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EFFECT OF MARBOFLOXACINE AND CEFTIOFUR SODIUM ON HEPATORENAL FUNCTION AND IMMUNOLOGICAL STATUS IN FATTINING CALVES

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SUMMARY

The objective of this study is designed to clearify the effect of marbofloxacine and ceftiofur sodium on the hepatorenal, cellular and humoral immune responses in fattening cattle calves .Twenty five baldy fattening cattle calves were divided into five equal groups (5 each).1st group served as control, 2nd and 3rd groups were injected with therapeutic dose (5mg/kg bwt) and double therapeutic dose (10 mg/kg bwt) of marbofloxacin for three consective days respectevily, 4th and 5th groups were injected with therapeutic dose (10 mg/kg bwt) and double therapeutic dose (20 mg/ kg bwt) of Ceftiofur sodium for three consective days respectevily.At 3rd day 1st, 2nd and 3rd week post injection ,blood samples were collected in two portions,1st one was collected on heparinized tube for determination of total and differential leucocytic count,phagocytic and killing %.2nd one was centrifuged at 3000 r.p.m.for 15 min. to separate clear serum, for determination of humoral immune response and some biochemical parameters.

Both marbofloxacin and Ceftiofur sodium in both therapeutic and double therapeutic doses elucidated significant reduction of phagocytosis and bacterial killing efficiency of blood polymorphnuclear leucocytes at the 1st and 2nd week post injection. Also both drugs evoked a significant increase in total leucocytic count and neutrophil and decrease in lymphocytes at the 3rd day 1st,2nd and 3rd week post injection.

Marbofloxacine in therapeutic and double therapeutic doses in fattening calves evoked a significant decline of total protein, albumin, gamma globulin, total globulin and A/G ratio, meanwhile alpha and beta globuline levels demonstrated a

significant increased at the 3rd day,1st and 2nd week post injection. Ceftifure sodium in a therapeutic or double therapeutic dose resulted in a significant decrease in total protein, gamma globulin, total globulin levels and insignificantly decrease in albumin but alfa and beta globulin levels insignificantly increased as compared with control calves at the 3rd day,1st, 2nd week post injection of ceftifure sodium.

The obtained results showed that marbofloxacin and ceftifure sodium in therapeutic amnd double therapeutic doses elicited significant elevation in serum AST, ALT, ALP urea and creatinine at the 3rd day,1st, 2nd week post injection .

It was concluded that marbofloxacine and ceftiofur sodium in both therapeutic and double therapeutic dose may provoke a remark hepatorenal change and immunosuppressive effect in calves.

INTRODUCTION

Immunosupperssion properties of some antibiotics are effective in inhibition of both cellular and humoral immune responses to a variety of vaccines Shalaby (1989). Seve-ral antibiotics suppress the immune response by their ability to interfere with protein or immunoglobulin synthesis Richard and Merle (1984).

Fluoroquinolones are a class of synthetic antimicrobial agents. Structurally,all fluoro-quinolones contain a fluorine molecule at the 6-position of the basic quinolone nucleus. It is a series of synthetic antimicrobial agents that are used in the treatment of a variety of bacterial infections. Marbofloxacin (3rd generation)is a synthetic bactericidal antimicrobial fluoroquinolone carboxylic acid derivatives with a broad spectrum activity against both G-ve, and G+ve bacteria and Mycoplasma spp Spreng et al. (1995)., recently introduced for use in veterinary medicine as they have a wide spectrum of antimicrobial activity,a large volum of distrbution and are effective at very low concentration Eyett (1997).

Cephalosporins are a group of antibioyics derived from mould of cephalo-sporium species and are based on 7-aminocephalosporic acid which crrosponds to 6-penicilanic acid in penicillins, Ceftiofur sodium is a third generation of cephalosporins antibitotics. It is a broad spectrum antibacterial activity against G+ve and G-ve bacteria and remain safety of the first and second generation products Brander, et al. (1982). It is a broad spectrum beta- lactamase resistant cephalosporin, It is bactericidal destroying bacteria by preventing the synthesis of the cell wall Yancey et al. (1987).This antibacterial activity due to ability of beta- lactamase ring to bind bacterial enzyme transpeptidase which important for proper cell wall synthesis (Thomson, et al. 1984).

