



Effect of Cefuroxime Sodium and Meloxicam Administration on Certain Biochemical Parameters in Barbari Goats

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Received: 03 Oct., 2017

Revised: 18 Nov., 2017

Accepted: 22 Nov., 2017

ABSTRACT

In the present study, the effects of cefuroxime sodium and meloxicam administration on biochemical parameters were studied in barbari goats. In this study, cefuroxime sodium was administered @ 20 mg.kg⁻¹ by intramuscular route and Meloxicam was administered @ 0.5 mg.kg⁻¹, intramuscularly. The result of this study indicated that multiple intramuscular doses of cefuroxime sodium along with meloxicam did alter some of the biochemical parameters in barbari goats. In the present study, significant changes (P<0.05) were observed in biochemical parameters like creatinine and blood urea nitrogen. However, in creatine phosphokinase, no statistically significant changes were observed.

Keywords: Goat, biochemical, cefuroxime sodium, meloxicam

Cephalosporins are well-known and very useful classes of antibiotics and are widely used in veterinary medicine for treatment of bacterial infections (Becker *et al.*, 2004). Cefuroxime sodium is used in both human and veterinary medicine with good results in the treatment and prophylaxis of bacterial infections. Cefuroxime sodium active against various gram-positive organisms. In addition to this it is also high activity against non- β -lactamase-producing gram negative bacteria.

Antibiotics are often used along with analgesic and anti-inflammatory drugs (Joly *et al.*, 1988; Sadaria *et al.*, 2010) for the treatment of various clinical disorders. Here antibiotics takes care of infection while NSAID drugs control inflammation and give immediate relief to the animal. Meloxicam is common NSAID drug used in human and veterinary medicine for the treatment of pyrexia, muscular pain and other painful conditions etc. Further it is a relatively selective COX-2 inhibitor.

Keeping in view, the possibility of their simultaneous use, the present research work was undertaken to study various

biochemical parameters of their concurrent administration in barbari goats.

MATERIALS AND METHODS

Animals

The study was conducted in Department of Veterinary Pharmacology and Toxicology, College of Veterinary Science and Animal Husbandry, NDVSU, Jabalpur (M.P). The experiment was conducted on 6 healthy barbari goats of 1-2 years of age weighing 22-25 kg. These goats were kept at Amanala livestock farm, NDVSU, Jabalpur. Animals were kept under observation for two weeks prior to start of experiment to eliminate possibility of any disease condition in animals. Animal were housed in hygienic conditions and provided balance ration; water was given *ad-lib*. Experimental protocol and use of animals in experiment was approved by Institutional Animal Ethics Committee (IAEC). Guidelines of CPCSEA were followed for care and management of these experimental animals.

Chemicals

In this research work, cefuroxime sodium injectable drug (Supacef, 750 mg) was obtained from M/s GSK, Mumbai (India). This comes as a dry powder which was reconstituted with pyrogen free distilled water immediately before administration. The injectable meloxicam (Melonex) was obtained from M/s Intas Pharmaceuticals, Ahmedabad, Gujrat (India).

Experimental design

In this study, cefuroxime sodium, was given at the dose rate of 20 mg.kg⁻¹ by intramuscular route and repeated at every 12 h. Meloxicam was given at the dose rate of 0.5 mg.kg⁻¹, intramuscularly and repeated at every 24h. Cefuroxime sodium and meloxicam was continuously administrated for 7 days and blood samples were collected from jugular vein at every twelve hour.

Blood samples (2 ml) were collected in pro-coagulation vacutainer for evaluation of various biochemical parameters. Blood samples were collected before administration of the drug which served as control (day 0). After administration of drugs, blood samples were collected at day 1st, 2nd, 3rd, 4th, 5th, 6th and 7th from jugular vein for serum biochemical analysis.

RESULTS AND DISCUSSION

The biochemical evaluation included determination of various parameters like creatinine level, blood urea

nitrogen and creatine phosphokinase to evaluate kidney and other functions of the body following multiple-dose intramuscular administration of cefuroxime sodium with meloxicam.

The results suggest that multiple intramuscular doses of cefuroxime sodium (20 mg.kg⁻¹, repeated at 12 hour) along with meloxicam (0.5 mg.kg⁻¹ repeated at 24 hour) for 7 days in goats alters some of the biochemical parameters to certain extent.

The creatinine level (Table 1) in administered goats rose significantly (P<0.05) from 0.85±0.3 mg/dl on day zero to 1.02±0.3 mg/dl on day seven of the study. Maximum rise in creatinine level was observed from fourth day onwards in the treated animals. Although this moderate rises in creatinine level does not indicative of severe renal injury.

Statistically significant (P<0.05) rise in blood urea nitrogen (Table 2) was observed from 17.07±0.75 mg/dl on day zero to 23.20±1.01 mg/dl on day seventh of the study in drug administered goats. The total rise in blood urea nitrogen was moderate in nature; however, significant rise was observed on third day of study.

The level of creatine phosphokinase, (Table 3) rise from 100.52±2.19 IU/L to 108.22±2.44 IU/L from day zero to day seven of the study, however, this rise was statistically non significant.

