Also on the 4th and 5th day of observation the improvement in CIIS was more pronounced in Group 3, however, the differences in comparison to other groups, were not statistically significant. At the 7th day, body temperature in all groups returned to normal, but breathing and heart rates as well as other CIIS were still the highest in Group 1, treated with oxytetracycline alone.

The antipyretic effects of both SAIDs and NSAIDs are a well-known phenomenon. After a challenge with an infectious stimulus, a number of brain mediated signals of the illness are generated that include fever. It has been suggested that cytokines, produced and released into circulation by leukocytes, act as humoral signals which transported to the brain where they induce fever by a prostaglandin-dependent mechanism **(Bednarek et al., 2003).**

In the present work, diseased calves showed a significant decrease in RBCs count, Hb concentration and PCV as shown in table (1). Similar results were also reported in calves suffering from pneumonia **(El-Bealawy 2003).** These results may be attributed to the sequestration of iron in the bone marrow macrophages and hepatocytes during infection, thus became unavailable for utilization in hemoglobin synthesis, resulting in inhibition of erythropoiesis **(Coles 1986).** Treatment of the diseased calves with long acting oxytetracycline alone resulted in an improvement in the erythrogram 7th

day post-treatment while both anti-inflammatory drugs induced faster improvement which was more pronounced in meloxicam group (table 1).

Regarding the leukogram, the diseased calves before treatment exhibited a significant increase in WBCs count in comparison to the values considered as normal in healthy calves. This increase was directly connected with the rise of neutrophil, monocytes, and eosinophils count associated with significant decrease in lymphocyte count (table 2). This picture indicating the presence of inflammation and suppuration caused by bacterial infection and the response of leukogram to inflammatory lung disease **(Coles, 1986).**

These observations confirmed the results of earlier experiment concerning the phenotypic analysis of blood leukocytes in respiratory diseased calves **(Bednarek et al., 2001).**

When the diseased calves received oxytetracycline (Group 1) or oxytetracycline together with meloxicam (Group 3) a slow decrease in WBC count, in neutrophils, monocytes, and aeosinophils number was observed on the 3rd day post-treatment. The above mentioned cell number continued to decrease and reach the normal values on the 7th and 14th post-treatment (table 2).

However, the blood of the diseased calves which received oxytetracycline with flumethasone (Group 2) showed significant decrease in the number of lymphocytes which persist until the 14th day post-treatment. This lymphopenia was caused by a significantly lower number of T cells following flumethasone administration as reported by **Bednarek et al., (2001).**

The proteinogram of the diseased animals before treatment as illustrated in table (3), showed that the total serum proteins were non significantly altered, while the albumin showed significant decrease compared with the healthy control group. The significant decrease in albumin could be attributed to the destructive effect of bacteria and bacterial toxins on the liver cells which are the main sources of albumin and protein synthesis in the body **(McPherson, 1984).** The protein electrophoresis of the diseased calves before treatment was greatly affected in the present study. The α-globulin showed significant increase indicating tissue damage resulting from infection or inflammation. Total γ-globulin showed higher values indicating the activation of the immune defense of calves due to the infection **(Coles 1986).** Our results were also supported by the finding of **Humblet et al., (2004)** in calves suffering from bronchopneumonia.

Treatment of diseased calves with flumethasone induced a significant decrease in γ-globulin compared

with the diseased calves before treatment which reach the normal level of the control on 3rd day post-treatment till the end of the experiment. Such results are similar to those previously cited by **Bednarek et al., (1999)** in calve with experimentally-induce lung inflammation.