The present work was planned to investigate the capablity of marbofloxacin and ceftiofur sodium in inducing hepatorenal and change immunosuppressive effect on fattening cattle calves.

MATERIALS AND METHODS

1-Drug :

1-Marbofloxacin:(Marbocyl)® injectable sterile solultion from VÈtoquinol, Lure, (France) available as 50ml vial each one mililiter contain 100mg marbofloxacin.

2-Ceftiofur sodium(excenel)® a vial containing 1-4 gm.Obtained from Upjohn Co. kalamazoo, U.S.A.

2-Animals :

Twenty five baldy fattening cattle calves aged 8-12 months from a prived farm El-Ebrahimia, Sharkia provence were divided into five equal groups (5 each).The 1st group served as control,2nd and 3rd groups were injected with therapeutic dose (5mg/kg bwt) and double therapeutic dose(10 mg/kg b.wt.) dose of marbofloxacin (I/M) for three consective days respectively ,4th and 5th groups were injected with therapeutic dose (10 mg/kg b.wt) and double therapeutic dose(20 mg/kg b.wt.)of Ceftiofur sodium (I/M) for three consective days respectively.

3 - Sampling :

Jugular vein puncture was used to collect two blood samples at the 3rd day,1st, 2nd and 4th weeks post injection,first part was collected on heparinized tube for determination of total leukocytic and differinial count, and the other one was left for about 2hour inroom temperature then centrifuged at 3000rpm for 15 min to separate clear serum, for determination of cellular and humoral immune response receptively.

1- Cellular immune response

A-Determination of phagocytic and killing percentage.

Heparinized blood samples were used to obtain polymorphonuclear cells accord-ing to Rouse et. al. (1980). Mixtures of Staphylococcus aureus and polymorphonuclear cell were incubated at 37°C for 2 hours with regular stirring and then the mixtures were centrifugated for 5 min at 4 °C. The supernatant were used to estimate the percentage of bacteria phagocytosed.The mixture of bacteria and polymorphnuclear cell were treated with one cycle of freezing and thawing and the percentage of bacteria killed was estimated according to the formula descri-bed by Woldehiwet and Rowan (1990).

B-Total and differential leucocytic count

count were performed on collected heparinized blood samples using the method described by Jain (1986).

2-Humoral immune response

Determination of total serum protein and protein fractions :

Total protein was estimated according to Doumas,et.al (1981), quantitative estimation of serum protein fractions were performed using cellulose acetate electrophoresis test according to Henry et. al. (1974).

3- Biochemical examination :-

Aspartate aminotramsferase (AST), alanine aminotransferase (ALT) were estemiated according to Reitman and Frankel (1957), alkaline phosphatase acording to (John 1982). Serum urea was estimated according to Fawcet and Scott (1960) and serum creatinine (Husdan and Raporpot 1968).

4) Statistical analysis.

The obtained data was statistically analyzed (T-test) according to Petrie and Watson (1999).

RESULTS AND DISCUSSION

In veterinary practice antibiotics are involved in the treatment of bacterial infection, many of these antibiotics are capable of depressing the immune system even at therapeutic levels Shalaby (1989).

Statistical analysis of the obtained data showed that there was a highly significant decrease in the phagocytic activity and killing percent than in control calves at the 3rd day,1st and 2nd week post injection with therapeutic or double therapeutic dose of marb-ofloxacin or ceftifure sodium.Our results was supported by the results obtained by Zahra and Abd-El-Azem (2003) who noticed that the therapeutic dose of marbofloxa-cin results in depressed phagocytic and natural killer cell activities.Also,Ahmad, (1999) Confirmed that decrease in phagocytic activity and killing percent in calves after parentral administration with therapeutic dose of ceftifure sodium.These results may be attributed to that the prolonged exposure of leukocyte membrane to the marbofloxa-cine was responsible for the possible alteration in phagocytosis.Pulin, et.al. (1991). Pions and Hawley (1972) mentioned that marbofloxacine might depress the synthesis of cytochrome oxidase inhibiting metabolic process of phagocytic cells.

