Biochemical Alteration Induced After Intramuscular Administration of Long Acting Moxifloxacin in Sheep

Chirag M Modi*, Shailesh K Mody and Hitesh B Patel
Department of Pharmacology and Toxicology, College of Veterinary Science and Animal Husbandry, Sardarkrushinagar Dantiwada Agriculture University, Sardarkrushinagar, North Gujarat, Dantiwada, India

Abstract
The present study was conducted with objective to study biochemical alterations induced after single intramuscular administration of long acting moxifloxacin at the dose rate of 7.5 mg/kg body weight in six healthy male sheep. After deep intramuscular injection of moxifloxacin, blood samples in collected K_3EDTA at 0, 6, 12 hour and 2, 3, 4, 5, 6, 7th day after treatment were analyzed for biochemical Aspartate Aminotransferase (AST), Alanine aminotransferase (ALT), Alkaline Phosphatase (AKP), Acid Phosphatase (ACP), plasma creatinine, plasma Creatine kinase-MB, Blood glucose and Total bilirubin analysis. The results of the study clearly demonstrated that single intramuscular administration of long acting moxifloxacin in sheep at 7.5 mg/kg body weight did not cause any significant change in values of biochemical parameters in sheep with total absent of clinical signs of adverse reactions or toxicity.

Keywords: Long acting moxifloxacin; Sheep; Fluoroquinolone; Antibacterial

Introduction
The fluoroquinolones are the fastest growing antibacterial class in terms of global revenue, increasingly being used in dairy animals to treat a wide range of infectious diseases [1]. Moxifloxacin is a novel fourth generation with a broad spectrum of antibacterial activity against organisms Gram-positive and Gram-negative bacteria, anaerobes and atypical organism such as Mycoplasma and Chlamydia spp. [2]. It has the highest potency in its class against Staphylococcus aureus and Staphylococcus epidermidis which are the common pathogens causes mastitis and other bacterial infections in domestic animals including in sheep [3]. It’s spectrum of activity and pharmacokinetic properties favour its use in veterinary practice. Long acting moxifloxacin advantage over conventional moxifloxacin with respect to its longer duration of effect and frequency of dosing. Biochemical alteration as a part of safety profile induced by moxifloxacin needs to be assessed before it is recommended for clinical application in treatment of infections caused by sensitive organism in sheep. So present study was planned to investigate the biochemical alteration induced after single intramuscular administration of long acting moxifloxacin in sheep.

Materials and Methods

Experimental animals
The present study was conducted on six healthy male sheep weighing 35–40 kg. The study protocol was approved by the animal ethics committee. Animals were procured from Livestock Research Station, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Dantiwada, and housed in separate pen at research station. All animals were maintained on standard ration, and water was provided ad libitum. All animals were acclimatized for period of 15 days and observed clinically daily to rule out presence of any disease.

Drugs and Chemicals
Long acting moxifloxacin (10% moxifloxacin in solution with L-arginine, N-butyl alcohol and benzyl alcohol) injectable solution and moxifloxacin base powder were obtained from INTAS Animal health, Gujarat, India. Reagent kits for biochemical studying were purchased from Merck specialities private limited, Mumbai.

Experimental design and drug administration
All the six animals were treated with long acting moxifloxacin at a dose rate of 7.5 mg/kg body weight after intramuscular administration in deep gluteal muscle. Blood samples were collected from jugular vein into sterile K_3EDTA test tubes at o day (before drug administration) and on 6h, 12 h, 1, 2, 3, 4, 5, 6, and 7th day for biochemical analysis. The biochemical parameters of Aspartate Aminotransferase (AST), Alanine Aminotransferase (ALT), Alkaline Phosphatase (AKP), Acid Phosphatase (ACP), plasma creatinine, plasma Creatine kinase-MB, Blood glucose and Total bilirubin were analyzed by using automatic Clinical Analyzer (Systronics). Analysis of variance was used to detect differences between means for biochemical parameters. Statistical analysis of data was done by software SPSS (Version 12.0.1).

Results and Discussion
The safety study of long acting moxifloxacin in large animal has not been reported but safety profile of other fluoroquinolones like ciprofloxacin, enrofloxacin and levofloxacin was investigated in different species of domestic animal by different research group [4-6]. Fluoroquinolone as class are generally well tolerated with mild adverse reaction. The adverse reactions are of cell limiting in nature and does not need treatment to be discontinued [7,8].

In our study, it has been demonstrated that long acting moxifloxacin at the dose rate of 7.5 mg/kg body weight in sheep was found safe and well tolerated. The

*Corresponding author: Chirag M Modi, Department of Pharmacology and Toxicology, College of Veterinary Science and Animal Husbandry, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat-385506, India, Tel: +91-9924872823; Fax: 02748-278263; E-mail: chiragvets@yahoo.co.in

Received June 06, 2013; Accepted July 03, 2013. Published July 10, 2013


Copyright: © 2013 Modi CM, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
biochemical parameters of sheep treated with single dose of long acting moxifloxacin (7.5 mg/kg) were given in Table 1.

It is evident that of biochemical parameters observed before treatment and after treatment did not offer significant (P<0.05). The results are in agreement with study repeated by Sadaria et al. [9] in wistar rats. Similarly Kubin and Reiter [10] also concluded that moxifloxacin is safe and well tolerated in human. Other fluoroquinolones like ciprofloxacin when given repeated in calves at intramuscular dose in calves did not cause any significant alteration in the values of biochemical parameters [4]. The same conclusion was also obtained for enrofloxacin in yak [5] and levofloxacin in layer birds [9].

In conclusion, lack of clinical signs of adverse reactions and absence of significant biochemical alteration following intramuscular administration may be open a new avenue for insight into the strategy for clinical treatment of various bacterial diseases in sheep. In future the drug may be potential candidates to be used in the treatment of infectious diseases in sheep.

Acknowledgement

The authors are highly grateful to Sardarkrushinagar Dantiwada Agriculture University, Sardarkrushinagar, North Gujarat, India for providing fund and facilities for smoothly conducting of research work. Animal facilities along with housing and feed provided by Livestock Research Station, SD Agricultural University, Gujarat, India is highly acknowledged. All values in treatment groups are not significantly different (p>0.05) when compared to control (0 h).

References


Table 1: Biochemical parameters (Mean ± S.E) after single intramuscular administration of long acting moxifloxacin (7.5 mg/kg of body weight) in male sheep.