

Tackling Staph aureus Mastitis

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Considerable progress has been made in reducing the level of contagious mastitis over the past thirty years. National herd cell counts have fallen from close to 600,000 in 1970 to levels under 200,000 in 2000. The level of Staph aureus clinical mastitis has fallen from 45% of all cases in 1968 to 5% in the late 1990's. This reduction has been achieved through the improvement of milking hygiene, use of dry cow therapy, post milking teat disinfection, culling of problem cows etc.

Over the past year, the level of Staph aureus mastitis has increased quite significantly. This has occurred for a variety of reasons, including the recent outbreak of foot and mouth disease, which restricted the culling of cows. The low milk price over the past few years has resulted in farmers cutting costs, including reduced labour input, substitution of cheaper teat dips and hygiene products, possibly reducing the frequency of servicing the milking machine and changing the liners. The U.K. has been under quota for the past couple of years and at the end of the quota year, many farmers who see an opportunity of selling as much milk as can be produced without penalty will often buy in 'cheap' cows to maximise profits and in so doing buy in new infections.

It is essential to understand the way Staph aureus spreads and can survive in the udder in order to ensure that the correct control measures are implemented.

Epidemiology

Staph aureus lives in the udder and is spread from cow to cow during milking time by anything that comes into contact with infected milk. This will include the hands of the milker, udder cloths and the liners of the milking machine. The organism thrives on damaged teat skin and teat end lesions. The bacteria then grow up through the teat canal and colonise the udder where infection is established which may be clinical and/sub clinical. Clinical infections are easy to observe, provided the farmer has good mastitis detection, and will be treated thereby minimising the risk of sub clinical infection resulting. This is assuming of course that the correct treatment is being used.

The most dangerous form of treatment is sub clinical infection. Here the organisms will continue to multiply in the udder where they cause a significant amount of tissue damage. The organisms form micro abscesses within the udder tissue, which can block the milk ducts. Organisms are shed intermittently and many of these cows have variable cell counts as is shown in the table 1, which records the somatic cell count of a quarter infected with Staph aureus for 14 consecutive milkings. It can be seen that if we were only to rely on one

recording, it might be very easy or difficult to be able to establish whether the cow has sub-clinical mastitis or not.

Staph aureus tends to be more of a problem with older animals. These will have been exposed for infection for a longer period of time with the resulting tissue damage in the udder itself. If one looks at individual cell counts and finds that the majority or cows with high cell count are the older cows, this would indicate that Staph aureus could be the cause of the problem.

Diagnosis of Staph Aureus.

Staph aureus can be very difficult to isolate from infected cows. A positive bacteriology culture proves the cow is a Staph aureus cow. A negative result may be inconclusive and in several instances, it has been found that up to three tests are needed in order to be able to confirm the cow is or is not infected with Staph aureus. This is due to the intermittent shedding of the organisms as shown by the cell count results in table 1.

A useful way to assess the level of Staph aureus in the herd is to carry out a total Staph aureus count on bulk milk. All cows in the herd have contributed to the bulk tank. The target is to have a total Staph aureus count of 10 or less. There are some herds that have counts of 300 and above which indicates a major problem. If the herd's somatic cell count is low, and the total Staph aureus count is high, this would suggest that infection is spreading through the herd rapidly and is likely to be followed by an increasing cell count in the future.

Treatment success.

The treatment success with Staph aureus depends on the age of the animal and any previous damage to udder tissue. Heifers respond to treatment most successfully and older cows tend to respond very poorly. Overall, the bacteriological cure rates for Staph aureus infections are 25% for clinical mastitis, 40% for sub clinical infections when both of these are treated during lactation. With dry cow therapy cure rates can increase to 65% plus as large amounts of antibiotic can be administered as there is no milk discard period.

In reality, treatment success with heifers may be as high as 60 – 70% during lactation and with cows in lactation 5 and above may only be in the order of 5 – 10%. These cows have chronic infections, which are highly unlikely to respond to treatment, and the only option for them is culling.