It is clear evident from table(1&2)revealed that the injection of fattening calves with therapeutic or double therapeutic doses of marbofloxacin or ceftifure sodium resulted a significant increase in total leucocytic count,neutrophils ,esinophils and decrease in lymphocyte at the 3rd day ,1st and 2nd week post injection.Our results were in complete harmony with those reported by Zahra and Abd-El-Azem (2003) stated that marbofloxacin iduce significant increase in total white blood cell ,neutrophils and eosinophils. Jayakumar,et. al. (2002) reported that, Ciprofloxacin (10 mg/kg bw.) iduce significant increase in total leukocyte count.Also Helal and Abdel Fattah (2003) reported that enrofloxacin induced significant decrease

in lymphocytes percentage in sheep.Similar effects on the nuclear DNA of lymphocytes by several quinolones had been reported by De Simone et al. (1986) who revealed that, all studied quinolones induced inhibition of DNA synthesis of human lymphocytes. Our results are in acco-rdance with Ahmad, (1999) who found ceftifure sodium induce significant increase in total leucocytic count and neutrophils in chickens after 3rd day,1st and 2nd week post injection.In same line Bogert and Kroon (1982) recoded that the ceftafure sodium could be able to pentrate lymphocytes and therby inhibite the protein and DNA synthesis and eventually supperess the cellular function.

Our results revealed that calves injected with therapeutic dose of marbofloxacin or ceftifure sodium exerts a significant decrease in serum total proteins, and albumin at 3rd day,1st and 2nd week post injection if compared with non injected control group and these results parallel with those obtained by Zahra and Abd-El-Azem(2003) Who found that significant decrease in the level of serum total proteins and albumin in calves after administration of marbofloxcin.These resluts might be attributed to generalized inhibation of protein synthesis and B-cells activity in mammalian cells by marboflo-xacin, Stroev (1986).Significant hypoalbuminemia produced by marbofloxacin might be related to liver dysfunction , as liver a source for albumin biosynthesis Stroev (1986). Furthermore the obtained data coincide with results of Abd-Latif and Gamal El- Din (1998)).Who found that treatment healthy chickens with ceftiofur sodium improved adverse effects repersented by significant decrease in total protein, significant decrease value of globuline and insignificant decrease serum albumine levels.Emam and Abd El Azem(2001) mentioned that Healthy buffalo-calve given ceftiofur sodium showed significant decrease in total proteins, albumine and globuline.

Electrophoretic sepearation of serum proteins in this work revealed a decrease in gamma globulin and total globulin levels in calves at 3rd day,1st and 2nd week post injection with therapeutic dose of marbofloxacin or ceftifure sodium.This results are in agreement with those of Zahra and Abd-El-Azem (2003)who reported a significant decrease in gamma globulin and total globulin levels after marbofloxacin injected in calves.The reduction of parameters serum globulin might be attribute to reconstru-ction, activation and hyperplasia of lymphoreticular cells at the begining of immunog-ensis as mentioned by (Danielova and Humbartsumian 1976), Helal and Abdel Fattah (2003) reported that enrofloxacin induced significant decrease in gamma globu-lins in sheep.In keeping with this line, danofloxacin had immunosuppressive effect on the sheep (Zaghawa and Khalil,1997).Our results was previously recorded by Ahmad, (1999) in chicken.

Measurement of serum transaminases (AST and

ALT) activities are a standard tests for hepatocelluler damage. It is well known that the enzymes are intracellular, being located in the mitochondria,The cytoplasm or both, consequently, circulating levels increase following liver cell damage (Doxey 1971).

Concerning the effect on liver function parameters, the obtained results showed that marbofloxacin in therapeutic and double therapeutic doses elicited significant elevation in serum AST,ALT and ALP activities of normal cattle-calves.These findings might be attributed to alteration of membrane permeability or damage of the hepatic cells by direct effect of the drug resulting in escape of these enzymes to the plasma (Coles 1986 and Hanafy 1993).The present findings are supported by the results previously recorded by Gellert (1981) and Hanafy (1993) who noted that norfloxacin at therapeutic dose resulted in elevated liver enzymes.The rise in serum alkaline phosphatase activity is concomitantly recorded with liver damage leading to escape of this enzyme into serum in abnormal high concentration (Joan and Pannall 1981).

