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Study of serum levels of cefquinome in buffalo calves by using microbiological assay method

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Abstract
For this study, 12 buffalo calves of either sex were selected. A group of six buffalo calves was administered with cefquinome @ 2 mg/kg by intramuscular route and another group of six buffalo calves was administered with cefquinome @ 2 mg/kg by intravenous route. The serum cefquinome concentrations in buffalo calves were determined up to 24 hrs after drug administration by using microbiological assay method. In the present study the therapeutic concentrations of cefquinome were maintained for more than 8 hours (0.007 ± 0.003mcg/ml) after intravenous administration and intramuscular administration and at the time of 10th hr sampling the cefquinome was not detected in serum after either intramuscular or intravenous administration

Keywords: Serum levels, cefquinome, buffalo calves, microbiological assay

Introduction
Cefquinome, an aminothiazolyl cephalosporin is a member of the 4th generation of cephalosporin's which have been developed solely for veterinary use [5][6]. To decide the drug dose administration interval it is necessary to study the serum levels of cefquinome at different intervals of drug administration. Therefore the present study was planned to study the serum levels of cefquinome in buffalo calves by using microbiological assay method after intramuscular and intravenous administration of cefquinome.

Materials and method
For this study, 12 buffalo calves of either sex were selected. A group of six buffalo calves was administered with cefquinome @ 2 mg/kg by intramuscular route and another group of six buffalo calves was administered with cefquinome @ 2 mg/kg by intravenous route. The serum cefquinome concentrations in buffalo calves were determined up to 24 hrs after drug administration by using microbiological assay technique using large glass plate[1][2][3]. The serum cefquinome levels data were analyzed by randomized block design and the significance was tested at 5% and 1% levels as per [7].

Results and discussion
The serum cefquinome concentrations in buffalo calves of around one year of age were determined up to 24 hrs after drug administration by using microbiological assay method. The mean serum cefquinome concentrations at different time intervals in each buffalo calves after administration of single dose (2 mg/kg body weight) by intravenous and intramuscular routes are presented in Table nos. 1 and 2 respectively.
The zero time concentration (C^0p) of cefquinome in buffalo calves receiving cefquinome by intravenous route of administration was found to be 2.107 ± 0.218 mcg/ml and the serum cefquinome concentrations as shown in Table 1, were detectable up to 8 hours (0.007 ± 0.003mcg/ml) post administration. The maximum serum cefquinome concentration observed was 1.742 ± 0.151 mcg/ml at 0.0416 hrs (2.5 min) of sampling time. The therapeutic concentrations of cefquinome were maintained up to 8 hours after intravenous administration..
As shown in Table 2, the peak serum concentration (C max) of cefquinome was 2.29 ± 0.101 mcg/ml and it was observed at 0.75 hour (45 minutes) after administration of cefquinome by intramuscular route in buffalo calves. The cefquinome was detectable in serum up to 8 hours which was 0.025 ± 0.010 mcg/ml after intramuscular administration. The therapeutic cefquinome concentrations were maintained up to 8 hours after.

The serum cefquinome concentrations were not detectable in buffalo calves at 10 hrs of sampling either after intramuscular or intravenous administration.

The results of the present study are similar to the results observed by [4] with maximum serum concentration of 3.19 ± 1.68 mcg/ml at 0.85 ±0.118 hrs in calves after intramuscular administration of cefquinome @ 1 mg/kg body weight. [5] reported C-max 4.5 mcg/ml at 2.0 hrs after cefquinome administration @ 10 mg/kg in calves.

Table 1: Serum concentration of cefquinome at different time intervals after intravenous administration (2 mg/kg B.W.) in buffalo calves.

Time (in hrs)	Concentrations (mcg/ml) in Buffalo calve						Mean	SDTV	± S.E.
	B1	B2	B3	B4	B5	B6			
0	0	0	0	0	0	0	0	0	0
0.0416	1.45	1.95	1.60	1.45	2.40	1.60	1.74	0.371	0.151
0.0833	1.20	1.35	1.35	1.20	1.80	1.35	1.38	0.221	0.090
0.0167	0.98	0.80	0.88	0.98	1.60	0.98	1.04	0.285	0.117
0.25	0.66	0.66	0.67	0.80	1.35	0.80	0.82	0.267	0.109
0.5	0.54	0.54	0.50	0.60	1.05	0.49	0.62	0.215	0.088
1.0	0.35	0.40	0.40	0.54	0.80	0.26	0.46	0.191	0.078
2.0	0.18	0.29	0.28	0.22	0.49	0.14	0.26	0.123	0.050
4.0	0.09	0.12	0.16	0.14	0.16	0.08	0.13	0.033	0.013
60.	0.08	0.08	0.07	0.07	0.08	0.07	0.08	0.007	0.003
8.0	0.06	0.06	0.04	0.06	0.05	0.05	0.05	0.007	0.003
10.0	ND	ND	ND	ND	ND	ND	---	----	----

ND=not detected

Table 2: Serum concentration of cefquinome at different time intervals after Intramuscular administration (2 mg/kg B.W.) in buffalo calves

Time (in hrs)	Concentrations (mcg/ml) in Buffalo calve						Mean	SDTV	S.E.
	B1	B2	B3	B4	B5	B6			
0	0	0	0	0	0	0	0	0	0
0.25	1.50	1.60	1.45	1.30	1.25	1.20	1.38	0.157	0.064
0.50	2.10	2.25	1.95	1.65	2.20	1.95	2.02	0.218	0.089
0.75	2.40	2.55	2.20	1.95	2.55	2.10	2.29	0.248	0.101
1.00	1.65	1.65	1.65	1.45	1.80	1.80	1.67	0.129	0.053
1.50	0.98	0.90	1.05	0.90	1.30	1.25	1.06	0.174	0.071
2.00	0.60	0.58	0.66	0.62	0.90	0.90	0.71	0.150	0.061
4.00	0.35	0.33	0.38	0.33	0.54	0.40	0.39	0.079	0.032
6.00	0.18	0.18	0.19	0.19	0.32	0.18	0.21	0.057	0.023
8.00	0.12	0.12	0.13	0.13	0.16	0.08	0.12	0.025	0.010
10.00	ND	ND	ND	ND	ND	ND	--	--	--

ND=not detected

Conclusion

It was concluded that the serum concentration of cefquinome was maintained upto 8 hours of intramuscular and intravenous administration of cefquinome in buffalo calves @ 2 mg/Kg body weight. At the time of 10th hr sampling the cefquinome was not detected in serum after either intramuscular or intravenous administration.

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