

Acoustic Pulse Therapy (APT) as non-antibiotic treatment and prevention for mastitis in dairy cows

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Introduction

The prevalence of clinical and subclinical mammary infections ranges between 20 to 40%. As of today, the excess drug treatment in clinical mammary infections are antibiotics given during lactation. In cases of subclinical infections, no treatment is used during lactation and treatment is delivered upon entry into the dry-off period. In recent years, the awareness of the development of antibiotic-resistant bacteria led to legislative processes to reduce the use of antibiotics in animal farming, therefore there is a need for a non-antibiotic treatment for mastitis. Acoustic Pulse Therapy (APT), known as “shockwave treatment”, has been widely reported to be used in orthopedics, physiotherapy, sports medicine, urology, and veterinary medicine. APT produces various responses in biological tissues, such as angiogenesis and antiinflammatory effects. A new APT-based device developed specifically for treating dairy cows produces high power, deep penetration acoustic pulses distributed over a large treatment area. Previously a number of experiments with APT were conducted on 262 cows identified with clinical or subclinical mastitis and showed >70% success in curing the infected quarter. Significant milk yield increase, reduction in SCC as well as bacterial elimination was shown, with an 80% reduction in culling rate of clinically infected cows in the APT group compared to the control group. The specific objective of this study was to evaluate the effect of APT on SCC and milk yield when applied on cows at the dry-off period.

Materials and Methods

Fifty cows, 21 APT and 29 controls, were treated during dry-off periods 4 to 5 weeks before parturition. Cows were paired according to lactation, daily milk yield, DIM, SCC,

history of infection, bacteriology (if exist), and number of infected quarters. In each pair, 1 cow was assigned to APT and the second to control. An APT treatment session includes 400 pulses (1.9Hz, energy density of 0.041 mJ/mm²) delivered over 2 regions of each quarter. APT was given 3 times with 3 days between treatments.

Results

In the APT group, milk yield during the first 100d compared to the same period in previous lactation was increased by 10.2%, compared to 0.8% in the control group.

Average SCC in the first 100d was significantly lower in APT (101x10³ vs 427x10³). New infections during 100d were significantly lower in the APT group (9.5% vs 24%).

Significance

In early studies, APT was found to be more effective than antibiotics in treating clinical mastitis. APT in subclinical mastitis during the lactation was found to reduce SCC and increase milk yield. In contrast to antibiotic treatment, APT does not require bacterial identification nor discarding of milk after treatment and it is an easy-to-use confined treatment of cows' udders. In the current study, treatment during the dry-off period was an alternative to the use of antibiotics to prevent subclinical mastitis as well as increasing milk yield.