There were no significant difference in the liver enzymes (AST, ALT and Alkaline phosphatase) between the normal calves given therapeutic or double therapeutic dosess of ceftiofur sodium and the normal ones that were given no medication which agree with Abd-Latif and Gamal El-Din (1998). Who found that the normal chickens given ceftiofur sodium showed no significant difference in the liver enzymes .Same results were reported by Emam and Abd El Azem (2001) mentioned that Healthy buffalo-calve given ceftiofur sodium showed non significant effect on liver enzyemes (AST, ALT and Alkaline phosphatase).Noguchi,et.al.(1984) found also that sulperazon at a doses of 1200 mg/kg for rats produced slight increase in hepatic weight, but no effect on sGOT or sGPT.A similar result was rc orded in rabbits by Hassan (1996) who found that cefoperazone in therapeutic or double therapeutic doses (140 or 280 mg/kg b.wt) revealed non significant effect in the level of ALP in rabbit.Our results were in complete harmony with those reported by Mwafy, (2000) .

The results of this study indicated that urea and creatinine levels were significantly elevated in healthy calve treated with marbofloxacin in both therapeutic or double therapeutic dose of ceftiofur sodium.These result agree with reported by Abd-Latif and Gamal El-Din (1998), where they mentioned that therapeutic dose of ceftiofur sodium induce non significance chang in urea and creatinine in chicken.Same results were reported by Emam and Abd El Azem(2001) in calve given therapeutic dose of ceftiofur sodium.Treatment with norfloxacin (10mg/kg B.W.) for 5 days resulted in an increase in the levels of creatinine and urea Eisa (1998).Our findings coordinated with the finding of Roushdy, (2007) who found that pefloxacin resulted in elevated urea and creatinine.

Table(1)Effect of therapeutic and double therapeutic dose of Marbofloxacin and Ceftifur sodium on phagocytosis % and killing % of treated calves compared with control calves (n=5).

	Parameter	Control	Marbofloxacin				Ceftifur sodium			
			3rd days	1st week	2nd week	3rd week	3rd days	1st week	2nd week	3rd week
therape	Phagocytosiss %	86.67± 2.80	78.8± 1.08*	76.33± 1.05**	75.29± 1.98*	85.25± 2.97	76.48± 1.01**	77.07± 1.11**	80.97± 0.62*	83.3± 1.43
	Killing %	84.50± 1.11	77.9± 0.92**	79.83± 0.87**	81.60± 0.77*	83.83± 1.86	75.17± 2.31**	78.6± 1.61*	80.6± 1.21*	82.65± 1.65
Doubl	Phagocytosiss %	86.67± 1.80	77.09± 1.23**	76.13± 1.15**	78.03± 1.92*	83.15± 1.38	75.14± 1.18**	78.20± 1.11**	79.52± 1.36*	83.20± 1.94
	Killing %	84.50± 1.71	74.03± 1.84**	77.41± 1.39**	79.37± 0.91*	84.25± 1.91	76.52± 1.12**	77.21± 1.01**	79.51± 0.89*	83.83± 1.73

* P<0.05 ** P< 0.01

Table(2)Effect of therapeutic dose of Marbofloxacin and Ceftifur sodium on total and differential leucocytic count of treated calves compared with control calves (n=5).

Parameter		Control	Marbofloxacin				Ceftifur sodium			
			3rd days	1st week	2nd week	3rd week	3rd days	1st week	2nd week	3rd week
Total leukocytic 103/ul		9.5± 0.96	12.5± 0.33*	11.80± 0.18*	11.62 ± 0.17*	10.7± 0.62	13.5± 0.44**	12.2± 0.48*	10.5± 0.13	9.89± 0.42
Differenial count (103/ul)	Neutrophil %	26.14± 0.70	28.5± 0.21**	27.80± 0.16*	27.63± 0.13*	26.67± 0.37	29.67± 0.32*	29.09± 0.66*	28.5± 0.34*	27.12± 0.93
	Esinophil %	5.17± 0.69	7.67± 0.41*	7.43± 0.27*	7.34± 0.76*	5.13± 0.31	8.13± 0.51**	8.00± 0.22**	7.33± 0.33*	6.01± 0.96
	Lymphocyte%	64.5± 1.18	61.3± 0.21*	59.2± 0.12**	61.17± 0.31*	62.83± 0.65	59.87± 1.22*	60.6± 0.33*	61.1± 0.14*	62.95± 0.51
	Monocyte %	4.16± 0.61	2.53± 0.26*	2.17± 0.48*	3.86± 0.43	4.67± 0.33	1.63± 0.43**	1.74± 0.61*	3.07± 0.17*	3.91± 0.29

* P<0.05 ** P< 0.01

Table(3)Effect of double therapeutic dose of Marbofloxacin and Ceftifur sodium on total and differential leucocytic count of treated calves compared with control calves (n=5).

