Case Report: Subclinical Mastitis Due to *Streptococcus Agalactia* in a Dairy Herd

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Introduction

High fluctuating total bacteria counts (TBC) of between 7,000 and 74,000/ml together with a somatic cell count of 882,000 in the same month prompted the herdowner to request a mastitis investigation. Mastitis incidence averaged 3.5 clinical cases/100 cows/month for the past 7 months. Streptococcus agalactia was isolated from a bulk tank milk sample.

History

This is a 250 cow dairy herd of British Friesians, with cows calving from August to December. Any cows not pregnant at the end of the breeding seasons are either culled or milked on, and rebred the next season. The average milk yield per lactation is 6000 kgs.

Cows are housed in two identical cubicle sheds from early November through to mid-April. There are 152 cubicles for the 250 cows, each measuring 3'9" by 7'0". Cubicles are bedded sparingly with wood shavings every 5 to 6 days. Cubicle usage is apparently low. Winter diet is self-feed grass silage, together with a high energy 16% protein concentrate fed in the milking parlour. Cows are milked through a 16 x 16 direct line herringbone parlour by two men who are paid on contract for litres of milk produced. They are also responsible for heat detection, and cleaning, feeding and bedding in the winter. Dry cow therapy is used.

Clinical Examination

A farm visit was arranged to observe current milking management, and to suggest improvements in the milking routine to minimise the spread of infection and to improve udder health.

Only heavily contaminated teats were washed and dried using disposable paper towels. No cows were foremilked. Clusters were attached to the cow, and pulled off without shutting off the vacuum. Cows were overmilked for an average of three minutes each milking. There was a high incidence of teat end lesions including black spot. The milking parlour had been tested by a milk board technician four months previously, and found the vacuum reserve, pulsation system, regulator function and overall condition of the parlour satisfactory. Mastitis cows were milked through the same clusters as healthy cows, and were not disinfected between cows. Mastitis cows were milked as and when they entered the parlour. All cows were foremilked during the visit, and one severe clinical case was identified and sampled.

Laboratory Analysis

In order to establish the full extent of infection within the herd, individual cow somatic cell counts were measured. Results are shown below.

TABLE I

Somatic Cell Count	Percentage of herd (241 cows)
0-250,000	26
250-500,000	29
500-750,000	11
750-1,000,000	6
1-2,000,000	9
2-5,000,000	15
5,000,000+	4

These results were subdivided into three groups; heifers, cows in lactation numbers two to four, and cows in lactation five and above. These results are shown in Graph I, and show very strong evidence that the proportion of cows with a high somatic cell count increases with lactation number.

