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Addressing an Acute Milk Quality Problem through a Strategic Targeted Management Team Approach

Chris Mondak
Iowa State University

Leo L. Timms
Iowa State University

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Chris Mondak, ISU dairy extension field specialist;
Leo Timms, associate professor of animal science

Summary and Implications

Objectives of this field investigation were to assemble a management team to develop, implement, and monitor targeted strategies (both prevention and therapeutic) to address an acute milk quality issue resulting from cows mistakenly being teat dipped for 3 milkings with a formaldehyde foot bath solution (SCC /SPC counts > 2 million ; majority of teat ends with tissue damage). The team assembled included farm owner/manager and personnel, veterinarian, milk plant field personnel, nutritionist, and ISU extension (both field and campus). Initial strategies focused on enhancing tissue healing and trying to minimize new intramammary infections (IMI). After 2 months (successful prevention and healing), strategic antibiotic therapies were implemented. Thirty one Strep. cows (54 quarters) were treated using recommended pirlimycin therapy (one 10 ml plastet 50 mg pirlimycin HCl (Pirsue, Pfizer, Inc.)) at 24-hour intervals for two days. Nineteen Staph. aureus cows (26 quarters) were treated using an extended pirlimycin therapy (one plastet every 24 hours for eight days). Overall streptococci quarter cure rate was 85%. Quarter cure rates for Staph. aureus (extended pirlimycin therapy) were 96%. SCC decreased to ~250,000 (lower than herd was before problem). Follow up DHI records shows SCC remaining < 250,000, limited new infections, and milk production recovered back to normal.

This team approach to this emergency situation resulted in strategies which minimized the net losses, and in the end, resulted in increased profits at the farm level due to higher milk quality premiums and minimizing culling and replacement of problem animals. This shows that although one-on-one may take time and considered costly, it can result in large benefits to the clients as well as all other involved by providing experiential learning and foundations for team building and continuing education.

Objectives

Objectives of this field investigation were to provide one-on-one troubleshooting to a dairy producer in NW IA, develop an emergency response plan when an error was made where all cows teats got mistakenly teat dipped with a formaldehyde foot bath solution for 3 milkings, and build a management team to sustain milk quality, animal health, and profitability.

Information, Investigation, and Prevention

This field investigation involved a well managed 200 cow Iowa dairy with a milk rolling herd average of 25,300 lbs./cow/year and a SCC of 300,000 (range 250 – 350,000 over the previous year). An acute milk quality issue resulted in late January when cows mistakenly were teat dipped for 3 milkings with a formaldehyde foot bath solution. Somatic cell and bacteria counts jumped to > 2 million with a majority of teat ends of all animals showing tissue damage. Milk production dropped (13,000 to 9,000 pounds daily). Milking times went from 4 hours (prior to problem) to 9 hours each milking shift. Individual animal SCC 10 days after the mishap showed 58% of cows > 300,000 SCC, with 50% of herd > 1 million SCC (many > 3 million).

A management team was created to develop immediate, short, and long term strategies. Team included farm owner/manager and personnel, veterinarian, milk plant field personnel, nutritionist, and ISU extension (both field and campus). Immediate strategies focused on enhancing tissue healing and trying to minimize new intramammary infections (IMI). Some severe late lactation animals were dried off. Initial visual appraisal of teats of dried off animals one week post dry off showed exceptionally good healing (cessation of mechanical milking stress on teats), so many other were subsequently and strategically (mid-late lactation and pregnant) dried off. Other short term strategies included enhanced record monitoring to assess progress, and enhancing protocols to limit additions of new problem and infections. Enhanced milking procedures were emphasized and implemented in the herd (proper functioning equipment, blotting teats, assuring proper milkout, high quality iodine teat dip with excellent germicide and skin conditioners, and lots of TLC by farm personnel).

DHI-SCC in early March showed overall average SCC improvement (984,000) but 54% still > 300,000 and 38% > 1 million SCC. One noted bright spot was the low level of new infections, including cows that had calved and entered the milking string since the incidence (> 35 fresh cows with < 10% high SCC). This was excellent evidence that enhanced milking practices were preventing new infections and contagious spread.

A herd visited was conducted and all cows > 300,000 (84) had a California mastitis test(CMT) performed. Aseptic quarter milk samples were taken from all high CMT quarters and cultured using NMC protocols. Initial cultures showed 16 Staph. aureus cows and 38 environmental strep. infected cows (primarily Strep. dysgalactiae which is almost always associated with teat trauma). MIC data showed all organisms showing excellent sensitivity to pirlimycin so it was chosen as the antibiotic for subsequent treatment.