Parameter		Control	Marbofloxacin				Ceftifur sodium			
			3rd days	1st week	2nd week	3rd week	3rd day	1st week	2nd week	3rd week
Total leukocytic 103/ul		9.5± 1.26	14.02± 0.25**	13.95± 0.43**	13.48± 0.41**	11.06± 0.95	14.38± 0.22**	13.12± 0.31*	12.28± 0.23*	12.07± 0.75
Differenial count (103/ul)	Neutrophil %	26.14± 0.78	31.81± 0.42**	30.94± 0.21**	29.12± 0.43*	28,09± 0.84	31.09± 0.36**	30.13± 0.31**	29.13± 0.22*	28.66± 0.89
	Esinophil %	5.17± 0.17	6.98± 1.06	5.97± 1.23	5.48± 1.13	5.31± 0.97	6.71± 1.21	5.62± 1.41	5.45± 1.09	5.01± 1.48
	Lymphocyte%	64.5± 1.48	58.29± 0.14**	59.14± 0.22**	61.21± 0.48*	62.46± 0.83	59.60± 0.22**	60.04± 0.28*	61.06± 0.13*	62.10± 0.52
	Monocyte %	4.16± 0.31	2.92± 0.12*	3.95± 0.33	4.19± 0.13	4.14± 0.19	2.60± 0.23*	4.21± 0.13	4.36± 0.14	4.23± 0.19

* P<0.05 ** P< 0.01

Table(4)Effect of therapeutic dose of Marbofloxacin and Ceftifur sodium on serum total protein and protein fractions of treated fattening calves compared with control calves (n=5).

Parameter		Control	Marbofloxacin				Ceftifur sodium			
			3rd days	1st week	2nd week	3rd week	3rd days	1st week	2nd week	3rd week
T. protein (gm/dl)		7.18± 0.43	5.44± 0.43*	5.12± 0.35*	5.15± 0.48*	6.10± 0.46	4.76± 0.53**	5.50± 0.43*	5.30± 0.90*	6.30± 0.36
Albumin (gm/dl)		2.40± 0.33	1.48± 0.25*	1.68± 0.13**	1.85± 0.20*	2.17± 0.30	1.12± 0.12*	1.75± 0.19	1.83± 0.26	2.05± 0.18
Globulin (gm/dl)	Alpha	1.19± 0.08	1.49± 0.10*	1.34± 0.18	1.31± 0.09	1.29± 0.07	1.52± 0.06	1.38± 0.21	1.29± 0.19	1.16± 0.14
	Beta	1.22± 0.09	1.57± 0.09*	1.40± 0.02	1.37± 0.04	1.27± 0.08	1.40± 0.16	1.35± 0.18	1.30± 0.07	1.28± 0.09
	Gamma	2.37± 0.31	0.90± 0.09**	0.99± 0.07**	1.17± 0.08**	1.97± 0.17	0.72± 0.16**	1.02± 0.11**	1.28± 0.07*	1.81± 0.17
	Total	4.78± 0.17	3.96± 0.07*	3.44± 0.14*	3.30± 0.12*	3.93± 0.32	3.64± 0.09*	3.75± 0.08*	3.47± 0.05*	4.25± 0.24
A/G Ratio		0.50± 0.07	0.35± 0.06	0.40± 0.05	0.56± 0.04	0.45± 0.05	0.31± 0.03	0.47± 0.05	0.47± 0.11	0.48± 0.05

* P<0.05 ** P< 0.01

Table (5) Effect of double therapeutic dose of Marbofloxacin and Ceftifur sodium on serum total protein and protein fractions of treated calves compared with control calves (n=5).

