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ORIGINAL PAPER

Early udder inflammation in dairy cows treated by a homeopathic medicine (Dolisovet®): a prospective observational pilot study

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Background: **Mammary inflammation in dairy cows is a widespread problem in dairy farming resulting in significant economic and welfare concerns. Dolisovet® (Belladonna 1 dH, Calendula MT, Echinacea 1 dH, Dulcamara 1 cH) a homeopathic medicine, licensed in France and indicated for the restoration of mammary function in cows is presented as a 10 g tube of ointment for intramammary use.**
Method: **A prospective, uncontrolled, observational pilot study involving the collection and analysis of data from 31 udder quarters identified as being inflamed by an automated milking system (AMS) was conducted to evaluate the effect of Dolisovet® on selected parameters of mammary inflammation. Inflamed quarters were identified when milk quality started to deteriorate, via an alert generated by the AMS, on the basis of electrical conductivity (EC). Milk yield and EC were retrieved five to seven days prior to the AMS alert, on the day of and for the following seven days. Dolisovet® was administered twice daily for two consecutive days, commencing on the day of the AMS alert.**
Results: **A significant reduction in EC was observed 4–7 days following the first treatment. An increase in milk yield was also observed following the first treatment.**
Conclusion: **Dolisovet® may have a beneficial therapeutic effect in the early stages of udder inflammation and for restoring udder health and function. This medicine may be an effective first line treatment for sub-clinical bovine mastitis, reducing the need for antibiotics. Randomised, controlled studies should be undertaken to further investigate this possibility.** *Homeopathy* (2013) **102**, 139–144.

Keywords: Homeopathy; Prospective study; Dairy cattle; Mastitis; Udder inflammation; Conductivity; Milk production

Introduction

Mammary disorders are a major problem in dairy farming: 34% of disorders in dairy cows are cases of mastitis.[1] There is a large negative economic impact of mastitis resulting from decreased milk yield, inadvertent bulk tank contamination, veterinary fees, increased labour and the cost of replacing culled cows.

Mastitis is inflammation of at least one udder quarter, and results from contamination of the udder quarter(s) with one or more pathogens. The udder may become contaminated via the teat canal or as a result of haematogenous/systemic spread. Bacteria are the most common cause of mastitis, causing an inflammatory reaction resulting in an increase in the somatic cell count (SCC), changes in milk quality and colour (reduced volume, lumps, blood clots) and deterioration in the health status of the cow. Mastitis may be clinical or sub-clinical, acute, sub-acute or chronic in nature.[2] Clinical mastitis is often associated with clinical signs in the cow, such as fever and a painful, hard and swollen udder and accompanying changes in milk appearance. However, sub-clinical mastitis, where there is evidence of inflammation in an udder quarter with an associated increase in SCC, is much more difficult to recognise as there are few, if any, changes in the visual appearance of milk, in the health status of the cow, or external appearance of the udder.

The economic impact of mastitis, estimated as up to 182 Euros/cow/year in Europe, is linked to production

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losses due to reduced milk yield, discarded milk and penalties from an increased SCC.[3–7] Chronic sub-clinical cases are believed to have the greatest economical impact, because they often go undetected and result in long term reduced milk yield and increased SCCs. In addition to having an economic impact, mammary disorders may also have public health consequences. The risk of the transmission of pathogens from animals to humans (zoonotic risk) via contaminated milk is the subject of public health studies.[8,9]

Early detection of mammary inflammation is desirable to enable early intervention in the disease process. This is of particular importance when using automatic milking systems (AMS) or 'robots'. Such systems reduce the labour involved in milking, but also reduce the contact between the herdsmen and the cows and therefore diseases such as mastitis may go undetected. To help address this issue, the AMS collects measurements on parameters known to be predictive of mastitis, such as electrical conductivity (EC) and milk yield, during milking. As a quarter becomes inflamed, the electrolytes in the milk alter and the EC of the milk increases, and at the same time, the milk yield decreases. The system software can use these measurements to calculate a Mastitis Detection Index (MDI), and assess which quarters are likely to be inflamed, thereby alerting the herdsman of possible or impending mastitis.

Treatment of mastitis typically involves the use of antibiotics and in severe cases additional supportive therapy, such as intravenous fluids and pain killers. However, repeated use of antibiotics for the treatment of mastitis may lead to the emergence of bacterial resistances to antibiotics.[6] The threat presented by antibiotic resistance is of concern to the European Parliament and on 27 October 2011, the European Parliament adopted a resolution seeking to reduce this risk both in human and animal health.[10] Faced with this challenge, the French government launched an initiative to look for alternatives to antibiotics for the treatment of mastitis, and a risk reduction plan has been made public. In particular, it proposes evaluating the alternative therapeutic solutions to antibiotics.[11] For this reason, we were interested in evaluating the effect of Dolisovet® (BOIRON, Lyon, France), a homeopathic medicine to treat the early signs of udder inflammation in cows.

The objective of this pilot study was to determine the effectiveness of Dolisovet® in the reduction of mammary inflammation.

Materials and methods

Study design

An open, observational prospective study was conducted on two farms (Farms A and B) in the Rhône-Alpes region of France during the period from March 2007 to June 2010. The experimental unit was the udder quarter. The care of the animals complied with local regulations, and at any point, cows could be administered additional therapy if considered necessary for welfare reasons. Owner consent was obtained prior to the administration of any Dolisovet®.

Animals

The farms were selected because they used an automated milking system (AMS: DeLaval® VMS, DeLaval International AB, Tumba, Sweden) which generated electronic data that could be stored and retrieved for the period of the study.

Farm A milked approximately 130 cows and heifers (95% Montbéliarde and 5% Prim Holstein × Simmental crossbreeds) with an average milk yield of between 7500 and 9000 L/cow/lactation, and anticipated at least two cases of mastitis each month. Farm B milked approximately 110 cows and heifers (30% Montbéliarde and 70% Prim Holstein breeds) with an average milk yield of 9000 L/cow/lactation and anticipated at least three cases of mastitis each month.

Cows were uniquely identified by a tag system which was read and recorded by the AMS when the cow entered the milking parlour. Each individual udder quarter was also uniquely identified by cow ID and quarter location. Quarter specific data (EC, expected milk yield, the presence of blood in the milk, milking frequency) was recorded during milking. An individual quarter was considered inflamed and thus included in the study when:

- The AMS alert, which was defined and set in accordance with the manufacturer's specifications, was triggered indicating a case of inflammation in a quarter and
- The EC of the quarter exceeded 5000 μS/cm or 5.0 mS/cm and
- There was a complete and coherent set of data for both conductivity and milk yield.

Treatment and outcome measures

When there was an AMS alert, quarter specific data and milking frequency data from 7 days prior to the alert were retrieved for eligible quarters. The same data was collected for further 7 days after the AMS alert. Following the AMS alert, included quarters were administered Dolisovet® (see Table 1 for the active ingredients and their indications), by the intramammary route, twice daily (morning and evening) for two consecutive days, starting on the day of AMS alert (day 0). If additional antimicrobial therapy was administered to an inflamed quarter or to another quarter in the same cow, all data from the treated quarter were excluded from analysis in the study.

Statistical analysis

Data was excluded from the analysis if it was incomplete or incoherent, if there was non-compliance with the protocol or if treatment in addition to Dolisovet® was administered.

A one way analysis of variance (ANOVA) on repeated measures was performed on the EC and milk yield by using proc MIXED (SAS9.2) from the first day of treatment (day 0) to day 7. If a significant time effect was detected using a significance level of 0.05 then comparisons between the first day of treatment and the following days were performed based on least squares means (LS-mean). Multiple