

عنوان مقاله:

Plasma pharmacokinetics of pioglitazone following oral or intravenous administration in Holstein cows

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خلاصه مقاله:

Pioglitazone belongs to the thiazolidinedione (TZD) class of antidiabetic agents, with proven efficacy in increasing insulin sensitivity and in the treatment of type 2 diabetes mellitus in humans. Pioglitazone has been proposed as a potential feed additive to reduce insulin resistance and consequently some of the metabolic disorders in transition cows. This study was aimed at determining the pharmacokinetic parameters of pioglitazone following oral administration (PO) or intravenous (IV) injection. Six lactating Holstein cows were randomly assigned into two groups ($n=3$ cows per group) in a crossover design, and administered with pioglitazone (8 mg/kg BW) either per-oral (PO) or intravenously (IV), with an 8-day washout period. Blood samples were collected from the jugular vein before and up to 48 h after pioglitazone administration. Plasma pioglitazone concentration was determined by HPLC. The data were analyzed using a non-compartmental model for PO route, and a two-compartmental model for the IV route. The bioavailability of PO-administered pioglitazone was 58% and the highest plasma concentration (C_{\max}), the time (t_{\max}) at which the drug reached C_{\max} , half-life ($t_{1/2}$), absorption rate constant (k_{ab}) and elimination rate constant (k_{el}) were $11.57 \pm 1.44 \text{ } \mu\text{g/mL}$, $5.67 \pm 0.07 \text{ h}$, $7.10 \pm 0.32 \text{ h}$, $0.28 \pm 0.09 \text{ h}^{-1}$ and $0.10 \pm 0.03 \text{ h}^{-1}$, respectively. Elimination half-life ($t_{1/2\beta}$), volume distribution (V_{ss}) and elimination rate constant (k_{el}) after IV injection were $5.10 \pm 0.62 \text{ h}$, $0.12 \pm 0.01 \text{ L/kg}$ and $0.47 \pm 0.06 \text{ h}^{-1}$, respectively. Because of the relatively high bioavailability and half-life, pioglitazone may be useful for oral administration as an insulin-sensitizing agent in dairy cows.

کلمات کلیدی:

Bioavailability, Pharmacokinetics, Pioglitazone insulin resistance, Dairy cow

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