Parameter		Control	Marbofloxacin				Ceftifur sodium			
			3rd days	1st week	2nd week	3rd week	3rd days	1st week	2nd week	3rd week
T. protein (gm/dl)		7.18± 0.43	5.46± 0.39*	6.09± 0.35*	6.33± 0.38*	6.56± 0.53	4.94± 0.35**	5.58± 0.43*	5.53± 0.50*	6.11± 0.81
Albumin (gm/dl)		2.40± 0.33	1.40± 0.25*	1.58± 0.13*	1.85± 0.17*	1.97± 0.20	1.38± 0.47	1.35± 0.39	1.63± 0.247	2.22± 0.38
Globulin (gm/dl)	Alpha	1.19± 0.08	1.46± 0.09*	1.37± 0.02*	1.29± 0.13	1.20± 0.09	1.31± 0.12	1.27± 0.14	1.25± 0.12	1.30± 0.21
	Beta	1.22± 0.09	1.63± 0.08*	1.54± 0.04*	1.47± 0.06*	1.31± 0.06	1.53± 0.17	1.32± 0.13	1.33± 0.11	1.23± 0.06
	Gamma	2.37± 0.31	0.97± 0.12*	1.60± 0.05*	1.72± 0.09*	2.08± 0.07	0.72± 0.05**	1.53± 0.04*	1.32± 0.19	1.36± 0.37
	Total	4.78± 0.17	4.06± 0.13*	4.51± 0.07*	4.48± 0.03**	4.59 0.12	3.56± 0.09*	4.23± 0.04*	3.90± 0.10*	3.89± 0.4
A/G Ratio		0.50± 0.07	0.34± 0.04	0.35± 0.05	0.41± 0.04	0.43± 0.05	0.39± 0.03	0.43± 0.05	0.42± 0.11	0.57± 0.05

* P<0.05 ** P< 0.01

Table(6)Effect of therapeutic dose of Marbofloxacin and Ceftifur sodium on liver enzyems ,urea and creatinine of treated calves compared with controls (n=6).

Parameter		Control	Marbofloxacin				Ceftifur sodium			
			3rd days	1st week	2nd week	3rd week	3rd days	1st week	2nd week	3rd week
Liver enzymes	AST U/L	32.18 ± 1.002	39.52± 1.84**	36.11 ± 1.42*	34.31± 1.43	33.32± 1.74	33.40± 1.90	33.08 ± 1.51	32.47± 0.92	32.25± 1.02
	ALT U/L	11.42 ± 1.08	25.40± 2.84**	19.21 ± 1.3**	15.19± 1.63	12.21± 1.34	12.40± 1.90	12.08 ± 1.51	11.87± 0.92	11.58± 1.02
	AIK.Ph. I.U/ml	12.92 ± 0.77	19.31± 1.34**	14.97 ± 0.84*	13.43± 1.99	11.53± 1.23	14.70± 1.65	14.21 ± 1.52	13.47± 1.07	12.18± 1.37
Kidney function	Urea mg/dl	37.25± 1.32	43.57 ± 1.33**	42.18± 0.9*	38.14± 3.81	36.22± 1.78	39.92± 1.94	39.24± 1.78	37.60± 1.90	37.42± 1.61
	Creatini mg/dl	1.13± 0.22	1.93± 0.11*	1.86± 0.10*	1.33± 0.11	1.34± 0.11	1.23± 0.32	1.29± 0.10	1.21± 0.12	1.19± 0.21

* P<0.05 ** P< 0.01

Table (7) Effect of double therapeutic dose of Marbofloxacin and Ceftifur sodium on liver enzyemes ,urea and creatinine of treated calves compared with controls (n=6).

Parameter		Control	Marbofloxacin				Ceftifur sodium			
			3rd days	1st week	2nd week	3rd week	3rd days	1st week	2nd week	3rd week
Liver enzymes	AST (U/L)	32.18 ± 1.002	43.21± 2.63**	39.17 ± 1.5**	35.31± 1.87	33.34± 1.49	35.40± 1.90	34.08 ± 1.51	33.47± 0.92	32.18± 1.002
	ALT (U/L)	11.42 ± 1.08	27.39± 3.35**	25.83 ± 3.89*	21.59± 2.74*	17.48± 2.94	13.42± 1.40	12.26± 1.25	13.26± 1..32	12.30± 1.13
	AlK.Ph. (I.U/ml	12.92 ± 0.77	20.21± 1.68**	16.24 ± 1.73*	14.09± 1.39	12.31± 1.84	13.29± 1.52	13.24± 1.751	13.49± 2.73	12.30± 1.32
Kidney function	Urea mg/dl	37.25± 1.32	44.67± 2.42*	41.18± 1.08*	38.13± 2.94	37.54± 1.94	39.92± 2.61	38.24± 3.78	37.60± 2.90	36.92± 3.61
	creatinin mg/dl	1.13± 0.22	1.98± 0.21*	1.76± 0.110*	1.59± 0.15	1.56± 0.27	1.23± 0.53	1.26± 0.15	1.24± 0.22	1.10± 0.12

