

Failure of high-capacity pneumatic darts to consistently deliver tulathromycin to calves after remote drug delivery

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Introduction

Remote drug delivery (RDD) using pneumatic darts is becoming widespread in beef production systems with an estimated 4 million darts sold last year. Data concerning the impact of pneumatic dart delivery of antimicrobials in cattle are deficient in the published literature. In this report we describe a case of failure of high-capacity pneumatic darts to consistently deliver tulathromycin to calves after RDD.

Materials and Methods

Fifteen calves weighing between 748 lb (340 kg) and 906 lb (412 kg) received 10 mL of tulathromycin (Draxxin®, Zoetis) injected using a Type U 10.0 cc 3/4 inch 14 gauge needle (Gel collar) pneumatic dart (Pneu-Dart®) administered with a Model 178B breech loading projector. Calves were restrained in a mobile chute and the dart was delivered over a fixed distance of 30 feet (9.1 m) in accordance with the manufacturer's instructions. After RDD, blood samples were

collected for tulathromycin, CK, and AST determination, and injection sites were examined over 24 h.

Results

Darts remained in-situ for 1.07 ± 0.01 hours after RDD. Four of 15 calves failed to develop significant injection site lesions at 24 h and had no detectable plasma tulathromycin concentrations after RDD. Furthermore, CK concentrations were also significantly lower in these 4 calves at 12, 24 and 48 h ($P < 0.05$) post-injection. Darts recovered from calves without injection site reactions weighed 24 g compared to 13.5 g.

Significance

RDD of tulathromycin was unsuccessful in 4 of 15 calves. Given the low incidence of dart recovery reported in practice, this finding has important implications for the welfare of sick calves treated using RDD technology.

Does dart gun delivery of antibiotics cause changes in drug disposition or meat quality?

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Introduction

Use of remote delivery devices in non-restrained cattle has increased in the last few years, and it is unknown whether this route will result in subcutaneous delivery, appropriate drug levels, or tissue damage. The objectives were to assess the plasma disposition of labeled doses of tulathromycin, tildipirosin, and ceftiofur crystalline free acid (CCFA) delivered via dart and to determine impact on meat quality.

Materials and Methods

Forty steers were administered CCFA, tulathromycin, tildipirosin, or saline via dart. Type 'U' RDD (14 gauge, 3/4 inch cannula with Gel Collar end port discharge) darts were delivered via Pneu-Dart's X-Caliber Gauged CO2 Projector/Rifle, 25 feet (7.6 m) from the cattle, and into the left biceps femoris muscle. Blood samples were collected for 10 days after drug administration. Animals were fed to slaughter

weight, and muscle samples from bottom round steaks were harvested from the darted area and the non-darted side for Warner-Bratzler Shear Force analysis.

Results

Mean maximum plasma or serum concentrations (C_{max}) were: CCFA: 127±93 ng/ml; tildipirosin: 360±41 ng/ml (outlier removed); tulathromycin: 498±257 ng/ml (outlier removed). Elimination half-lives were: CCFA: 74±40 hr; tildipirosin: 77±15 hr; tulathromycin: 96±22 hr. Bottom round steaks from the non-darted side tended to be more

tender than steaks from the darted side ($p=0.08$). Steaks from cattle treated with saline or CCFA were significantly more tender than those treated with tulathromycin or tildipirosin ($p=0.003$). Steaks from tildipirosin-treated cattle were significantly less tender on the darted side than the non-darted side ($p<0.05$).

Significance

Dart delivery of antibiotics may result in changes in tenderness and somewhat altered plasma pharmacokinetics.

Relationship between trauma observed during unloading and carcass bruise prevalence in finished cattle at commercial slaughter facilities

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Introduction

Bruising in cattle is an indicator of poor welfare, as well as a significant cause of economic loss due to decreased carcass value. Vehicle design, transport conditions, and loading/unloading procedures are considered potential sources of carcass bruising; however, none of these have been explored extensively. The objective of the current study was to determine whether a relationship exists between trauma incurred during unloading and prevalence of carcass bruising in finished beef cattle at commercial slaughter facilities.

Materials and Methods

Carcass bruises were categorized by location and size, according to the Harvest Audit Program™ Carcass Bruise Scoring System. Traumatic events were observed as cattle exited trailers onto the unloading docks, and were categorized as "back," "shoulder," or "rib/hip" events. Descriptive statistics are reported, as well as simple linear regression models developed to explore the relationship between overall carcass bruising and traumatic events, and the relationships between bruising and traumatic events in the 3 categories 'back,' 'shoulder,' 'rib/hip.'

Results

Average carcass bruise prevalence per lot was 67.60% (+ 1.16%). Average prevalence of bruises along the dorsal midline was 53.52% (+ 1.12%). Bruising along the left and right sides of the carcass averaged 19.98% (+ 1.04%) and 26.49% (+ 1.10%), respectively. Average traumatic event prevalence per lot was 20.75% (+ 1.12%). Average prevalence for small, medium, and large bruises were 28.64% (+ 1.31%), 41.77% (+ 0.97%), and 29.58% (+ 1.81%), respectively. Regression analysis revealed an R² of 0.08 when comparing overall carcass bruise prevalence with traumatic event prevalence.

Significance

The correlation between traumatic events and carcass bruising is quite low, indicating that bruising likely occurs at numerous other points prior to and during the transportation process, including loading and transport. These areas should be explored to determine all potential causes of bruising in beef carcasses, and to help implement prevention practices.