

Efficacy of Liver Abscess Vaccines in Natural-fed Finishing Cattle and the Impact of Liver Abscesses on Performance and Carcass Characteristics

J.T. Fox, MS, PhD¹; D.U. Thomson, MS, PhD, DVM¹; N.N. Lindberg, DVM²; K. Barling, DVM, PhD³

¹College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506

²Progressive Beef Consulting Service, Great Bend, KS

³Novartis Animal Health, Greensboro, NC

Introduction

Liver abscesses occur in finishing cattle as a sequela to high-concentrate diets. Reductions in daily gain and feed efficiency, as well as loss of carcass yield occur as a result of abscessed livers. A common practice to reduce the incidence of liver abscesses is the feeding of antimicrobials. However, the demand for organic and natural beef in the US is on the rise and cattle reared in these systems typically cannot receive antimicrobials. These production systems do, however, allow the use of vaccines making them a potential alternative method for control of liver abscess. Two commercial vaccines are available for this use, Fusogard®, marketed by Novartis Animal Health, and Centurion™ marketed by Schering-Plough Animal Health. Our objectives were to evaluate the efficacy of these vaccines to prevent liver abscesses in finishing cattle not fed antimicrobials or ionophores, and to evaluate the impact of liver abscesses at harvest on previous feedlot performance and carcass characteristics.

Materials and Methods

Cattle (n=1,307) were enrolled in the study upon arrival to the feedyard. Cattle were randomly assigned to treatments: control, Fusogard vaccinated or Centurion vaccinated. Cattle were fed a steam flaked corn based finishing ration that did not contain tylosin or ionophores. Body weights were recorded on arrival at the feedlot and at 60 days on feed. Once weekly cattle were evaluated and selected for harvest. At harvest, hot carcass weight, yield grade and quality grade were determined by plant workers and USDA graders at a commercial abattoir. Livers were also evaluated and assigned a liver abscess score by members of the research team who were blinded as to treatment allocation. Scoring of livers was in accordance with the Elanco Animal Health system: 0, no abscesses; A-, one or two small abscesses; A, two to four well-organized abscesses less than one inch (2.5cm) in diameter; or A+, one or more abscesses greater than one inch (2.5cm) in diameter. Further classifications of liver abscess data were made and included the presence of a liver abscess (A-, A, or A+) and the presence of a severe liver abscess (A or A+).

Results

Prevalence of liver abscesses (56%) and severe liver abscesses (39%) was relatively high in this study. Lot number impacted prevalence and severity of liver abscesses and all performance parameters, suggesting cattle may be predisposed to abscesses upon entry and that different lots of cattle perform differently, as expected. Treatment did not impact prevalence estimates of liver abscesses (Control = 56%; Fusogard = 59%; Centurion = 58%,) or severe liver abscesses (Control = 38%; Fusogard = 40%; Centurion = 40%), $P>0.60$, nor did it impact liver abscess scores ($P=0.61$). Initial body weight (mean \pm standard deviation, 613 \pm 71 lb (278 \pm 32.2kg)), 60-day body weight (795 \pm 83 lb (361 \pm 38kg)), 60-day ADG (3.04 \pm 1.1 lbs/day (1.39 \pm .5kg)), total days on feed (237 \pm 20 days), hot carcass weight (738 \pm 63 lb (335 \pm 29kg)), and yield grade (2.74 \pm 0.7) were not different ($P>0.10$) between vaccine treatments. Liver abscessed cattle tended ($P=0.08$) to have lower 60-day ADG, but this was inconsistent among all lots of cattle (interaction $P=0.03$). Liver abscesses ($P=0.02$), severity ($P=0.09$), and scores ($P=0.11$) all showed that abscesses with increasing severity increased total days on feed. However, these differences (two to three days) were somewhat minor. The presence of severe liver abscesses reduced hot carcass weight (severe abscess = 739 lb (335kg)), no severe abscess 746 lb (338kg); $P=0.01$), and caused an increased proportion of cattle grading USDA Select (severe abscess = 19%, no severe abscess 13%; $P=0.01$) versus USDA Choice (severe abscess = 77%, no severe abscess 83%; $P=0.01$).

Significance

Results of this study suggest that commercially available liver abscess vaccines do not adequately protect against liver abscesses in natural-fed cattle when prevalence is abnormally high and the abscesses are severe. Liver abscesses can impact overall carcass weight and quality which may be economically detrimental.