Spurling *et al.* (1986) report only low levels of plasma protein as only observable change seen in biochemical parameters on oral administration of cefuroxime sodium

Table 1: Effect of daily intramuscular administration of cefuroxime sodium and meloxicam for 7 days on creatinine level (mg/dl) in goats

Day	Goat Number												Mean±S.E.
	G1		G2		G3		G4		G5		G6		
	M	E	M	E	M	E	M	E	M	E	M	E	
0	0.76	0.77	0.75	0.79	0.81	0.84	0.98	0.99	0.82	0.83	0.94	0.96	0.85±0.03 ^d
1	0.81	0.82	0.79	0.82	0.82	0.83	1.02	0.98	0.86	0.85	0.96	0.94	0.88±0.02 ^{cd}
2	0.85	0.84	0.84	0.87	0.83	0.84	1.05	0.99	0.89	0.86	0.88	0.87	0.88±0.02 ^{cd}
3	0.88	0.88	0.82	0.86	0.84	0.85	1.04	1.02	0.88	0.89	0.91	0.91	0.90±0.02 ^{cd}
4	0.86	0.92	0.85	0.83	0.86	0.86	1.02	1.05	0.95	0.93	0.94	0.87	0.91±0.02 ^{cd}
5	0.90	0.94	0.87	0.88	0.88	0.89	1.10	1.07	0.98	0.93	0.99	0.89	0.94±0.02 ^{bc}
6	0.95	1.01	0.92	0.94	0.90	0.91	1.14	1.17	0.96	0.95	1.02	0.92	0.98±0.03 ^{ab}
7	1.03	1.02	1.02	1.01	0.91	0.91	1.15	1.18	0.94	0.97	1.12	0.93	1.02±0.03 ^a

Different superscript differed significantly, (P<0.05) . M: Morning, E : Evening

Table 2: Effect of daily intramuscular administration of cefuroxime sodium and meloxicam for 7 days on blood urea nitrogen level (mg/dl) in goats

Day	Goat Number												Mean±S.E.
	G1		G2		G3		G4		G5		G6		
	M	E	M	E	M	E	M	E	M	E	M	E	
0	15.12	15.24	13.23	14.31	18.64	19.40	14.91	15.06	19.56	19.28	20.36	19.67	17.07±0.75 ^e
1	16.44	16.45	14.84	14.70	19.47	21.92	15.84	16.15	20.31	20.34	21.64	20.31	18.20±0.78 ^{de}
2	17.34	17.81	15.25	15.36	21.93	22.36	16.02	16.21	22.56	21.54	22.87	22.95	19.35±0.94 ^{cde}
3	19.85	19.61	15.97	16.03	22.46	22.36	16.55	17.70	21.18	22.64	22.58	22.82	19.98±0.80 ^{bcd}
4	19.98	20.30	17.85	17.65	23.97	23.58	17.97	18.62	23.89	24.01	23.41	23.77	21.25±0.79 ^{abc}
5	20.64	21.71	18.87	19.94	23.02	24.18	18.03	19.03	24.15	24.41	24.74	25.35	22.01±0.76 ^{ab}
6	22.16	23.65	20.16	21.12	23.67	23.45	19.37	20.24	25.87	26.07	25.07	26.17	23.08±0.71 ^a
7	23.67	23.87	21.74	21.93	24.68	15.97	19.67	19.88	26.80	26.15	26.94	27.15	23.20±1.01 ^a

Different superscript differed significantly, (P<0.05) , M: Morning, E: Evening

Table 3: Effect of daily intramuscular administration of cefuroxime sodium and meloxicam for 7 days on creatine phosphokinase level (IU/L) in goats

Day	Goat Number												Mean±S.E.
	G1		G2		G3		G4		G5		G6		
	M	E	M	E	M	E	M	E	M	E	M	E	
0	100.28	99.64	98.47	99.07	110.10	110.15	91.01	89.64	94.11	94.78	110.04	108.92	100.52±2.19
1	100.02	101.54	99.31	99.98	112.47	111.52	92.97	91.71	95.31	95.68	112.21	110.82	101.96±2.25
2	101.12	102.84	100.48	100.25	110.85	112.35	93.41	92.31	96.41	97.45	111.59	113.14	102.68±2.17
3	100.46	99.87	104.68	102.57	113.64	115.05	94.74	93.40	97.84	97.09	113.24	113.58	103.85±2.32
4	101.74	102.98	106.02	105.68	114.88	115.42	95.21	93.82	98.25	98.71	114.43	115.25	105.20±2.34
5	104.58	103.64	108.84	107.54	118.58	117.67	95.34	95.27	98.68	99.14	116.91	116.87	106.92±2.57
6	104.78	104.69	110.77	109.64	116.29	118.85	96.84	96.02	99.02	100.42	116.80	117.89	107.67±2.46
7	105.96	106.34	107.69	110.24	117.14	120.41	97.75	97.82	99.87	99.73	117.41	118.24	108.22±2.44

M: Morning, E: Evening

in beagle dogs. O'Callaghan *et al.* (1976) observed no evidence of toxicity due to cefuroxime in healthy human volunteers.

According to Walstad *et al.* (1983) cefuroxime was well tolerated and no side effects or changes in haematological or biochemical values were seen in human patient with renal insufficiency. On concomitant treatment of cefuroxime with furosemide no evidence of nephrotoxicity or renal impairment was found. As per the Capel-Edwards *et al.*

(1979) large doses of cefuroxime caused some increase in urine volume and electrolyte excretion, and slightly aggravated the age related nephropathy in rats.

On the basis of observation of various blood biochemical parameters, multiple intramuscular administration of cefuroxime sodium with meloxicam did not largely affect renal functioning. This suggests that long term intramuscular administration of cefuroxime sodium with meloxicam is relatively safe in goats. Thus it is



advisable to use cefuroxime sodium with meloxicam at recommended dosage for treatment of infections susceptible to cefuroxime sodium.

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