Effect of eprinomectin treatment at calving on milk production in confined and semi-confined dairy herds

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Summary

The objective of the study was to determine the effect of treatment with eprinomectin pour-on solution at calving on milk production in lactating dairy cattle that are totally confined or semi-confined during the summer. Parasite burden trends were monitored in study herds using fecal egg counts and monthly bulk tank milk ELISA optical density ratio (ODR). Preliminary results did not indicate any evidence that there is a beneficial effect of eprinomectin treatment on milk production. Semi-confined cows had higher fecal egg counts than totally confined cows. A marginally significant difference in ELISA ODR values between the housing types was observed.

Introduction

A recent study performed in Canada to evaluate the impact of eprinomectin treatment in dairy cows has shown a significant effect of treatment on milk production in pastured dairy cattle (Nodvedt *et al*, 2000). In a separate study, an ELISA test to detect the presence of gastrointestinal nematode antibodies was performed in milk samples from dairy herds in Nova Scotia. The study revealed that the mean ELISA optical density of milk samples collected from herds that had no access to pasture in summer, was 0.41 with a range that had a maximum of 0.9 (Guitian *et al*, 2000). Therefore, some of the totally confined herds had optical density values that were within the range of herds that had access to pasture. The primary objective of this study was to determine the effect of treatment with eprinomectin pour-on solution (IVOMEC® EPRINEX®, Merial Inc.) at calving on milk production in lactating dairy cattle that are totally confined or semi-confined during the summer. The secondary objective was to monitor parasite burden trends in these herds using fecal egg counts and bulk tank milk ELISA optical density ratios.

Methods and Materials

The study was a double-blind, randomized clinical trial that was performed in 66 herds enrolled with DHI and distributed in 4 regions in Canada and 1 state in the United States. Totally confined herds were defined as herds where lactating and dry cows were housed throughout the summer and had no access to pasture. Semi-confined herds were defined as herds that limited outdoor exposure to a yard or paddock but were still being fed a ration that met all their nutritional requirements. In other words, the composition and quantity of stored feeds (components or TMR) fed to lactating or dry cows was not changed when the cows went out to pasture. The study was carried out for a duration of 1 year between February 2002 and February

2003. Cows were randomly allocated to treatment and placebo and treatment was administered within a period 3 weeks before and 1 week after calving. All cows were given a mange-score (0 - 3) by the producer at the time of treatment. Mange-score was then dichotomized into absent (score 0) or present (greater or equal to 1). Four follow-up visits were made to each farm to ensure that the protocol was being adhered to and that the exposure status was maintained. On the second visit (May/June 2002), 8 fecal samples were collected from each farm and fecal egg counts determined. Monthly bulk tank milk samples were collected on each farm and an indirect ELISA using a crude *Ostertagia ostertagi* antigen was performed on them. Bulk milk samples collected between March 2000 and August 2000 were used in the analysis of factors affecting optical density ratio (ODR) values (Study site and housing type). Data from Saskatchewan were not available at the time of this analysis. A negative binomial model was used to evaluate the effect of housing type and parity on fecal egg counts. Generalized estimating equation was fit in Stata8 (Stata Corporation, 2003) to evaluate the effect of treatment on test-day milk production for the first 6 months of lactation . The treatment effect was controlled for: housing type, mange status, parity, days in milk, somatic cell count and month of test. Herd was included as a fixed effect in the model.

Preliminary results

Table 1: Fecal egg counts (FEC) per 5g of feces and bulk tank milk ELISA optical density ratio (ODR) values by site and housing type

		ᵀFEC/5grams		**Bulk Milk ODR**	
Site		Mean	Range	Mean	Range
	Atlantic	6.75	0 - 128	0.4	0.13-0.84
	Minnesota	0.57	0 - 50	0.32	0.11-0.57
	Ontario	4.14	0 - 134	0.38	0.11-0.93
	Quebec	0.94	0 - 29	0.36	0.07-0.87

	Sask.	1.54	0 - 29	-	-
Housing					
	confined	0.41	0 - 29	0.34	0.07-0.87
	semi-conf.	5.51	0 - 134	0.42	0.11-0.93

[τ] FEC distribution is skewed hence all median values are zero.

The ANOVA test showed a marginally significant difference (p=0.08) in ODR values between the housing types. There was no significant difference in ODR between the sites (p=0.4). In general, fecal egg counts were very low (mean = 2.86, range = 0 - 134). Preliminary results of a negative binomial regression model showed that parity and pasture exposure were significantly related to log fecal egg counts. Log fecal egg counts in cows that were in their second parity and above were 1.18 less than those from first parity cows. The log fecal egg counts of semi-confined cows were 2.39 higher than those in totally confined cows.

Table 2: Results of the generalized estimating equation (gee)

Variable	**Estimate**	**Standard Error**	**P**
Intercept	159.02	2.52	0.000
Treatment			
placebo	Baseline		

eprinomectin	-0.01	0.19	0.945
Housing			
Semi-confined	Baseline		
Confined	1.82	0.21	0.000
Mange			
No mange	Baseline		
With mange	-0.57	0.3	0.06

No significant effect of treatment on milk production was found (Table 2). Cows in confined herds had a milk production that is 1.8 kg higher than those in semi-confined herds. The effect of mange on milk production was marginally significant. Cows found to have mange at treatment have milk production that is 0.6 kg less than cows without mange, regardless of whether they were given eprinex or placebo. There is no evidence so far that the effect of treatment significantly varies according to housing type or mange status. All the other variables were found to be significantly associated with milk production in a predictable manner as other studies have shown.

Discussion

Preliminary results showed a marginally significant effect of housing type on bulk milk ODR. The higher mean ODR value for semi-confined herds was expected since these herds may be exposed to parasite larvae in pasture. As expected, fecal egg counts in semi-confined herds are higher than in confined herds. Consistent with literature findings, higher fecal egg counts were observed in younger first parity cows than in older parities. While it is expected that the treatment effect, if observed, will be lower than in the study by Nodtvedt *et al* which recruited herds that exposed their cows to pasture, no conclusions can be made at this point in the present study since data collection is still in progress.

References

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