** P<0.05 * P< 0.01

It was concluded that marbofloxacine and ceftiofur sodium in both therapeutic and double therapeutic dose provoked a remarkable immunosuppressive effect in calves.

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تأثيرالمربوفلوكساسين والسفتى فيور صوديوم
على الحالة المناعية لعجول التسمين

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استهدفت هذه الدراسة استبيان بعض المعلومات عن تاثير عقاري المربوفلوكساسين والسفتى فيور صوديوم على الحالة المناعية لعجول التسمين .

أجريت هذه الدراسة على خمس مجموعات متساوية من عجول التسمين كل مجموعة تحتوى على ٥ عجول بقرى بكل مجموعة عمرها ٨ – ١٢ شهراً، المجموعة الأولى بقيت بدون استخدام اى أدوية (مجموعة محكمة) المجموعة الثانية والثالثة حقنت بالجرعة العلاجية وضعف العلاجية (٥،١٠مجم/كجم من وزن الجسم) من المربوفلوكساسين لمدة ثلاث أيام متتالية،والمجموعة الرابعة والخامسة حقنت بالجرعة العلاجية وضعف الجرعة العلاجية (١٠،٢٠مجم/كجم من وزن الجسم) من السفتى فيور صوديوم لمدة ثلاث أيام متتالية.

وقد أظهرت النتائج أن المربوفلوكساسين والسفتى فيور صوديوم سوا بالجرعة العلاجية وضعف الجرعة العلاجية أديا إلى حدوث نقص معنوى فى نسبة الالتهام ونسبة القتل عند الأسبوع الأول والثانى والثالث والرابع وكذلك المربوفلوكساسين السفتى فيور صوديوم أحدثا زيادة معنوية فى العدد الكلى لكرات الدم البيضاء والنيتروفيل بينما أحدث نقص معنوى فى عدد الخلايا اللمفاوية عند اليوم الثالث والأسبوع الأول والثانى والثالث .

أثبتت هذه الدراسة أن الجرعة العلاجية وضعف الجرعة العلاجية من المربوفلوكساسين أدى إلى حدوث نقص معنوى فى نسبة البروتين الكلى، الالبيومين جاما جلوبيولين ، والجلوبيولين الكلى كما أدى إلى زيادة معنوية فى الالفا والبياتا جلوبيولين،ونقص غير معنوى فى النسبة بين الالبيومين والجلوبيولين عند اليوم الثالث والأسبوع الأول والثانى والثالث بعد استخدام المربوفلوكساسين.كذلك وجد ان عقارالسفتى فيور صوديوم له أثار سلبية على البروتين الكلى، الالبيومين جاما،الالفا والبياتا جلوبيولين والجلوبيولين الكلى .

لوحظ أيضا زيادة معنوية فى معدل كلا من الترانس امينيزسس والفوسفاتيز القاعدى واليوريا والكرياتين بعد استعمال عقار المربوفلوكساسين سوا بالجرعة العلاجية وضعف الجرعة العلاجية. أما استخدام والسفتى فيور صوديوم سوا بالجرعة العلاجية وأضعف الجرعة العلاجية أديا إلى حدوث زيادة غير معنوية فى معدل كلا من الترانس امينيزسس والفوسفاتيز القاعدى واليوريا والكرياتين .

نستخلص من هذه الدراسة أن المربوفلوكساسين والسفتى فيور صوديوم سوا بالجرعة العلاجية وضعف الجرعة العلاجية أديا إلى حدوث تأثيرات عكسية على الكبد والكلى نقص فى المناعة فى عجول التسمين.