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RESEARCH ARTICLE



²Blood Biochemical Studies of Enrofloxacin in Yak after Intravenous Administration Article Title

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8 ABSTRACT

The blood biochemical parameters were investigated in yak (Bos grunniens L) after intravenous adminiostration of 5 mg/kg enrofloxacin. Blood samples were collected from the jugular vein daily for 5 days after the initiation of drug administration. Heparinized blood samples were collected for determination of 12 mean corpuscular volume (MCV), erythrocyte sedimentation rate (ESR), hemoglubin (Hb) estimation and 13 serum was collected for estimation of total protein, albumin, globulin, urea and blood glucose. Results of 14 hematological and blood chemistry profile revealed that enrofloxacin did not change above mentioned 15 parameters significantly. Therefore, the drug might be used safely in the yaks.

16 Keywords: Enrofloxacin, Yak, Blood chemistry, Hematology

Enrofloxacin, a fluroquinolone antimicrobial is ap-44 clinically to evaluate health status and to rule out the 18 proved exclusively for veterinary use and has a broad 45 possibility of any diseases. They were housed in the 19spectrum of antibacterial activity with MIC values rang- 46animal shed with concrete floor and were maintained on 20ing from 0.008 to 0.06µg/ml. It has wide spread distri- 47 green fodder, dry grass and concentrate. Water was pro-21 bution to most tissues and body fluids with a potential 48 vided ad libitum. 22therapeutic application in many types of infections. 23Hence, it is effectively used in the treatment of septice-24 mia, respiratory tract, urinary tract, skin, soft tissues, 50 25bone and joint infections. Yak (Bos grunniens L), being 51male yaks. Blood samples (12 ml) were collected by 26 the most ecologically sustainable animal resource of 52 jugular vein puncture just before drug administration 27 Indian Himalayas, is the mainstay for highlanders, pro- 53 (normal/control), 30 minutes after drug administration 28viding basic needs in terms of meat, milk, hair wool 54 and on 24 hours intervals for 5 days. 4 ml aliquots of 29 and transportation in hilly terrain. For safety of admini- 55 collected blood were transferred to vials containing 30 stration in various animals, biochemical properties of 56 heparin as anticoagulant in order to estimate haemoglo-31 enrofloxacin have been carried out in cattle [1], buffalo 57 bin, PCV and ESR. Remaining 8ml of blood samples 32[2] and goat [3]. However, available data are inade- 58were kept in clean dry wide mouthed tubes in slanting aquate to warrant effective clinical use of enrofloxacin in 59 position at room temperature to separate serum for esti-34 yak. In the light of the above reports, it was decided to 60 mation of total serum protein, albumin, globulin, urea, 35 study possible biochemical and hematological changes 61 and blood glucose. 36 in yak after intravenous administration of enrofloxacin.

MATERIALS AND METHODS

38 Experimental animals

40 grunniens L) reared in the National Research Centre on 68 micro-haematocrit method as described by Prasad in 41 Yak, Nykmadung Farm, Dirang, Arunachal Pradesh, 691992 [5], and ESR by standard Wintrobe method. Bio-42India. The animals were weighing between 270-330 kg 70 chemical analyses of samples were performed to meas-43 and 2 1/2- 31/2 years of age. The animals were examined 71 ure glucose, total protein, albumin, blood urea nitrogen

49 Experimental design

The study was conducted in six clinically healthy

62 Estimation of biochemical and hematological prop-63 erties:

Standard procedures were followed for quantitative 65 determination of biochemical and hematological proper-66 ties. Haemoglobin was determined by acid hematin The study was conducted in six male yaks (Bos 67 method described by Barker et al in 1965 [4], PCV by

138 | IJPT | July 2007 | vol. 6 | no. 2

Khargharia et al.

Table 1 Mean (n = 5) hematological and biochemical parameters after i v administration of enrofloxacin (5mg/kg) in Yak