The identification of animals with BRD in the feedlot is usually performed by visual appraisal, which may be subjective. Easily measurable but accurate variables in the early diagnosis of BRD remain necessary **(Duff and Galyean, 2007).** In recent years, there has been a push for the discovery of novel biomarkers to aid in the early detection, diagnosis, and therapy of the diseases **(Angen et al., 2009).**

Acute phase proteins, such as haptoglobin and fibrinogen, are released by hepatocytes and mediate the inflammatory response to injury, trauma, or infection **(Baumann and Gauldie, 1994).** Their presence in the circulation may be an excellent biomarker of inflammation, because they are readily measurable in serum or plasma and may even discriminate between acute and chronic inflammation in cattle **(Horadagoda et al., 1999).** Serum haptoglobin concentrations may also be indicators of BRD **(Godson et al., 1996).**

In the recurrent work, there was a highly significant increase in both serum haptoglobin and plasma fibrinogen in diseased calves before treatment (table 4). Our results are paralleled to the finding of **Humblet et al., (2004) and Angen et al., (2009)** who reported that the haptoglobin might be the best choice for detecting respiratory diseases under field conditions and to distinguish between calves requiring anti-inflammatory drug. Treatment of the diseased calves with the antibiotic alone did not improve the elevated inflammatory marker while the use of flumethasone and meloxicam, exhibited an anti-inflammatory effect which was faster and more pronounced after meloxicam treatment.

Both steroidal and non-steroidal anti-inflammatory drugs used were found to significantly decrease the levels of the inflammatory marker compared to the group of calves given the antibiotic alone but the meloxicam was more effective than flumethasone as shown in table (4).

Regarding the studied tests of cellular immunity, the diseased calves before treatment revealed a significant decrease in lymphocyte transformation rate (LTR), phagocytic % and phagocytic index (table 4). Our results are similar to those observed by **Sulpizio et al. (2003),** who reported that heifers subjected to natural exposure of BRD, is often characterized by immunosuppression caused by environmental stressors coupled with a primary viral infection that allows a secondary bacteri-

al infection to establish in the pulmonary tissues.

Treatment of the calves with flumethasone resulted in significant decrease in cellular immunity on 3rd and 7th day post-treatment (table 4). In contrast, the treatment of the calves with meloxicam did not influence any test of cellular immunity. Our results agree with those reported by **Bednarek et al., (1999)** who reported that, a single dose of flumethasone, in spite of its anti-inflammatory activity, caused a significant decrease in the percentage of phagocytic cells, their random migration, inhibited cellular immunity and inhibited gamma globulin production.

Generally, corticosteroids are immunosuppressive agents. They are able to inhibit nearly all cellular and humoral immunologic reactions **(Braun and Harris, 1985)** and cytokine production in blood and epithelial cells **(Brattsand and Linden, 1996; Beetz et al., 1997).**

However, in contrast to our results indicating the negative influence of flumethasone on phagocytic activity, dexamethasone given to cattle increased activity of neutrophils and increased their chemotaxis **(Anderson et al., 1999).** On the other hand, **Zetterlund et al., (1998) and Bednarek et al., (1999)** stated that, glucocorticoids were shown to strongly suppress phagocytosis. The reasons for such a discrepancy are not known. We can only speculate that the effect of SAIDs depends on the dose used, or that the effect of SAIDs can change over time and can be inhibitory shortly after treatment of cattle (as in our experiment) and stimulatory several days after treatment **(Anderson et al., 1999).**

In the present work, most of the studied hematological, immunological and inflammatory marker in treated animals returned to their normal range 14 days post treatment with both anti-inflammatory drugs. However, the cure rates of calves treated with meloxicam were higher than those treated with antibiotic alone or antibiotic and flumethasone. Suspected adverse reactions were not reported following meloxicam treatment in contrast to the immunesuppressive effect of flumethasone. Based on these results, it could be concluded that the combination of meloxicam (NSAID) with the antibiotic in calves suffering from bronchopneumonia was superior to the antibiotic alone and also to the combination of the antibiotic with flumethasone (SAID).

