

Lower Mastitis and SCC

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Introduction

On most farms good mastitis control is achieved by milking efficiently, teatspraying after milking, finding new infections early, treating early, making good use of dry cow treatment to control long term infections, in other words, sticking to the basics.

There is rising concern over the increase in level of new infections around calving. In particular this problem makes it more difficult to control the somatic cell count through the rest of the lactation. Bulk milk cell counts rise in inverse proportion to milk volumes, affecting seasonal producers especially as the daily per cow yields decline in autumn.

When problems do occur they can be devastating. These are, and still will be, individual problems but the risk is reduced by a drive to lower the overall level of infection. Aim is to get the infected cow level in the herd to less than about 15% equivalent to an average bulk milk cell count of around 150 000. The challenge is to find ways to do this without increasing the cost of mastitis control.

Preventing cows becoming infected around calving

Here lies the onset of many farmers' mastitis control problems. Since the wider adoption of dry cow treatment, the level of infection caused by the contagious *staphylococcus aureus* bacterium has been reduced. More cows are now available to be infected with other organisms. The one that has grown in significance is widespread in the cows' environment and picked up from the ground around calving and at drying off. This at a time when the cow's ability to fight off infection is reduced. Not uncommon are cases where 10% of the calving cows become infected and up to 30% of heifers.

Infection by *streptococcus uberis* needs open teats. They may be caused by minor infections in the teat canal destroying the cow's natural protection system or by milk pressure forcing it open. The increased milk pressure can be due to the generally improved condition of animals gained by better management of stock over winter – a problem of the better herd managers!

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Control of the new infection rate is a real challenge and more study is needed. However, putting springers on to a ration with less high protein pasture and more hay (50% of the ration as a first guide) helps greatly as it reduces the severe udder oedema – and discomfort – both prior to, and after calving. Commonly late calvers are more affected, needing special care.

Reputedly there is benefit in reducing the level of exposure to the causative bacteria by keeping cows off heavily dunged areas, especially feed pads and cow camping sites – not easy to control when the cow's natural instinct is to head for shelter or high spots in rough weather.

The second approach is to milk before calving any animal that is leaking milk. Putting them into the colostrum herd is logical. (They still need a 4-day milk withholding time after calving). The advantage, apart from controlling the discomfort caused by the swelling and possible prevention of infection, is the ability to find and treat any new infections early, aiming for a better cure rate. Farmers decide the balance or emphasis on these two approaches based on their own priorities and ideas of risk.

Any first-time infection is worth an extended effort with a potential 75% chance of a cure. Early treatment aims to minimise the udder damage caused by the infection and reduce the loss in production caused by the disease.

Good quarter records will confirm whether the infection is a new one in a particular quarter or an infection carried over from the previous lactation, presumably having failed to be cured by dry cow treatment. (Cows carrying a sub-clinical infection that was not cured by DCT are unlikely to be cured by lactation treatment and not worth treating during the lactation, unless they become clinical).

Aim for perfect teat condition

Causes of poor teat condition are wind, driving rain, mud and dung that wash off or absorb the natural skin emollients. The dry skin is then cracked open by the action of the milking machine as the teats are flexed 500 to 600 times a milking. The problem is made worse if the vacuum level is too high. Attempts to replace the skin emollients involve the use of glycerol, sorbitol, or some other less common emollients.

Paraffin could also be used and would provide an excellent shield against the weather. After all it works to protect babies bottoms! However, it is less convenient in that it does not mix with water and also deactivates sanitisers such as iodine quite quickly. It would need to be continually shaken - unless an effective emulsifier is present - and mixed up fresh for every milking.

Most teatsprays contain a sanitiser to kill bacteria on the skin and just inside the teat orifice plus emollient to control teat condition - but not enough for early spring use in wet windy weather.

Various sanitisers can be used including those based on iodine and chlorine, both able to control viruses that may or may not be a problem on a particular farm. One advantage of iodine is that the efforts of the teatspray operator, good or bad are easily seen.

