The pharmacokinetics of transdermal flunixin meglumine in Holstein calves

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Introduction

Flunixin meglumine is the only nonsteroidal anti-inflammatory drug (NSAID) in the US approved for use in cattle. A novel formulation of flunixin meglumine intended as a pour-on application for transdermal absorption is approved in the European Union. Like the injectable product, it is only labelled to treat pyrexia associated with bovine respiratory disease and acute mastitis. The aim of this study was to describe the pharmacokinetics of flunixin meglumine when administered as a transdermal topical preparation.

Materials and Methods

Eight male Holstein calves, age 6 to 8 weeks, were administered flunixin at a dose of 1 mg/lb (2.2 mg/kg) intravenously. Following a 10-day washout period, calves were treated with the label dose of flunixin at 1.5 mg/lb (3.33 mg/kg) topically (transdermal). Blood samples were collected at predetermined times from 0 to 48 hours for the intravenous portions and 0 to 72 hours following topical dosing. Plasma drug concentrations were determined using liquid chromatography with mass spectroscopy. Pharmacokinetic analysis was completed using non-compartmental methods.

Results

The mean bioavailability of topical flunixin was calculated to be 48%. The mean area under the curve for flunixin was determined to be 13.9 h×ug/mL for IV administration and 10.1 h×ug/mL for topical administration. The mean half-life for topical flunixin was 6.42 h, and 4.99 h for the intravenous route. The Cmax following topical application of flunixin was 1.17 µg/mL. The time to maximum concentration was 2.14 h. Mean residence time following IV injection was 4.38 h, and 8.36 h after topical administration.

Significance

In conclusion, flunixin when administered as a topical preparation is rapidly absorbed and has longer half-life compared to IV administration.