

Economic comparison of immediate blanket treatment versus a delayed pathogen-based treatment protocol for clinical mastitis in a New York dairy herd

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Introduction

Clinical mastitis (CM) is one of the most economically important diseases in the dairy industry due to its high incidence and associated costs from decreased production, premature culling, mortality, discarded milk, and treatment expense. The industry is in need of mastitis treatment protocols that minimize antibiotic use while having minimal impact on therapeutic success. Pathogen based mastitis therapy has the potential for targeted use of intramammary (IMM) antibiotics, avoiding their overuse, reducing treatment costs, and increasing saleable milk. The objective of this study was to compare the economic impact of blanket IMM therapy with a pathogen based treatment approach. A partial budget analysis was used to compare the differences in the two approaches relative to cost of therapy, time spent in the hospital pen, and milk discarded using measured outcomes from an on-farm clinical trial.

Materials and Methods

The trial was conducted on a 3,500 cow commercial dairy in central New York from December 2014 to March 2015. The dairy used Dairy Comp 305 (Valley Ag Software, Tulare, CA) herd management software and Quality Milk Production Services (QMPS) for culturing, allowing for reliable daily culture and electronic transmission of data. Cows were randomized prior to the trial into treatment groups. Disease incidence, culture result, culling and death, duration of clinical signs and time spent in the hospital pen were recorded daily. In both groups, cows with *Prototheca*, *Mycoplasma*, *Staphylococcus aureus*, or *Streptococcus agalactiae* were culled when meat residue time was met. The blanket therapy (BT) group received 1 tube of ceftiofur hydrochloride (Spectramast; Zoetis) every 24h for 5d in the affected quarter(s) following detection irrespective of culture result. Cows in the culture based therapy (CBT) group were treated as follows: 1) *Staphylococcus* spp., or *Streptococcus* spp. - 1 tube IMM of cephalosporin sodium (Today; Boehringer Ingelheim Inc.) once every 12h for a total of 2 treatments, 2) all other culture results or a result of "No Growth" received no IMM. Systemically ill cows were treated supportively and removed

from study. IMM tube cost was \$3.80 x 5 tubes of Spectramast for BT and \$3.10 x 2 tubes of Today for CBT. Labor cost was \$15/hour (5 minutes per cow). Culture cost was based on \$6.00 per culture. Milk discard value was based on 60 lbs per day production for mastitis cows and a \$20.00/cwt milk price. Herd level cost estimates were based on 5% monthly incidence of mastitis per 1,000 lactating cows.

Results

Two hundred forty two cows were treated with BT and 247 cows were treated with CBT (83 (34%) IMM therapy and 164 (67%) with no IMM therapy). No significant differences in culling, death loss, milk production, recurrence of clinical mastitis or somatic cell count were detected between treatment groups ($P>0.25$). There were no significant differences in days to clinical cure, with the average for both being approximately 5 days ($n=398$, $P=0.25$). Days of non-saleable milk was significantly higher for BT compared to CBT ($n=424$, $P<0.001$). Mean hospital days were 7 for the culture based therapy group and 8.9 for the blanket therapy group. Costs associated with clinical mastitis treatment group were as follows: 1) material, culture, and labor: BT=\$25.25, CBT=IMM therapy \$15.95, no IMM therapy \$7.25; 2) value of milk discard: BT=\$106.80, CBT=IMM therapy \$84.00, no IMM therapy \$60.00; 3) cost per treatment protocol: BT=\$132.05, CBT=IMM therapy \$99.95, no IMM therapy \$67.25; 4) total cost by treatment group: BT=\$132.05, CBT=\$78.24 (difference of \$53.81 per case). The economic impact calculated as the cost of mastitis treatment per 1,000 cows was BT=\$79,230 and CBT=\$46,943, providing a savings per 1,000 cows of \$32,287.

Significance

The use of culture-based therapy to guide the treatment of clinical mastitis reduced treatment costs, increased volume of saleable milk, and allowed for a 67% reduction in IMM antimicrobial use with no impact on therapeutic success resulting in an increase in cash flow of over \$30,000 per 1,000 cows.