A second herd visit was conducted in late March. SCC at this time was down to 680,000, bacteria count to < 10,000, milking times to 3.5 hrs., and new mammary infections were controlled. 50% of the herd was still infected from the initial problem though and SCC was still near legal limits. The herd was in potential danger of market loss due to high SCC for multiple months even though tremendous progress had been made. All cows > 300,000 were again CMT'd but individual aseptic quarter milk samples were taken from all quarters of all these animals and cultured using NMC protocols. Culture results (Table 1) showed 27 cows (51 quarters) infected with strep. only, 12 cows (20 quarters) infected with Staph. aureus only, and 7 cows infected with a combination of strep. and Staph. aureus (12 strep quarters, 8 Staph. aureus quarters). Feeling extremely comfortable with the success of prevention strategies, strategic antibiotic therapies were implemented. 5 cows, accounting for 9 strep. and 2 S. aureus IMI, were dried off. Thirty one Strep. cows (54 quarters) were treated using recommended pirlimycin therapy (one 10 ml plastet 50 mg pirlimycin HCl (Pirsue, Pfizer, Inc.)) at 24-hour intervals for two days. Nineteen Staph. aureus cows (26 quarters) were treated using an extended pirlimycin therapy (one plastet every 24 hours for eight days). Individual cow SCC were run 14 days post treatment and the herd was visited 40 days post treatment to obtain aseptic quarter milk samples and assess prevention changes and therapy results.

Therapy Results and Beyond

Herd culture results prior to the therapy trial are shown in Table 1. Therapy cure rates for different organisms are shown in Table 2. Overall streptococci quarter cure rate was 85% and was higher than average published values (65-70%). Quarter cure rates for Staph. aureus (extended pirlimycin therapy) were extremely and pleasingly high (96%). This is much higher than published values and may have resulted from high sensitivity to the antibiotic, but more probably due to the short term nature of the infections (most infections ~ 2 month duration) and improved teat health (many teats healed completely).

Following this targeted approach, SCC decreased to ~250,000 (lower than herd was before problem). However, some new infections (clinical and subclinical) were occurring, primarily in fresh animals. Herd concerns were expressed that animals dried off with previous teat problems were relapsing or had contracted new infections due to compromised teat health at dry off. Evaluation of infection demographics and SCC showed a major percentages of these infections in fresh heifers (never exposed to the formaldehyde incident) and most all bacterial cultures were E. coli and Klebsiella (environmental organisms associated with wet conditions). Further investigation showed a combination of overcrowding in the dry cow/ transition barn (due to many heifers calving as well as the large group of cows dried off when the problem occurred) and very muddy outdoor lots (excessive amounts of rainfall). Corrective actions were taken to remedy this including application of internal teat sealants (Orbaseal, Pfizer., Inc) and movement of part of this group to the lactating cow barn (minimize any overcrowding). New infections were reduced dramatically and SCC returned to < 250,000. Follow up DHI records during Sept.-Oct. showed SCC remaining < 250,000, limited new infections, and milk production recovered back to normal.

This team approach to this emergency situation resulted in strategies which minimized the net losses, and in the end, resulted in increased profits at the farm level due to higher milk quality premiums and minimizing culling and replacement of problem animals. This situation has been turned into a case study portfolio which has been used for continuing education for producers and agri-professional in field extension meetings, and curriculum for a senior dairy production medicine course at a college of veterinary medicine. This shows that although one-on-one may take time and considered costly, it can result in large benefits to the clients as well as all other involved by providing experiential learning and foundations for team building and continuing education.

Table 1. Herd culture results prior to therapy based on 2 different samplings.

	No. cows	No. quarters
Strep. only	27	51
Staph. aureus only	12	20
Combined strep. and Staph aureus	7	12 strep.; 8 S. aureus

Table 2. Cure rates for gram + IMI using recommended (*) or extended pirlimycin therapy (**).

	Strep. (mostly dysgalactiae)*	Staph. aureus**
Quarter cure rate	85%	96%

*Recommended therapy = treated intramammary 2x with one 10 ml plastet 50 mg pirlimycin HCl 24 hrs apart;
**Extended therapy = 1 tube pirlimycin / day for 8 days (24 hrs apart)