Control of Staph aureus

Before deciding specific action for problem cows it is essential that any deficiencies in the mastitis management, which are contributing to the spread of Staph aureus, be corrected. These will include looking at the milking routine, dry cow therapy, treatment of clinical cases, milking machine etc. Pointers for each of these areas are listed below.

Milking Routine	<ul style="list-style-type: none"> Milkers to wear gloves Gloves kept clean during milking Good mastitis detection Avoid udder cloths Good teat dip cover
Milking machine	<ul style="list-style-type: none"> Frequent change of liners Milk mastitis cows through separate cluster Disinfect cluster between uses Change liners in mastitis cluster frequently Service milking parlour regularly
Dry cow therapy	<ul style="list-style-type: none"> Correct selection of dry cow therapy Dry off abruptly Dry off once yield is 8L/day Excellent hygiene at drying off DCT to all infected cows
Replacements	<ul style="list-style-type: none"> Avoid buying old cows Buy low SCC cows Home replacements are best
Action for problem cows	<ul style="list-style-type: none"> Segregate and milk last (practicality?) Milk through separate cluster to avoid spread Do not rely on blitz treatment
Monitoring	<ul style="list-style-type: none"> Check individual cow cell counts monthly Bacteriology of high cell count cows Decide action for problem cows with vet Consider total Staph aureus count Monitor herd cell count trend carefully

In order to fully assess the risks relating to the spread of Staph aureus and other contagious mastitis organisms I find it essential to visit the farm and go through all the mastitis management in great detail. In most herds there are a variety of deficiencies, which will result in an increased risk of spread. In an ideal world, the milking routine would be full and thorough. In practical terms, it is necessary to break as many of the rules as possible in order to maintain high levels of milk quality and low levels of clinical mastitis. Often some of these control measures have to be established in order to protect the uninfected part of the herd.

Action for Staph aureus positive cows

Bacteriology is essential to identify high cell count problem Staph aureus cows. If the herd cell count is at acceptable levels and the farm is not being penalised for cell count, there may be no need to take any action in the short term. If however cell count penalties are being incurred then action must be taken as soon as possible. There are a variety of options for high cell count cows these include

- Culling
- Drying off early
- Treatment during lactation
- Dump milk
- Milk last

High cell count Staph aureus positive cows in the third lactation and above should be culled. Treatment during lactation and/or dry cow therapy is unlikely to eliminate high levels of Staph aureus infections from these cows. If there is an exceptional animal that a farmer wishes to keep then an aggressive form of dry cow therapy could be administered provided the farmer is aware that if she calves back into the herd with a high cell count then culling is the only option. The bulk tank cell count can be quickly manipulated by discarding milk from known high cell count cows that are contributing high percentage of somatic cells. Animals in first and second lactation may be treated during lactation or dried off early using an appropriate choice of treatment as advised by their veterinary surgeon. Dry cow therapy in these animals is likely to be quite successful, treatment during lactation is less likely to be successful as prolonged contact with antibiotic is often required in order to eliminate these organisms. In addition, treatment during lactation is often hindered by the presence of micro abscesses in the milk ducts and udder. Often the use of combination therapy, the use of intramammary and injectable antibiotics, is recommended in order to maximise the levels of antibiotic and their distribution in the udder.

Summary

In order to successfully control Staph aureus in the dairy herd it is essential to know the proportion of Staph aureus positive high cell count cows. Before any action is taken in dealing with these animals, it is essential to completely review the mastitis management of the herd. If problem cows are culled without halting the spread of infection, they will only be replaced by more high cell count cows in the future. The high cell count cow is only a symptom of the underlying problem. Don't rely on antibiotic treatment of high cell count cows during lactation as a backstop. The results for Staph aureus are very poor.

Staph aureus is a particularly difficult organism to eliminate. Diligence and careful attention to detail are necessary in order to control the spread of this infection in the dairy herd.