

# Pharmacokinetics and adverse reactions to fentanyl transdermal patches in healthy and hospitalized calves

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## Introduction

Fentanyl is a mu opioid receptor agonist that has been used for analgesia in multiple species. One of the more common routes of administration of fentanyl is the transdermal route. There have been multiple reports of the use of Fentanyl Transdermal Patches (FTP) in large animal practice as a longer-term method of analgesia. The use of the patches has been described for analgesia in horses, sheep, goats, pigs, and llamas, but there is no data available for the use of this extended-release formulation in cattle.

## Materials and Methods

The primary objectives of this study were to determine the pharmacokinetics (PK) and effect of fentanyl transdermal patches in healthy and hospitalized bovine calves.

## Results

Three patient calves and 5 healthy calves had fentanyl patches applied as described for sheep. Six out of the 8 calves exhibited episodes of tachycardia, tachypnea, bellowing, and ataxia. These signs resolved within 2 to 6 hours in 6 calves when the patches were removed, and a commercial opioid antagonist was administered to 2 calves. Maximum concentration ranged from 0.726 to 3.292 ug/mL, and a time to maximum concentration ranged from 4 to 10 hours at the time of patch removal due to clinical presentation.

## Significance

The adverse effects of the administration of fentanyl patches in calves requires more research to determine an appropriate clinical regimen and environment for this sustained-delivery therapy.

# Comparison of ionized calcium concentrations using an Abaxis Vetscan iSTAT with a Horiba LAQUAtwin calcium meter in dairy cows fed low, medium, and high calcium DCAD rations and challenged with EGTA

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## Introduction

Prepartum feeding of a negative dietary cation-anion difference (-DCAD) ration has proved to be an effective method of preventing hypocalcemia. However, the optimum Ca concentration to feed with -DCAD rations has not been determined. We conducted an experiment to assess the implications of feeding a low, medium, and high concentration Ca -DCAD ration on the ability of a cow to respond to an induction of hypocalcemia.

## Materials and Methods

Three groups of non-lactating, non-pregnant Holstein cows were fed -DCAD rations (15.1 mEq/100 g DM) for 21 d with low (LC = 0.45% Ca; n=5), medium (MC = 1.13% Ca; n=6) or high (HC = 2.02% Ca; n=6) concentrations of dietary Ca and then subjected to a controlled induction of hypocalcemia to determine the ability of cows to respond to the challenge based on dietary Ca. On d 22, 23, and 24 hypocalcemia was induced using an intravenous infusion of 5% ethylene glycol