Chlorhexidine, some other products and particular forms of iodine are less harsh on skin and need less emollient. Be guided by observations of skin condition.

Teat damage problems can be alleviated by adding more emollient to the mix and starting application earlier. One recommendation for early spring is a mix containing 4litres of an approved iodine based spray, 2 litres of emollient (glycerol is thought to be slightly better in the worst conditions) to 14 litres of water making up the total 20 litres. Other mixes are possible – and can be equally effective – depending on the product.

When the weather improves, the levels of iodine and emollient can be progressively reduced to match the summer recipe. Concern over possible reduced effectiveness of sanitisers by using too much emollient has been voiced but is misplaced according to early trial work. There was no adverse effect up to 25% emollient under the trial conditions. Besides, quick repair of any damaged teats is vital when 75% of them normally become infected.

Dr Woody Pankey supported the idea of using teatspray before calving in extreme situations. A practical way would be to use a mix with high levels of emollient or to use teat salve on the springer mob recognising that glycerine or sorbitol is washed off quickly by driving rain. The use of paraffin as a skin protector warrants further discussion and study.

After calving, a good post-milking teatspray controls teat condition and prevents about 50% of new infections of contagious bacteria. Also, it kills *corynebacterium bovis* that otherwise multiplies on skin surfaces and can lead to an increase in the number of new infections of *streptococcus uberis* the following spring, by up to 5 times.

Pre-milking sanitising of teats has become popular in some areas. Dr Pankey working in the United States showed it prevented 10% of new infections (no improvement shown in an equivalent NZ trial) compared to 50% for post-milking sanitising (60% in one NZ trial), a clear 5 to 6 times advantage.

The other main cause of teat damage is high vacuum level stretching the teat skin excessively. A less common cause can be unsuitable liners. They may be too wide for cows' teats or have a deep lip cavity exposing the teat to continuous high vacuum or, more seriously,

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are unsuited to the shell so that pulsation is ineffective. (Again a compromise is necessary with liner dimensions to give efficient fast milking).

Horizontal cracks on the sides of the teats are generally due to an ineffective teatspray mix. Damage on the teat ends can be due either to the teatspray mix or to badly adjusted milking machines.

Using efficient milking machines efficiently

Efficient milking is not rocket science. Set the milking machine at a moderate vacuum level as in Table 1. (Cows milk well down to a vacuum level much lower than shown but slow cows become unbearably slow). Teat damage is less at the lower vacuum levels so one is, and should be, protecting the younger animals with their generally smaller teats.

Table 1: Guideline for setting milking machine vacuum levels

Vacuum level vs milking height: A guideline	
Milking height in metres above cow platform	Vacuum in kilopascals
1.8	48
1.6	46-48
1.4	44-46
1.2	42-44
Lowline	40-42

Use the lower vacuum levels listed with large bored long milk tubes, or in wet, windy weather, e.g., at the start of spring calving.

With Automatic Cluster Removers, depending on their internal head loss, and after spring, the higher level is acceptable.

Increase to around 48 kPa for herd testing to compensate for the head losses in current milk meters.

Overmilking, almost inevitable in early lactation as heifers are being trained, does much less teat damage than high vacuum or lack of emollient. (Excessive overmilking, more than 2-3 minutes, is to be avoided as it simply increases the time in which infection can take place).

Effort in recent years has been aimed at getting perfect cluster alignment so that cows milk out completely. It is possible to halve the somatic cell count of infected cows by insisting on complete milking. The cow is not cured but the tissues are less irritated by retained (infected) milk.

Pulsators must work properly and are recommended to give a 'd' or rest phase of at least 20% – or 200 milliseconds – slightly longer than the NZ Standard of 150 milliseconds.

There is great variation in opinion as to the best liner, but people generally believe that it should have a relatively narrow barrel diameter in relation to the teat diameter to avoid stretching the teats unnecessarily. However one must avoid over-simplification. The liners need to stay on the cow so a compromise is needed.

