Risk Factors of Displaced Abomasum in Wisconsin Dairy Herds

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Abstract

Analysis was performed on data collected in an earlier study, regarding peripartal feeding and management practices, and incidences of displaced abomasum in 71 dairy herds in Wisconsin. In primiparous cows, the average herd incidence was 0.08, and in multiparous cows 0.03. The data were analysed using nominal logistic regression. In primiparous cows, a low rumen fiber effect at calving, a rapid change of concentrates after calving, a tough social adaptation in herd at calving and straw or corn stalk bedding, as compared to other beddings, were found to increase disease incidence significantly. For multiparous cows, only low rumen fiber effect at calving was shown to be a risk factor. The results demonstrate that a high rumen fiber effect at calving is extremely essential to prevent displaced abomasum both in young and older cows. In primiparous cows, the feeding schedule for concentrates after calving and the way the cows are introduced into the herd at calving seem to be important.

Key Words: displaced abomasum, dairy cow, management, feeding

Introduction

The incidence of displaced abomasum in dairy cows is at least 10 times higher in Wisconsin herds than in Sweden, even though average production levels are similar. In southern Wisconsin an incidence of 2.5-3.5% has been reported as normal (Dr. Rhoda, Evansville, WI, USA, pers. comm., 1992). In an earlier investigation (Pehrson & Shaver, 1992) the effects of peripartal feeding and management on the incidence in Wisconsin dairy herds was studied. The data were collected mainly by a mailed questionnaire. The analysis of 12 risk factors was done using the unpaired t-test for each one of them separately, comparing high incidence herds with low incidence herds. However, the interpretation of the result was difficult, since potential risk factors were not analyzed simultaneously.

Materials and Methods

In 1992, a detailed questionnaire was mailed to 499 milk farmers in three veterinary service areas of Wisconsin. Data pertaining to the last year in production were obtained regarding general herd data, number of cows with displace abomasum, management and feeding practices. Information was obtained for primiparous and multiparous cows separately. Seventy-one answers were received and completed in a manner that allowed adequate evaluation. The data were completed by a telephone interview in 27 cases and a farm visit in 44 cases.

The following variables were evaluated: NUM (number of cows in each age category), HSIZE (total number of cows in the herd). FEED (feeding system; component or total mixed ration), CORN (amount of corn silage fed daily at calving), GRAIN (amounts of grains fed daily at calving), HAY (amount of long hay fed daily at calving), FIBER (rumen fiber effect at calving), CFRGE (change of forages at calving), CCBEF and CCAFT (change of concentrates before and at calving, and after calving, respectively), ADAPT (social adaptation in herd at calving), GRZING (use of pasture grazing or outdoor exercise; yes or no), BARN (type of barn; stanchions or tie stalls), BED (type of bedding and floor; straw/corn stalk on concrete or other), PROD (milk production per year). FAT (milk fat concentration in herd), and PROT (milk protein concentration in herd). The variables FIBER, CFRGE, CCBEF, CCAFT and ADAPT were assigned values from 1 to 5 on an ordinal scale (1=extremely mild, 5=extremely tough, etc.). All herds were pure Holstein. Data collection and manipulation have been described in detail elsewhere (Pehrson & Shaver, 1992).

The herd incidence of displaced abomasum was estimated as the relative frequency of cases last year in each age group. In primiparous cows, it ranged from 0 to 0.48 (mean 0.08, median 0.05, 75% percentile 0.14),

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and in multiparous cows from 0 to 0.18 (mean 0.03, median 0.02, 75% percentile 0.05).

The data were analyzed using nominal logistic regression in JMP® statistical software package (SAS Institute Inc., 1995). The dependent variable was assigned three levels: below, between and above the 50 and 75% percentiles of DA. In the final model for primiparous cows variables FIBER, CCAFT, ADAPT and BED were included, and the number of cases was 61. For multiparous cows, the final model contained only FIBER and 71 cases.

