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Short Communications

Hematobiochemical changes following repeated cefquinome administration in camel (*Camelus dromedarius*)

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Abstract

The objective of present study was to investigate the possible toxic or adverse effects of repeated cefquinome administration in camel with particular reference to changes in hemato-biochemical parameters. Cefquinome sulphate injection was administered once daily at dose rate of 1 mg per kg body weight by intramuscular route for 5 consecutive days to five adult healthy male camels. The animals were examined daily for appearance of any clinical signs or symptoms suggestive of adverse drug effects and blood samples were collected on day 0 and day 3, day 5 and day 7 for estimation of various haemato-biochemical parameters. Any clinical symptoms suggestive to adverse drug reaction were not recorded in any animal. Different heamtological parameters did not differ significantly (i.e. P>0.05) on different observation day and they remained within the normal reported range. Values of different biochemical parameters including SGOT (AST), SGPT (ALT), alkaline phosphatase (AKLP), urea, creatinine, total protein and albumin did not differ significantly and remained within the normal reported range. Results of the present study suggested that repeated intramuscular administration of cefquinome at the rate of 1 mg/ kg body weight once daily is safe in camel.

Key words: Biochemical, Camel, Cefquinome, Hematology, Safety

Camel, the state animal of Rajasthan is regarded as a primary source of livelihood in remote rural areas of the state. Cefquinome, having broad spectrum of antibacterial activity, low toxicity potential and long half life may have potential clinical use in this species. The advantages of cefquinome include broad spectrum antibacterial activity, stability against β-lactamase, enhanced potency and bioavailability and the ability to penetrate easily into gram negative bacteria (Ahmed *et al*., 2015). However, repeated cefquinome administration has been reported to alter certain hemato-biochemical and blood gas parameters in sheep (Corum et al., 2016), buffalo calf (Mangal and Sharma, 2015) and dog (Maden *et al*., 2001). There seems no report available investigating possible toxic or adverse effect of prolonged cefquinome administration in camel. Therefore, the present study aimed to study the effect of repeated cefquinome administration on hemato-biochemical parameters in camel.

The study was conducted in five healthy male camel (3 to 4 years old with body weight in between 400-450 kg). The animals were maintained under an intensive system of management and fed daily with guar (*Cyamopsis tetragonoloba*) meal and groundnut (*Arachis hypogaea*) haulms. Cefquinome sulphate injection (Inj. Cobactan® 2.5%, MSD Animal Health, Pune, India) was administered once daily at dose rate of 1 mg per kg body weight by intramuscular route for 5 consecutive days. The animals were examined daily for appearance of any clinical signs or symptoms suggestive of adverse drug effects and blood samples were collected on day 0 and day 3, day 5 and day 7 for estimation of various haematological parameters. Haematological parameters were estimated manually by standard techniques Benjamin (1985). Various biochemical parameters *viz*. ALT, AST, ALKP, Urea, creatinine, total protein and albumin were estimated in serum using kits supplied by Erba diagnostics, Mannhein, GmbH. The Ethical standards and guidelines of CPCSEA, as approved by IAEC were followed throughout the experiment. The statistical analysis of the data obtained was performed as per the standard methods using the software Statistical Package for the Social Sciences (SPSS), version 16.0.

Cefquinome is a broad-spectrum fourth generation cephalosporin antibiotic (Sader and Jones, 1992). It is an aminothiazolyl cephalosporin exclusively used for treatment purposes in animals (CVMP, 2003 and Thomas *et al*., 2006). As a group, cephalosporins have a favorable profile of toxicity in comparison to antimicrobial agents (Norrby, 1987; Sattler *et al.,* 1988; Fekety, 1990 and Zhanel, 1990). Nevertheless, they have

Table 1. Changes in hematological parameters in camel receiving cefquinome injections.