| | | U | 1 | | | | | |
|-----------------|-------------------------|------------------------|-------------------------|------------------------|------------------------|------------------------|--------------------------|-------------------------|
| Day | Hb | ESR | PCV | Protein | Albumin | Globulin | Glucose | Urea |
| | (g%) | (mm/24 h) | (%) | (g %) | (g/dl) | (g/dl) | (mg/dl) | (mg/dl) |
| Normal | 12.17±0.55 ^a | 6.97±0.35 ^a | 46.50±0.64ª | 5.03±0.06 ^a | 2.69±0.14 ^a | 2.14±0.09 ^a | 42.82±1.01ª | 30.24±2.02ª |
| 1 st | 12.05±0.45 ^a | $6.67{\pm}0.57^{a}$ | 46.37±1.79 ^a | 5.79±0.39 ^a | $3.20{\pm}0.11^{a}$ | $2.59{\pm}0.10^{a}$ | 124.60±3.01 ^b | 49.01 ± 2.46^{b} |
| 2^{nd} | 12.57±0.42ª | 7.08 ± 0.56^{a} | 43.90±1.49 ^a | 5.63±0.34 ^a | 3.15±0.11 ^a | $2.44{\pm}0.09^{a}$ | 78.91±1.71° | 89.04±3.11° |
| 3 rd | 12.03±0.47 ^a | $6.75{\pm}0.50^{a}$ | 45.00±1.42 ^a | 5.17±0.34 ^a | $2.91{\pm}0.14^{a}$ | $2.27{\pm}0.16^{a}$ | 57.97±2.43 ^b | 60.36 ± 2.99^{b} |
| 4^{th} | 12.66±0.46 ^a | $6.25{\pm}0.40^{a}$ | 46.66±2.13 ^a | $5.27{\pm}0.42^{a}$ | $2.87{\pm}0.13^{a}$ | 2.39±0.14 ^a | 51.32±2.35 ^a | 47.39±4.68 ^a |
| 5 th | 13.46±0.40 ^a | $7.42{\pm}0.40^{a}$ | 40.71±1.11ª | 5.63±0.38 ^a | 3.01±0.13 ^a | 2.62±0.12 ^a | 45.12±2.02 ^a | 38.00±3.96ª |

Having same superscripts no significant difference (p<0.05)

Having different superscripts significant difference (p < 0.05)

72 and globulin as described in literature supplied with the 113 tion of enrofloxacin. The mean level of protein, albu-73kits. For estimation of blood glucose, albumin, total114min, and globulin in present study did not show signifi-74 serum protein and blood urea nitrogen, a UV spectro-115 cant difference and was consistent with data reported by 75 photometer (Systronic) was used at wavelength 630,116 Nath et al., 2000 [9].

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76555 and 480 nm respectively in accordance with pro-117 77vided instructions. Results were calculated according to 118rofloxacin intravenously at a rate of 5 mg/kg body 78 the formula provided in kit.

80 Statistical analysis

Analysis of variance was used to detect differences 122 REFERENCES 82between means for hematological and biochemical pa-83 rameters. p values < 0.05 were considered to be statisti-124 84 cally significant.

RESULTS

The results obtained in the study are presented in the 1303 87 Table 1.

DISCUSSION

Mean (n=5) hematological and biochemical results 90after intravenous administration of enrofloxacin₁₃₈₅. 91(5mg/kg) in yak are presented in Table 1. In the present139 92study, it is observed that blood glucose level increases¹⁴⁰⁶. 93after intravenous injection of enrofloxacin in yak. This¹⁴¹₁₄₂₇. 94 might be due to stress which is developed due to re- $\frac{142}{143}$ 95 peated puncture of the jugular vein which in turn trig-1448. 96 gers the release of epinephrine from adrenal medulla,145 97stimulating glycogen breakdown and also inhibits gly-140 98 cogen synthesis in the liver, thus directing all available 148 99glucose residue and precursors into the production of 149 100 free blood glucose [6]. It was observed that blood urea¹⁵⁰ 101 level increased significantly. This was probably due to 102 intravenous administration of enrofloxacin, which inhib-151 CURRENT AUTHOR ADDRESSES 103 its the growth of enteric organisms that synthesize en-152 Sanjib Khargharia, Department of Pharmacology and Toxicology, 104zyme urease responsible for breakdown of urea to am-153 105monia in the G.I. tract. As a result, urea passes from 106 intestine to blood and elevates the blood urea level [7].

The normal level of Hb, ESR and PCV of adult yak 157108 are 12.8 g/dl, 6-10 mm/24 h and 36.0% respectively as 158 109 reported by Nivasarkar et al., 1998 [8]. In the present 159 Nabin Nath, Department of Animal Physiology and Biochemistry, 110study Hb, ESR and PCV values are consistent with the 160 111previous report and there was no significance effect on¹⁶¹

The present study suggests that administration of en-119 weight in yak does not change the hematology and bio-120 chemical profile of the animal; hence it is suggested for 121 clinical use,

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112Hb, ESR and PCV values after intravenous administra-162M.Bhattachrya, Director NRC Yak, Dirang, Arunachal Pradesh, India.