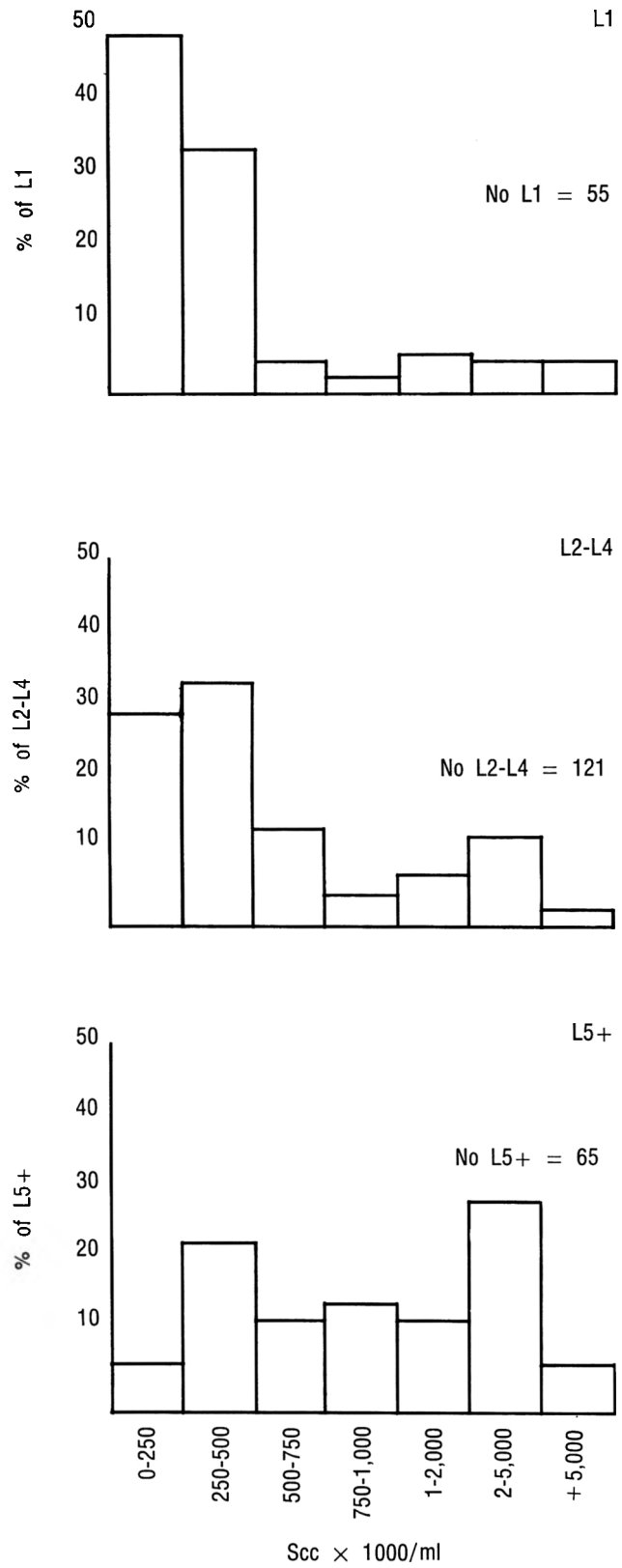
Twelve of the high cell count cows were examined and sampled. No clinical mastitis was identified, despite cell counts ranging between 1,045,000 and 9,962,000, however, some of the milk appeared watery. Ten samples produced a pure growth of Streptococcus agalactia, as did the sample from the clinical case.

Treatment and Control

The herdowner was keen to carry out blitz treatment on the infected cows. After much discussion, it was decided to divide the herd into two, a "clean" herd, SCC under 500,000, and an infected herd, SCC over 500,000. Any cow that had clinical mastitis from the date of herd SCC sampling, went into the infected herd where she remained. The clean herd was milked first through the parlour, and extreme care was taken to keep the two herds separate. The infected herd was treated with 300 mg. Erythromycin (CEVA - Erythrocin Intramammary) per quarter on two

Graph I

Scc vs. Lactation Number



Somatic Cell Counts v. Lactation Number.

Somatic Cell Count	Percentage in each category		
	Lactation 1	Lactation 2-4	Lactation 5+
0-250,000	49	29	6
250-500,000	33	33	22
500-750,000	4	13	12
750-1,000,000	2	4	14
1-2,000,000	5	7	12
2-5,000,000	4	12	28
5,000,000+	4	2	6
Sample Number	55	121	65

consecutive milkings. This was an attempt to reduce the bulk of subclinical infection in the herd.

The milking routine was improved. All dirty cows to be washed and dried. All cows foremilked to allow earlier detection and treatment of clinical cases, while reducing the spread of infection to the rest of the herd. Once cows are milked out, vacuum is to be shut off, the cluster removed, and the entire surfce of every teat dipped with an iodophor dip.

Mastitis cows are milked through a separate cluster, which is disinfected between cows. Teats were dipped before and after any intramammary preparation is administered to reduce the danger of introducing new infection via a tube. The full consequences of *Strep. agalactia* were explained to the herdowner and the milkers. The importance of each part of the new milking routine and its benefit to udder and financial health were discussed. Follow up visits to ensure the success of the programme were carried.

Sequelae

The monthly cell counts are shown in Table II, from which it can be seen that the SCC dropped to 312,000 in the month following treatment.

TABLE II

Month	Monthly SCC
September 87	515,000
October 87	481,000
November 87	504,000
December 87	882,000
January 88	498,000
February 88	312,000
March 88	373,000
April 88	349,000
May 88	402,000
June 88	627,000

The monthly cell counts have risen since treament due to infection spreading through the clean herd, and also back into the infected herd when both were mixed at the start of the grazing season. The concentration effect of reduced milk yield in late lactation will also increase cell counts.

