305 *S. aureus* isolates were identified for use in this study.

An EP was considered to persist long-term if it was found in samples collected 10 or more years apart.

Results and Discussion

Forty EPs of *S. aureus* were identified between 1988 and the present in the three herds studied. Of these, seven have persisted long-term in the combined herds. One persistent EP was common to all three herds. These results indicate that some EPs of *S. aureus* can persist long-term in some herds. Determining the bacterial properties that allow long-term persistence may lead to enhanced methods to manage *S.aureus* mastitis.

Re-thinking Clinical Mastitis Therapy

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Introduction

The course of treatment for clinical mastitis varies greatly from farm to farm. In most large herds (500 cows or greater), a cow is separated from the production herd when clinical mastitis is detected by abnormal milk. Abnormal milk is an indication of a problem that can occur with or without swelling and fever. When clinical mastitis is brought to the attention of the herdsman, he must make the decision to move the cow and start treatment. Unfortunately, this is often the point where treatment decisions are based on experience and opinions, rather than good scientific guidelines and protocols. In order to implement an effective clinical protocol, it is useful to determine the cause of infection and implement a treatment protocol that is specific for that type of infection. A good treatment protocol can reduce antibiotic use with fewer days of unsaleable milk.

Materials and Methods

A large commercial dairy located in central Michigan, milking 3200 cows twice a day with excellent facilities, was enrolled in a clinical mastitis treatment project. This study took place from October 2001 to May 2002.

Culturing Clinical Cows. Milk samples from clinical quarters were collected aseptically and cultured on-farm. The milk sample was placed on a standard blood agar with 1% esculin and MacConkey agar plates. All streptococcal organisms were transferred to a CAMP test to identify the presence of *Streptococcus agalactiae*. *Staphylococcus aureus* was confirmed using a coagulase test. Coliforms were isolated on MacConkey agar and *Eschericha coli* and *Klebsiella* sp were identified by lactose fermentation, bile salt precipitation and other colony characteristics.

Treatment Protocol. Starting in October of 2001, clinical cases were not treated until after the culture results were entered on the cow's record in Dairy Comp 305. If either *E. coli* or *Klebsiella* were identified on culture, the cow was marked "NO TREAT" and the quarter was monitored. All others were marked "TREAT" and started on antibiotic therapy. In early February, half of the cows that cultured "no growth" were removed from the treatment group, while the other half continued the routine treatment protocol. The groups were compared for return to normal milk, days out of production and quarter loss.

Results

The majority of clinical cases occurred in the first 100 days of lactation, with peaks at 25 days and 75 days for gram-negative bacteria (*E. coli* and *Klebsiella* sp) infections. The greatest number (28%) of gram-positive bacteria infections (*Strep* sp and *Staph* sp) were cultured in the first 25 days, with the remaining infections occurring throughout lactation.

In February, when the treatment protocol was changed to limit antibiotic therapy to cows that were culture-positive for gram-positive bacteria, the number of cows requiring intramammary antibiotics was reduced 80%. Fifty-five percent of the clinical quarters cultured "no growth", and 25% cultured gram-negative bacteria which did not require intramammary antibiotics. Very few of the clinical cases were ill or had a fever that required immediate attention. When treatment was withheld for 24 hours awaiting the culture results, most clinical signs had resolved and the gram-negative and "no-growth" quarters did not require treatment. Cows assigned to treatment in the "no-growth" category did not return to normal milk quicker and did not have fewer quarters lost.

Conclusion

In this study, cows with clinical mastitis that cultured *E. coli* or "no growth" did not benefit from treatment with intramammary antibiotics, and milk was deemed unsaleable for longer periods due to milk withdrawal requirements. Currently, cows with clinical mastitis are identified by culture and monitored for fever. They do not receive antibiotic treatment, and are returned to the milking herd when milk is observed normal. Only cows that culture streptococcal and staphylococcal intramammary infections are treated with antibiotics. Change in treatment protocol has increased mastitis monitoring, reduced the lost days of production and decreased the amount of antibiotics used without jeopardizing the animal's health and well-being.

Persistent Coliform Mastitis

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Introduction

The debate over treating clinical mastitis with an antibiotic has hinged around the isolation of environmental pathogens. Although intramammary antibiotics may be successful in eliminating gram-positive organisms, beta-lactam antibiotics have little efficacy on gram-negative organisms. Research also reports[1] that many of the gram-negative coliforms are self-eliminating, and are generally cleared by the time clinical mastitis is detected when antibiotics are administered. However, others have reported[2] that coliforms can persist without treatment and can contribute to increased somatic cell count in a herd. This study looked at the persistence of gram-negative coliforms in quarters that have been identified by culture at the signs of clinical mastitis.

Materials and Methods

In two large dairy herds of 2800 cows and 3500 cows, clinical mastitis was identified and routinely cultured for treatment decisions based on the culture results. In the case of severe mastitis and a sick animal, supportive therapy that included fluids and anti-inflammatory drugs was administered immediately upon detection. However, in most cases reported in this study, antibiotics were reserved for treatment of gram-positive pathogens identified at 24 hours. Most coliform mastitis cases (*Escherichia coli* and *Klebsiella* sp) were left "untreated" (no antibiotic therapy) and re-cultured at 5 to 10 days. In as many enrolled cows as possible, milk samples were collected and re-cultured at 21 to 35 days. *Klebsiella* sp and *E. coli* were confirmed on MacConkey agar and the number of colony forming units/ml (CFU) were recorded. The disposition of each cow was recorded as: 1) returned to the milking herd, 2) died, 3) sold, or 4) quarter was removed from production.

Results and Discussion

Coliforms were cultured from 165 cows on the two farms (87 cows and 78 cows), which accounted for approximately 25% of the clinical mastitis cases. Over half of the clinical mastitis cases were negative to culture (55%), and most of remaining cases (20%) were gram-positive pathogens. Of the 165 coliform cases, 149 were recultured and 77% were identified as *E. coli* and 23% were *Klebsiella* sp. One herd had a significantly higher number of *Klebsiella* infections, but the majority of clinical cases were due to *E. coli*, with 68% and 87%, respectively. *Klebsiella* sp were more likely to be re-isolated in 71% of the *Klebsiella* mastitis cases, compared to re-isolation of *E. coli* in 39% of the *E. coli* mastitis cases. If growth was heavy on agar (>1000 cfu/ml), coliforms were re-isolated in 68% of the cases; 82% for *Klebsiella* sp. and 62% for *E. coli*. If growth on the initial culture was less than 1000 cfu/ml, isolation dropped to 35% for *E. coli*, while *Klebsiella* sp remained more persistent and was isolated from 65% of the cases.

Thirty-three percent of the cows (54/165) did not return to normal production as a result of lost quarters, death or were sold. Cows with *Klebsiella* infections were more likely to be sold or lose a quarter, while more cows with *E. coli* died of severe mastitis.

Conclusion

It is believed[1] that gram-negative coliforms that produce clinical mastitis routinely clear the infection without the use of antibiotic therapy. This study showed