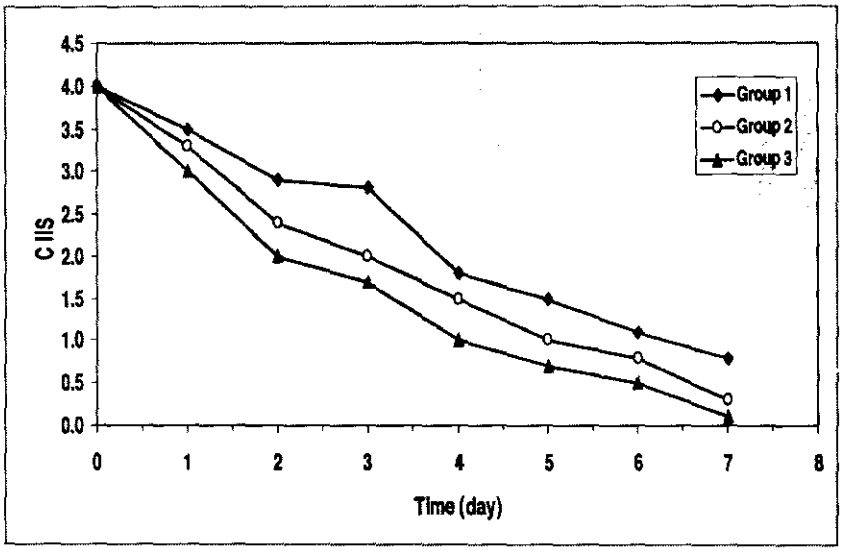

Fig. (1): Clinical Illness Index Score (CIIS) of diseased calves before and after treatment with oxytetracycline alone (Group 1), oxytetracycline + flumethasone (Group 2) and oxytetracycline + meloxicam (Group 3).

Table (1): Erythrogram of healthy and diseased calves before and after treatment with oxytetracycline alone (Group 1), oxytetracycline + flumethasone (Group 2) and oxytetracycline + meloxicam (Group 3).

(N = 5 CALVES) (MEAN ± S.E)

GROUP	HEALTHY CONTROL CALVES	DISEASED CALVES BEFORE TREATMENT	DISEASED CALVES ON 3RD DAY POST TREATMENT			DISEASED CALVES ON 7TH DAY POST TREATMENT			DISEASED CALVES ON 14TH DAY POST TREATMENT		
PARAMETERS			GROUP 1	GROUP 2	gROUP 3	GROUP 1	GROUP 2	GROUP 3	GROUP 1	GROUP 2	GROUP 3
RBC, 10^6/UL	8.29 ± 0.46	6.24* ± 0.78	6.82* ± 0.42	7.68 ± 0.71	7.89 ± 0.65	7.24 ± 0.41	7.84 ± 0.52	8.06 ± 0.49	7.88 ± 0.53	8.12 ± 0.6	8.18 ± 0.6
HB GM/DL	12.5 ± 0.91	9.4* ± 0.82	9.8* ± 0.88	11.32 ± 0.92	11.6 ± 0.92	10.1 ± 0.88	11.5 ± 0.83	11.8 ± 0.91	11.2 ± 0.94	11.7 ± 1.1	11.9 ± 0.8
PCV %	38.4 ± 2.09	28.4* ± 2.62	30.9* ± 2.26	36.4 ± 1.6	36.5 ± 1.8	32.0 ± 2.08	36.8 ± 1.9	37.2 ± 1.2	37.1 ± 2.1	37.2 ± 1.8	37.6 ± 1.7
MCV Fl	46.3 ± 3.7	45.5 ± 3.2	45.3 ± 3.9	47.3 ± 2.3	46.3 ± 3.1	44.19 ± 2.1	46.9 ± 2.4	46.2 ± 2.6	47.1 ± 3.1	45.8 ± 2.3	46.0 ± 3.2
MCH PG%	15.08 ± 1.2	15.05 ± 0.9	14.4 ± 1.02	14.7 ± 1.3	14.7 ± 0.9	14.0 ± 1.2	14.7 ± 0.8	14.6 ± 1.1	14.2 ± 0.9	14.4 ± 0.8	14.5 ± 0.9
MCHC %	32.6 ± 2.8	33.1 ± 2.12	31.7 ± 2.16	31.08 ± 2.5	31.8 ± 2.1	31.5 ± 2.1	31.3 ± 1.9	31.7 ± 2.2	30.2 ± 2.4	31.5 ± 2.1	31.6 ± 1.6

*Significant at P < 0.05

Table (2): Leukogram of healthy and diseased calves before and after treatment with oxytetracycline alone (Group 1), oxytetracycline + flumethasone (Group 2) and oxytetracycline + meloxicam (Group 3).

