Automatic Milking Systems: A Dutch Study on Risk Factors for Udder Health

Francesca Neijenhuis, Henk Hogeveen+ and Kees de Koning**
** Wageningen UR Livestock Research, Lelystad, the Netherlands*
+ Faculty of Veterinary Medicine, Utrecht University, Utrecht, the Netherlands

Udder health on farms milking with an automatic milking system (AMS) can be a problem. The percentage of cows with a high somatic cell count (SCC) seems to be higher after the introduction of an AMS and on two out of three farms the incidence of clinical mastitis was also higher (Hillerton et al 2004). Besides a decrease in udder health short after the introduction of an AMS, the bulk milk SCC (BMSCC) is shown to be, on average, higher in the long term (Van der Vorst et al 2002). The basic mechanisms leading to intramammary infections will be the same on farms with an AMS as on farms with conventional milking. However there are essential differences between AMS and conventional milking, such as detection of clinical mastitis and automatic cleaning of teats. Within the Dutch Mastitis Research Program (www.ugcn.nl) a study was conducted to identify risk factors for mastitis and to translate these risk factors to preventive measures.

Materials & Methods

The first step in the research was to gather expert knowledge on udder health during two sessions. A list of risk factors and management measures was constructed. This list was complemented with knowledge from scientific literature. Not only the specific risk factors for udder health on AMS farms are implemented in this list but also the risk factors known on farms wit a conventional milking system. The complete list was used as input for constructing a research data collection protocol. The second step was the setup of a research protocol to be used on the farms. The research protocol consisted of observations on cows (like hygiene and locomotion), AMS (like teat cup attachment, teat spraying and hygiene of the AMS parts) and stable (like the presence of a waiting area). Furthermore, an extensive survey was conducted to collect data on the farm structure, the information sources used by farmers, handling of the AMS, mastitis management, houding and feeding. Farmers were asked to fill in a list with propositions (to get an idea of the attitudes and interests of the farmer). Finally the data from the AMS (robot performances) and the milk production registration (MPR) were collected. Udder health was described in terms of clinical mastitis incidence (given by the farmer) and subclinical mastitis in terms of mean cow somatic cell count (SCC) and fraction of new high SCC animals from the MPR data from November 2007 until November 2008. AMS farms with at least one year experience with automatic milking, were asked to participate through their dairy cooperative. Out of the more than 1,100 farms with automatic milking systems, 150 farms were visited by pairs of trained master students in veterinary science.

Analysis

Data were analyzed by univariate and multivariate modeling. Using principal component analysis, for each of the following clusters, the most important variables were selected: observations on cows, on AMS and in the stable, survey and characterization of the farmer based on combination of propositions. These variaibles were modeld in a multivariate analysis with udder health marks as dependent variables. In this model farm size, milk yield and milking intervals were tested, after

which variables on bulk milk SCC and mean cow SCC around the period of switching to AMS were added. Finally, remaining data from the AMS were tested.

Results & Discussion

The average size of the farms was 84 dairy cows (with a range from 30 to 420 cows), with an average 305 day milk production of 9,020 kg (range 5,500 – 11,000). The weighed average cow SCC of the MPR was 262,000 cells/ml, on a log scale, the average cow SCC was 4.6 (range 3.58 – 5.19). The average percentage of cows with an increased SCC was 24 % (range 6-42). Average new high SCC was 10 % (range 5-21). Average incidence of clinical mastitis was 27 cases per 100 cows per year (range 1-135). During statistical analyses, it became apparent that the variable clinical mastitis incidence (representing farmer's reported incidence of clinical mastitis) was a difficult variable to work with. Many of the found associations seemed, from a biological point of view, to be the result of a high percentage clinical mastitis rather than being a cause off a high percentage of clinical mastitis.

Results indiciated that smaller farms with an AMS had, on average, a better udder health than larger dairy farms. Also the milk production level of cows was associated with udder health on farms with an AMS. A higher milk production was related to a better udder health. Overall farm management may play a role in this association. The main areas related with good udder health were hygiene of cows, and especially teats, proper milking technique of the AMS to ensure proper teat health (ringing of teat base and hemorrhages), use of a waiting area, preventive health care (e.g., controlling BVD) and time spent on health control of dairy cattle. The udder health status before introduction of AMS was an important factor explaining the udder health status when milking with an AMS. For advising an AMS farmer to improve udder health, no full blueprint can be given. Clear attentions and measures based on inspections on cows (hygiene, milking intervals and health) should be tailor-made per farm. This research project provided a number of clear areas for attention for good udder health on AMS farms. Moreover, this project points out that professional skills of the farmer are an important contributory to good udder health on AMS farms.

Acknowledgement

This study (Neijenhuis et al, 2009) is part of the five year mastitis program of the Dutch Udder Health Centre and was financially supported by the Dutch Dairy Board. The authors gratefully acknowledge the efforts from the farmers who participated in this study, the students involved visiting the farms and the experts who provided their knowledge during the sessions.

References

Hillerton JE, Dearing J, Dale J, Poelarends JJ, Neijenhuis F, Sampimon OC, Miltenburg JDHM, Fossing C. 2004, Impact of automatic milking on animal health. In: Meijering A, Hogeveen H, De Koning CJAM (eds). Automatic milking – A better understanding. Pp 125-34. Wageningen Academic Publishers, Wageningen, the Netherlands, 2004

Neijenhuis, F.N., J. Heinen, H. Hogeveen, 2009, Automatic milking: Risk factors for udder health, Report 257 (in Dutch), Wageningen UR Livestock Research

Van der Vorst Y, Knappstein K, Rasmussen MD. 2002. Milk quality on farms with an automatic milking system; Effects of automatic milking on the quality of produced milk. www.automaticmilking.nl/projectresults/Reports/DeliverableD8.pdf. Research Institute for Animal Husbandry, Lelystad, The Netherlands,