Day	Parameter						
	Hb (g/dl)	TEC ($X10^6$/µl)	TLC($X10^3$/µl)	N(%)	M(%)	E(%)	L(%)
0	10.900±0.367	7.710±0.357	10.900±0.752	62.400±4.261	4.800±1.020	3.600±0.748	29.200±4.587
3	10.100±0.620	7.264±0.325	10.780±0.712	67.200±2.871	3.600±0.400	4.000±0.632	25.200±2.577
5	10.300±0.644	7.756±0.283	10.880±0.740	70.400±2.315	4.800±0.490	3.200±0.490	21.600±2.482
7	10.500±0.592	7.744±0.245	10.680±0.920	67.600±2.482	4.000±1.095	4.400±0.783	24.000±3.033

Note: Values within a column did not differ significantly (P>0.05)

been reported to cause nephrotoxicity, hepatotoxicity, abnormal hemostasis and few other adverse effects in human (Saxon *et al*., 1987; Quin, 1989; Donowitz, 1989). There appears no report available documenting any adverse effects of cefquinome administration in camel.

In the present study, intramuscular cefquinome administration at the rate of 1 mg/ kg body weight once daily to five adult camels for five consecutive days did not reveal any clinical symptoms in any animal suggestive to adverse drug reaction. Changes in various haematological and plasma biochemical parameters on different observation days are given in Table 1 and 2, respectively. Values of different haemtological parameters did not differ significantly (i.e. P<0.05) on different observation day in animals receiving cefquinome. Different hematologial parameters remained within the normal reported range in camel (Weiss and Wardrop, 2010; Narnaware *et al*., 2016). Plasma biochemical parameters did not show any significant change on different observation day. Values of different parameters including SGOT (AST), SGPT (ALT), alkaline phosphatase (AKLP), urea, creatinine, total protein and albumin were all within the normal reported range.

In corroboration of the present study, intramuscular administration of cefquinome at a dose of 1 mg/kg once daily for 14 days in adult female dogs did not induce any major effect on biochemical and hematological variables (Maden *et al*., 2001). Likewise, no significant changes in blood biochemical parameters including AST, ALT, GGTP and AKLP were recorded in buffalo calves receiving once daily intramuscular cefquinome injection continuously for 7 days, though different hematological parameters varied significantly (Mangal and Sharma, 2015). However, the author reported significant increase in blood urea nitrogen and creatinine levels and was noted on day 2 and 3. Among haematological parameters, there was significant variation in the levels of haemoglobin, total erythrocyte count, erythrocyte sedimentation rate, mean corpuscular volume, mean corpuscular haemoglobin, and mean corpuscular haemoglobin concentration in treated animals, but no abnormal clinical symptoms were observed in any animal receiving cefquinome (Mangal and Sharma, 2015). Rana (2014) also recorded no significant change in hematological and blood biochemical parameters following cefquinome and tolfenamic acid for 5 consecutive days in sheep. Maden *et al*. (2001) investigated the effects of cefquinome administration on clinical, biochemical, haematological and blood gas variables in five healthy dogs after administration of cefquinome @ 1 mg/ kg b.wt. once daily for 14 days. No significant effect on clinical, biochemical and haematological variables were recorded in treated dogs, however, certain blood gas variables evidenced significant alterations.

Table 2. Changes in biochemical parameters in camel receiving cefquinome injections.

Day	Parameter						
	SGOT (U/L)	SGPT (U/L)	AKLP (U/L)	Urea (mg/dl)	Creatinine (mg/dl)	Total protein (g/dl)	Albumin (g/dl)
0	102.624±2.366	13.140±1.099	122.064±24.142	3.902±0.425	1.206±0.164	6.194±0.133	2.540±0.116
3	101.594±4.641	12.720±1.098	127.548±13.160	3.894±0.373	1.112±0.098	6.282±0.267	2.536±0.214
5	102.172±2.567	12.762±0.810	136.166±17.448	3.974±0.693	1.130±0.120	6.402±0.444	2.644±0.218
7	101.668±4.305	13.230±1.642	107.488±14.804	3.620±0.389	1.124±0.106	6.104±0.417	2.478±0.168

Note: Values within a column did not differ significantly (P>0.05)

Therefore, from the results of the present study, it can be concluded that intramuscular administration of cefquinome at the rate of 1 mg/ kg body weight once daily is safe in camel.

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