(N = 5 CALVES) (MEAN ± S.E)

GROUP / PARAMETERS	HEALTHY CONTROL CALVES	DISEASED CALVES BEFORE TREATMENT	DISEASED CALVES ON 3RD DAY POST TREATMENT			DISEASED CALVES ON 7TH DAY POST TREATMENT			DISEASED CALVES ON 14TH DAY POST TREATMENT		
			GROUP 1	GROUP 2	gROUP 3	GROUP 1	GROUP 2	GROUP 3	GROUP 1	GROUP 2	GROUP 3
TLC 10^3/UL	10.6 ± 0.61	12.8* ± 0.75	12.62* ± 0.74	10.93 ± 0.71	10.54 ± 0.82	11.14 ± 0.82	10.05 ± 0.53	10.62 ± 0.47	10.65 ± 0.5	9.56 ± 0.46	10.57 ± 0.72
NEUTROPHIL 10^3/UL	4.85 ± 0.46	7.84** ± 0.81	6.98* ± 0.71	6.44* ± 0.31	5.12 ± 0.6	5.62 ± 0.4	5.9 ± 0.34	5.06 ± 0.5	5.09 ± 0.57	5.18 ± 0.48	4.96 ± 0.5
LYMPHOCYTE 10^3/UL	5.1 ± 0.42	3.44** ± 0.39	4.66 ± 0.32	3.6* ± 0.34	4.6 ± 0.28	4.6 ± 0.29	3.4* ± 0.3	4.82 ± 0.31	4.75 ± 0.36	3.7* ± 0.32	4.92 ± 0.35
EOSINOPHIL 10^3/UL	0.25 ± 0.03	0.42** ± 0.05	0.38* ± 0.05	0.39* ± 0.05	0.32 ± 0.04	0.34 ± 0.04	0.37* ± 0.04	0.28 ± 0.03	0.31 ± 0.05	0.32 ± 0.04	0.27 ± 0.04
MONOCYTES 10^3/UL	0.4 ± 0.05	0.7** ± 0.07	0.6* ± 0.05	0.5 ± 0.05	0.5 ± 0.04	0.5 ± 0.04	0.38 ± 0.04	0.46 ± 0.03	0.5 ± 0.05	0.36 ± 0.05	0.42 ± 0.04

*SIGNIFICANT AT P < 0.05 ** SIGNIFICANT AT P < 0.01

Table (3): Proteinogram of healthy and diseased calves before and after treatment with oxytetracycline alone (group 1), oxytetracycline + flumethasone (group 2) and oxytetracycline + meloxicam (group 3). (n = 5 calves) (mean ± s.e)

