future contributions as well as the cost and value of her replacement, if she is removed from the herd.

Results

Under the assumptions used in the model, milk price, parity, cow relative value and replacement cost were the primary decision drivers. During times of low milk prices, replacement animals must produce more marginal milk to cover her replacement costs and each individual animal merits more investment from a medical and management perspective. First- or second-lactation animals are generally wiser economic choices for surgical management as compared to more mature cows, due to the longer predicted time available to recoup the cost of the intervention. Older, more mature animals should generally be culled instead of attempting surgery, except for extremely high-relative-value animals. In most cases, there is little economic difference between surgical intervention and roll and toggle for correction of LDA. Of course, under field conditions, prognosis for successful outcome will vary depending on the experience and expertise of the veterinary surgeon, the presence of concurrent disease, duration of the displacement and aftercare provided by the dairy. Each of these factors must be considered in evaluating risk vs benefit. Previous periods of high milk prices created conditions favoring more aggressive culling and made the higher predicted lifetime production of the new replacement animal even more valuable. However, during tight economic times of low milk prices and high replacement costs, dairymen should be more willing to invest more in surgical correction for LDA's.

Significance

The decision regarding whether to invest more medical management dollars into an individual animal must consider not only her past performance, but her predicted performance as well as the cost associated with replacing her. Younger cows are better candidates for surgical correction of LDA, while older or lower-value animals often should be replaced, depending upon prognosis for successful economic recovery, cost of her replacement and current and future milk prices.

Pharmacokinetics of Parenteral Vitamin E in Peripartum Dairy Cows

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Introduction

Supplementation of peripartum dairy cattle with parenteral vitamin E has been reported to decrease the incidence of retained placenta and metritis. Our objective was to compare the effect of one subcutaneous (SC) or intramuscular (IM) injection of vitamin E on plasma and neutrophil α-tocopherol concentrations.

Materials and Methods

Cows and heifers in two research herds (n=46) were enrolled. Cattle were fed a total mixed ration based on alfalfa and corn silage including 750 IU/d of supplemental vitamin E. Ten days before expected calving, animals were randomly assigned to receive one injection of 3000 IU of RRR-alpha-tocopheryl acetate IM or SC, or an IM saline placebo. Blood samples were collected immediately before treatment and then three times per week for three weeks. Blood (50mL) was collected from the coccygeal vein into tubes with EDTA, and then chilled. Plasma was harvested and cholesterol and α-tocopherol concentrations were determined. Cholesterol concentrations were used as a surrogate measure of availability of lipoproteins for α-tocopherol transport. In a subset of animals (n=15) neutrophils were isolated, re-suspended in saline with 1% pyrogallic acid, and frozen. Both plasma and neutrophil α-tocopherol concentrations were measured with a standard HPLC technique. Effect of treatment was analyzed with multivariable linear regression accounting for repeated measures (Proc Mixed in SAS). Covariates included parity, body condition score at enrollment and occurrence of retained placenta.

Results

Overall, IM (n=14) and SC (n=17) groups had higher ($P < 0.01$) plasma α-tocopherol concentration than control (n=15) cows (2.51, 2.77 and 1.66 μg/ml, respec-

tively), but IM and SC were not different (P=0.29). Similarly, plasma alpha-tocopherol:cholesterol mass ratio was higher (P < 0.01) in IM and SC than in controls (4.03, 4.26 and 2.75 x 10^{-3}, respectively), but there was no significant difference among the treated groups (P=0.5). Plasma α-tocopherol:cholesterol mass ratio peaked on day two after injection for both IM and SC, and was not different among these groups. IM-treated cows maintained higher (P< 0.05) plasma α-tocopherol:cholesterol mass ratio than the control animals for seven days, while SC animals were higher for 14 days after the injection. Treated animals sustained higher plasma α-tocopherol from 10 days before calving to one day after calving with no difference between the treatment groups. There were no significant treatment effects on neutrophil α-tocopherol concentrations, but these were numerically higher in IM and SC cows than in controls (0.20, 0.14 and 0.1 μg/10^6 neutrophils, respectively), and followed a similar pattern to the changes in plasma concentrations.

Significance

These results suggest that, if used, vitamin E should be injected within one week of expected challenge, and that SC administration is as effective at raising circulating vitamin E concentrations as IM injection.

Preliminary Results from a Field Study to Investigate the Relationship between Colostrum Quality and Management and Serum Immunoglobulin Concentrations in Dairy Calves

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Introduction

Results of two large national studies indicate that the national preweaning mortality rate in dairy heifers has improved very little over the past ten years (10.8% in National Animal health Monitoring Systems (NAHMS), 1993, 8.7% in NAHMS, 2002). Failure to reduce mortality in preweaned dairy heifers is partially attributable to poor colostrum management practices. In 1993 (NAHMS), 41% of 2177 calves sampled between 24 and 48 hrs of age suffered from failure of passive transfer (FPT), or low serum immunoglobulin G (IgG) concentrations. Numerous studies have demonstrated that failure of passive transfer (FPT; calf serum IgG concentration < 10 mg/ml) is associated with a significant increase in risk for morbidity and mortality in the period between birth and weaning (Fowler, 1999; Wells *et al*, 1996). Conventional factors considered to be important in an effective colostrum management program have included quantity of colostrum fed, quality of colostrum fed (IgG concentration) and quickness (or age at first feeding). Offering a second feeding of colostrum is also frequently recommended. Recently, calf management experts have also begun to evaluate colostrum cleanliness (total bacteria count or total coliform count) as another potentially important factor. Limited studies have suggested that bacteria counts in colostrum not only serve as a pathogen source, but may also reduce efficiency of IgG absorption in the gut. The objective of the current study was to evaluate the relationship between serum IgG concentrations in dairy calves and the aforementioned colostrum management factors (colostrum quantity, quality, quickness, cleanliness).

Materials and Methods

A field study was performed between July and September 2003 in 12 commercial Holstein dairy herds in