

Field Trial of Vaccination against *Leptospira borgpetersenii* serovar *hardjo bovis* in a Single New York Dairy Herd

C.L. Guard, DVM, PhD¹; D.V. Nydam, DVM, PhD¹; S.W. Eicker, DVM²

¹Department of Population Medicine and Diagnostic Science, Veterinary College, Cornell University, Ithaca, NY 14853

²Valley Ag Software, King Ferry, NY 13081

Abstract

Dry cows and late gestation heifers were assigned randomly to receive a monovalent vaccine against *L. borgpetersenii* serovar *hardjo-bovis* at about 220 days of gestation or nothing. A second dose of vaccine was administered about 28 days later to the vaccinated group. Before the trial, the herd was determined to be infected. Five of 45 lactating animals chosen by convenience were shedding leptospire in urine by fluorescent antibody testing. The herd was milking about 2600 cows during the duration of the trial. There were 1208 animals enrolled in the trial, 601 controls and 607 vaccinates. The reproductive management of the herd was not changed during the study period. Outcome measures were first service conception rate: 27% for controls, and 36% for vaccinates, chi square test, $p=0.004$. Survival analysis of days to conception: 50% were pregnant at 105 days in controls, and 90 days in the vaccinated group, Wilcoxon rank sum of Kaplan Meir estimates $p<.001$. Overall pregnancy rate from DC305 for controls was 19%, and 21% for vaccinates. There were nearly equal abortions after first pregnancy palpation at 35-41 days after breeding, 56 in the control group and 58 in the vaccinates. Vaccination in this herd improved reproductive performance by increasing the apparent conception risk to first service.

Résumé

Deux traitements ont été alloués aléatoirement à des vaches taries et des taures en fin de gestation, soit un vaccin monovalent dirigé contre *L. borgpetersenii* serovar *hardjo-bovis* approximativement 220 jours dans la gestation ou soit rien du tout. Une seconde dose du vaccin était administrée 28 jours plus tard dans le groupe vacciné. Le troupeau avait été déclaré positif avant le début de l'essai. Parmi 45 vaches choisies selon nos besoins, cinq vaches excrétaient des leptospires selon le test de fluorescence pour anticorps. Le troupeau comprenait près de 2600 vaches en période de traite pendant la durée de l'essai. Cet essai incluait 1208

animaux dont 601 témoins et 607 vaccinés. La régie de la reproduction n'a pas changé durant le cours de l'essai. Le taux de conception à la première insémination était de 27% dans le groupe témoin et de 36% dans le groupe vacciné (test du chi-deux, $p = 0.04$). La moitié des vaches étaient gravides après 105 jours dans le groupe témoin et après 90 jours dans le groupe vacciné (analyse de survie de Kaplan-Meier avec le test de Wilcoxon, $p < 0.001$). Le taux de gestation DairyComp 305 en général était de 19% dans le groupe témoin et de 21% dans le groupe vacciné. Le nombre d'avortements était sensiblement le même après le premier diagnostic de gestation dans l'intervalle de 35 à 41 jours, soit 56 dans le groupe témoin et 58 dans le groupe vacciné. La vaccination dans ce troupeau améliora la performance de reproduction en augmentant le taux apparent de conception à la première insémination.

Introduction

Leptospirosis caused by *Leptospira borgpetersenii* serovar *hardjo bovis* is thought to impair reproductive performance in cattle. Several new vaccines have been introduced to help prevent these reproductive losses. A clinical trial was designed to evaluate the consequences of vaccination in a single commercial dairy.

Materials and Methods

Infection status of the herd was determined by testing urine from 45 conveniently chosen lactating cows. Five of 45 were positive by fluorescent antibody testing. Cows and nulliparous heifers were randomly assigned to vaccination or controls in an incomplete random block design at about 220 days of gestation. A second dose of vaccine was administered to the vaccinates about 28 days later. All vaccinations were performed by the same technician. No other interventions were performed. Herd managers followed their routine breeding management program without modification throughout the trial. Animals were enrolled between November 11, 2003 and May 5, 2004 to include 602 controls and 607 vacci-

nates. Pregnancy status was determined by transrectal palpation at 35-41 days after breeding and confirmed at 100-106 days after breeding.

Results

First-service conception proportion was 27% for controls and 36% for vaccinates (chi square test, $p=0.004$). Kaplan Meir survival analysis was performed on time to pregnancy. The time for 50% to become pregnant was 105 days in controls and 90 days in vaccinates (Wilcoxon rank sum test $p<0.001$). Pregnancy rate as

calculated by Dairy Comp 305 was 19% for controls and 21% for vaccinates. There were 56 abortions after first palpation in controls and 58 in vaccinates.

Conclusions

In this herd with some evidence of infected cattle, vaccination against *L. borgpetersenii* serovar *hardjo bovis* resulted in significant improvement in reproductive performance without changing the visible proportion of abortions.