GROUP / PARAMETERS	HEALTHY CONTROL CALVES	DISEASED CALVES BEFORE TREATMENT	DISEASED CALVES ON 3RD DAY POST TREATMENT			DISEASED CALVES ON 7TH DAY POST TREATMENT			DISEASED CALVES ON 14TH DAY POST TREATMENT		
			GROUP 1	GROUP 2	GROUP 3	GROUP 1	GROUP 2	GROUP 3	GROUP 1	GROUP 2	GROUP 3
TOTAL PROTEIN (GM/DL)	7.55 ± 0.42	7.3 ± 0.31	7.54 ± 0.24	6.88 ± 0.29	7.37 ± 0.33	7.72 ± 0.26	7.19 ± 0.31	7.64 ± 0.28	7.72 ± 0.29	7.42 ± 0.27	7.67 ± 0.31
ALBUMIN (GM/DL)	4.22 ± 0.31	3.07* ± 0.34	3.54 ± 0.27	3.46 ± 0.23	3.57 ± 0.28	3.8 ± 0.31	3.76 ± 0.27	3.89 ± 0.24	3.96 ± 0.33	3.98 ± 0.26	4.1 ± 0.28
TOTAL A-GLOBULIN (GM/DL)	0.87 ± 0.06	1.21* ± 0.09	1.06* ± 0.05	0.9 ± 0.04	0.88 ± 0.04	1.03* ± 0.03	0.91 ± 0.05	0.87 ± 0.05	0.93 ± 0.05	0.90 ± 0.04	0.86 ± 0.04
TOTAL B-GLOBULIN (GM/DL)	0.93 ± 0.05	1.07 ± 0.05	0.98 ± 0.04	0.96 ± 0.04	0.97 ± 0.05	0.97 ± 0.03	0.93 ± 0.05	0.97 ± 0.04	0.95 ± 0.04	0.92 ± 0.06	0.93 ± 0.05
TOTAL Γ-GLOBULIN (GM/DL)	1.53 ± 0.11	1.95** ± 0.09	1.96* ± 0.14	1.56 ± 0.18	1.95 ± 0.21	1.92 ± 0.15	1.59 ± 0.20	1.91 ± 0.22	1.88 ± 0.17	1.62 ± 0.21	1.78 ± 0.26
TOTAL GLOBULIN (GM/DL)	3.33 ± 0.31	4.23* ± 0.22	4.0 ± 0.22	3.42 ± 0.31	3.8 ± 0.27	3.92 ± 0.29	3.43 ± 0.28	3.75 ± 0.31	3.76 ± 0.32	3.44 ± 0.27	3.57 ± 0.32

*SIGNIFICANT AT P < 0.05

Table (4): Some inflammatory markers and cellular immunity of healthy and diseased calves before and after treatment with oxytetracycline alone (group 1), oxytetracycline + flumethasone (group 2) and oxytetracycline + meloxicam (group 3).

(N = 5 CALVES) (MEAN ± S.E)

GROUP / PARAMETERS	HEALTHY CONTROL CALVES	DISEASED CALVES BEFORE TREATMENT	DISEASED CALVES ON 3RD DAY POST TREATMENT			DISEASED CALVES ON 7TH DAY POST TREATMENT			DISEASED CALVES ON 14TH DAY POST TREATMENT		
			GROUP 1	GROUP 2	gROUP 3	GROUP 1	GROUP 2	GROUP 3	GROUP 1	GROUP 2	GROUP 3
SERUM HAPTOGLOBIN (MG/ML)	0.105 ± 0.018	0.620*** ± 0.073	0.410*** ± 0.082	0.345* ± 0.08	0.210 ± 0.07	0.306* ± 0.06	0.228 ± 0.06	0.183 ± 0.03	0.216 ± 0.05	0.172 ± 0.04	0.126 ± 0.06
PLASMA FIBRINOGEN (MG/DL)	514 ± 42.6	826*** ± 30.5	712** ± 46.5	670* ± 40.8	640 ± 52.4	710* ± 56.2	622 ± 39.2	602 ± 37.8	652 ± 51.1	613 ± 46.2	582 ± 51.2
LTR	1.57 ± 0.05	1.26** ± 0.04	1.32* ± 0.07	1.19** ± 0.07	1.37 ± 0.08	1.36 ± 0.08	1.26** ± 0.06	1.41 ± 0.07	1.42 ± 0.06	1.36 ± 0.08	1.48 ± 0.07
PHAGOCYTIC %	79.8 ± 3.2	66.6* ± 4.2	69.4 ± 5.1	65.1* ± 4.3	73.4 ± 5.1	71.6 ± 6.2	67.2 ± 4.9	73.8 ± 4.9	72.4 ± 3.5	69.6 ± 5.1	75.1 ± 5.3
PHAGOCYTIC INDEX	16.7 ± 1.2	12.2* ± 1.5	12.7 ± 1.8	11.2* ± 1.5	15.5 ± 4.1	13.4 ± 2.3	11.41* ± 1.6	15.66 ± 3.2	14.3 ± 2.5	12.1 ± 1.9	16.05 ± 2.9