Slip, where air leaks between liner and teat, is considered to be a contributor to mastitis spread but in the author's opinion is less important than was previously thought. (Dr G Mein said that based on the research, one needed 2500 slips to cause one new infection). Slip however can lead to a complete disruption to milking, a major source of irritation to milkers possibly leading to a lack of care, so it is to be prevented.

Other aspects of the milking machine such as claw and pipeline sizes within commonly accepted guidelines are unlikely to have any effect on the new infection rate.

Targeting the younger end of the herd

Here one can argue the case based on the following logic: Cows that have been infected for only a short time are easier to cure. Heifers generally enter the herd with very few of them infected. The infections are usually caused by *streptococcus uberis* that is relatively easy to cure if treated promptly.

An early cure is expected to help production by minimising the extent of udder damage. A trial lasting only two years showed gains of about 6-8% by *preventing* infection of heifers compared to treatment *and a cure* at the end of the first lactation. Using today's prices, this represents a gain of about \$90 worth of extra production, well worth extra effort.

Early treatment of infections is expected to be rewarded by gains. As well, one should consider the less tangible but none-the-less real benefits of heifers without the pain and other debilitating effects associated with mastitis.

Points of an early treatment programme are:

- First, find the infected cow using the herd test report. Alternatively she could be a new clinical case. An early sign is a heifer that unusually starts kicking when clusters are being put on.

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- Confirm the infected quarter has not been (self) cured by checking with the RMT test kit or a conductivity meter. If you cannot confirm the infection, try again later. Up to about a half can self-cure, according to US studies.
- Treat to cure, extending the time if necessary beyond the minimum shown on the label.
- Take milk samples just before treatment from at least 8 to 10 of the new infections aiming to find the causative organism, then on veterinary advice, adjust the control programme to suit. Keep the samples in a freezer up to but no longer than a month until they can be forwarded as a batch. Note, there may be a high proportion of samples with no growth. If so, take another batch of samples later until there is a satisfactory pattern.

After every herd test up until, say, January with a seasonal calving pattern, repeat the process. After that time, defer till drying off, unless the infection is clinical when one should treat immediately.

Using dry cow treatment (DCT)

Much has been said and written about dry cow treatment so it is not necessary to repeat this here. It has had a major impact on mastitis levels generally, curing around 50% of infections (87% in one New Zealand trial). It also helps prevent new infections over the dry period and at calving.

Blanket DCT is recommended for herds that are over 40% infected to get a better start the following season. To that group, add those cows that are the very high producers and those hard to dry off – cheap insurance! To get ongoing benefit, continue to make adjustments to your control programme advocated in the SAMM booklet. Its advice is being continually refined aiming to promote ideas on how to prevent infection and aid rapid cure.

Chronic cases uncured by dry cow treatment are destined for early removal from the herd. Logically they are a source of new infections. On the other hand, provided all the other control measures are in place, they do not appear to greatly affect the new infection rate and can be retained while they are economically productive. However, as for any particular problem, be advised by your local veterinarian. His/her specific advice is far better than any generality.

Summary

For a healthier herd and to provide peace of mind, aim to get the herd infection level below 15% and the bulk cell count below 150 000:

- Use dry cow treatment to attempt to cure persistent infections. Use veterinary advice to help choose the proportion of herd to treat, techniques and choice of treatment.

- Minimise udder swelling at calving by substitution of some pasture (50% of ration?) with dry feeds such as hay or silage. Watch for more definite advice from the scientists!
- Milk cows before calving if they are leaking milk. Check before every milking for new clinical infections.
- Teatspray with enough added emollient to prevent teat damage. Start early, before calving if necessary.
- Find, then treat new infections early and thoroughly.
- Operate efficient milking machines sensibly. Use your local milking machine company to set it up with perfect cluster alignment and suitable settings.
- Collect milk samples of around 8 to 10 new infections initially for analysis through your vet to find the bacteriological cause of a problem and the best methods of treatment/control.

Because of increased production alone, the benefits gained by having uninfected cows far outweigh any temporarily needed additional input. In addition, farmers gain collectively by the better quality milk improving processing efficiency and giving higher quality products.

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