Results

For primiparous cows, the corresponding odds ratios when the highest level of each independent variable was compared to its lowest level, was 2749 for FIBER ($p<0.001$), 299 for CCAFT ($p<0.01$), 2013 for ADAPT ($p<0.001$) and 27 for BED ($p<0.01$). For multiparous cows, the odds ratio for FIBER was 1380 ($p<0.001$).

Discussion

The overall incidence of displaced abomasum was approx. 5%, which was close to twice the normal incidence in the geographic area. It seems reasonable that farmers with past or current problems with displaced abomasum were more prone to complete and return the questionnaire than farmers without problems.

There were a few important differences between the results of Pehrson and Shaver (1992) and those of this study. It has been reported previously (Robertson, 1968; Coppock, 1974; Grymer *et al.*, 1981) that a high feeding intensity (high grain content and high ratio of concentrate to roughage) is one of the risk factors of displaced abomasum. The work of Pehrson and Shaver points in the same direction. The significance of the factor CCAFT in primiparous cows certainly confirms this. However, Pehrson and Shaver did not find a significant effect of the amount of concentrates fed after calving specifically.

A factor which is related to the feeding intensity is rumen fiber effect, which was the greatest single risk factor in both primiparous and multiparous cows, also found by Pehrson and Shaver (1992) and has been documented by others (Gard, 1990; Constable *et al.*, 1992).

Social adaptation in the herd at calving appeared to be an important risk factor in primiparous cows, but was not significant in multiparous cows. Pehrson and shaver (1992) found a similar effect. It is possible that a difficult social adaptation causes disease occurrence not only by a stress mechanism but also by a lowered actual intake of forages at the manger. The amount of forages offered by the farmer is used in the analysis, but it may not reflect the individual intake very well.

Pehrson and Shaver (1992) also found significant effects of milk fat content, change of forages at calving, change of concentrates before and at calving, and amount of long hay fed at calving. However, no such effects were found in this study. This may be explained by the multivariate approach.

With regard to parity, Pehrson and Shaver (1992) found "a stronger significance" of the differences between high and low incidence herds for primiparous cows than for multiparous ones concerning social adaptation, change of forages and change of concentrates at calving. In the present study, only rumen fiber effect had a significant effect in multiparous cows, while several factors were identified in younger animals.

Finally, the results indicate a negative effect of the use of straw or corn stalk as bedding, compared to other beddings. This effect was unexpected and can only be explained as a spurious relationship. It was not found by Pehrson and Shaver (1992).

In general, the results support the conclusion of Pehrson and Shaver (1992), that measures to prevent displaced abomasum should focus on achieving good rumen fill and a high rumen fiber effect at calving, in all cows. Furthermore, they point out the importance of a gradual adaptation to concentrates after calving an a careful introduction into the herd at calving, as regards primiparous cows.

References

Constable, PD, Miller, GY, Hoffsis, GF, Hull, BL and Rings, DM 1992. Risk factors for abomasal volvulus and left abomasal displacement in cattle. *Am J Vet Res,* Vol 53 pp 1184-1192. Coppock, CE 1974. Displaced abomasum in dairy cattle: etiological factors. *J Dairy Sci* Vol 57 pp 926-933. Gard, C 1990 Abomasal displacement and volvulus. In: Large Animal Internal Medicine. Ed. Smith, BP, the CV Mosby Company. St. Louis, Baltimore, Philadelphia, Toronto. pp. 792-797. Grymer, J, Hesselholdt, M and Willeberg, P. 1981. Feed composition and left abomasal displacement in dairy cattle. A case-control study. *Nord Med Vet,* Vol 33, pp. 306-309. Pehrson, BG and Shaver, RD, 1992. Displaced abomasum: clinical data and effects of peripartal feeding and management on incidence. *Proc 17th World Buiatrics Congress* and *25th American Association of Bovine Practitioners Conference.* St. Paul, Minnesota, USA, August 31-September 4, Vol 1 pp 116-121. Robertson, J McD 1968. Left displacement of the bovine abomasum: etiological factors. *Am J Vet Res,* Vol 29, pp 421-434. SAS Institute Inc. 1995. JMP® UserÕs Guide and Statistics and Graphics Guide. Cary, NC, USA.