***Significant at P < 0.05 ** Significant at P < 0.01 *** Significant at P < 0.001**

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الملخص العربى

مقارنة تأثير مضادات الالتهاب الاستيرودية و اللاستيرودية مع المضادات الحيوية فى علاج الامراض التنفسية فى العجول

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تهدف هذه الدراسة الى مقارنة تأثير استخدام أحد مضادات الالتهاب الاستيرودية (الفلوميثازون) و اللاستيرودية (الميلوكسيكام) مع المضاد الحيوي فى علاج الامراض التنفسية فى العجول لتحديد الافضل و الأكثر فاعلية فى العلاج. اجريت هذه الدراسة في احدى مزارع عجول التسمين بمحافظة الشرقية على عدد20 عجل تتراوح اعمارهم بين 3-5 شهور من بينهم 5 عجول سليمة ظاهريا و اكلينيكيا و غير معالجة (مجموعة ضابطة) و 15 عجل مصاب بأعراض تنفسية (سعال حاد ، افرازات مخاطية من الانف ، ارتفاع في درجة الحرارة و فقدان الشهية). قسمت العجول المصابة عشوائيا الى ثلاثة مجموعات متساوية، المجموعة الاولى: مصابة و معالجة بالاوكسي تتراسيكلين ممتد المفعول (20 مجم/كجم) مرة واحدة حقنا فى العضل، المجموعة الثانية مصابة و معالجة بالاوكسي تتراسيكلين ممتد المفعول + الفلوميثازون (2,5 مجم/ عجل) مرة واحدة حقنا

فى العضل' و المجموعة الثالثة: مصابة و معالجة بالاوكسي تتراسيكلين ممتد المفعول + الميلوكسيكام (5، مجم/ كجم) مرة واحدة حقنا فى العضل. تم متابعة العجول اكلينيكيا قبل و بعد العلاج لمدة اسبوعين لملاحظة الحالة الصحية و درجة الحرارة و جميع الاعراض المصاحبة للمرض. تم تجميع عينات الدم على مانع للتجلط قبل العلاج و فى اليوم الثالث ، السابع و الرابع عشر من بدء العلاج و ذلك لفحص صورة الدم و قياس المناعة الخلوية. كذلك تم فصل السيرم لاجراء الفصل الكهربي لبروتين الدم و قياس بعض دلالات الالتهاب.

و قد اظهرت النتائج في العجول المصابة قبل العلاج العديد من التغيرات فى صورة الدم و المناعة السائلة و الخلوية و ارتفاع حاد فى دلالات الالتهاب مما انعكس سلبيا على الحالة الصحية للعجول المصابة. كذلك كان لعلاج الحيوانات المصابة بمضادات الالتهاب اثرا ايجابيا فى سرعة شفاء العجول المصابة و اختفاء الاعراض المصاحبة للمرض و كذلك عودة معدلات مضادات الالتهاب الى حدودها الطبيعية بالمقارنة بالمجموعة المعالجة بالمضاد الحيوي فقط و قد كان هذا التأثير اكثر وضوحا عند استخدام الميلوكسيكام مع المضاد الحيوي. كما اوضحت النتائج ان العلاج بالفلوميثازون احدث نقصا فى معدل الجاما جلوبيولين و قدرة الخلايا الليمفاوية على التحول و كذلك نسبة و نشاط الخلايا الليمفاوية و على العكس لم يتسبب العلاج بالميلوكسيكام فى احداث اى اثر سلبى على القياسات المناعية. و لذلك يمكن استنتاج ان العلاج بمضادات الالتهاب اللاستيرودية (الميلوكسيكام) مع المضاد الحيوى كان اكثر كفاءة فى علاج جميع الاعراض المصاحبة للمرض و عودة جميع العناصر التي تم قياسها الى معدلاتها الطبيعية ودون تسجيل أى أثار جانبية على مناعة العجول المصابة مقارنة بمضادات الالتهاب الاستيرودية (الفلوميثازون) او استخدام المضاد الحيوي بمفرده.