The clinical incidence dropped to 1.2 cases/100 cows/month for the five months following treatment. The incidence will drop due to most cows being in late lactation.

At the end of July, only 25% of the herd will be in milk. It has been decided to blitz treat these cows with Erythromycin as before, in an attempt to remove infection from the herd, assuming that the dry cow therapy (Cloxacillin 500 mg. with 250 mg. Ampicillin) will have eliminated any residual infection in the rest of the herd. The modified milking routine will be continued and regular checks for *Strep. agalactia* carried out from clinical cases and bulk tank milk samples. This herd (Farm A) can be compared to another of the same size, design and management owned by the same herdowner, one mile away (Farm B). The nutrition of both herds is very similar with the same concentrate and feed levels being used in both, and forage crops conserved at the same time of the year. The only difference in the milking routine is that Farm B has been teat dipping.

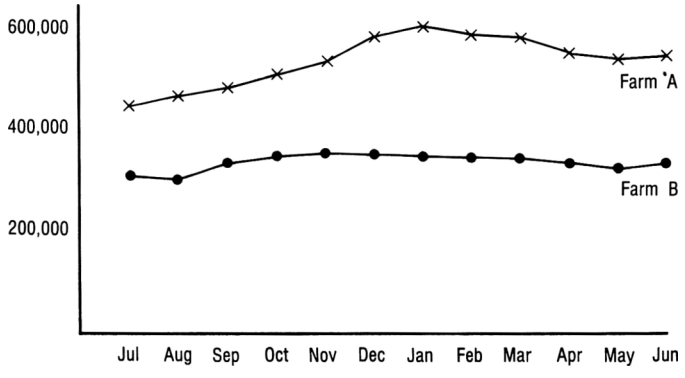
Rolling herd somatic cell counts and butterfat levels are shown in Graphs II and III. Butterfat levels in Farm A have always been lower than Farm B, while the rolling somatic cell counts have been higher than Farm B. Milk quality will be monitored on both farms to see the effect of somatic cell count on butterfat levels.

Discussion

Streptococcus agalactia is a highly contagious obligate pathogen of the bovine udder that usually causes subclinical mastitis with the occasional clinical flare up. It can only

Graph II

Annual Rolling Mean Cell Counts of 2 Farms — 1987/88

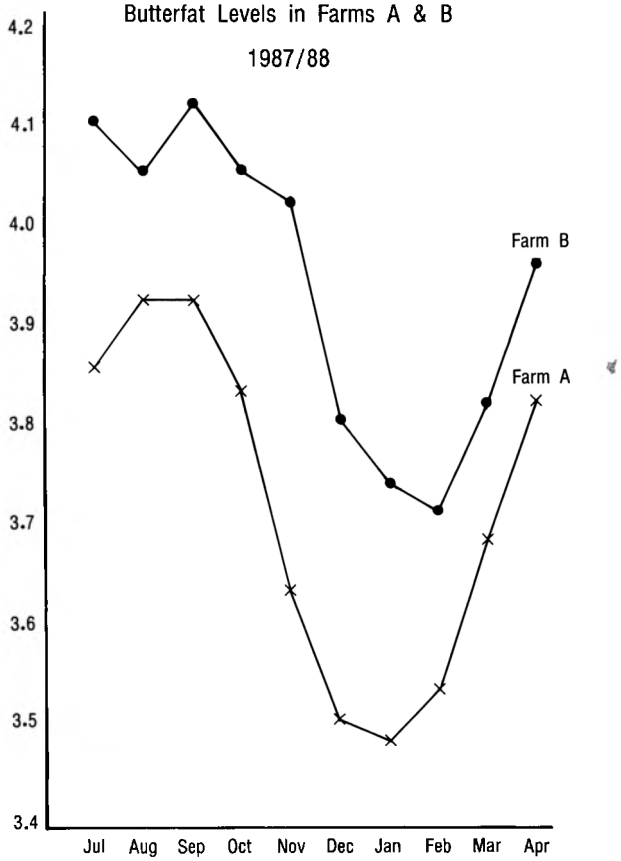


Average Annual Cell Count x 1000 1987/88

	Farm A	Farm B
July	455	317
August	476	315
September	493	345
October	522	356
November	542	362
December	594	360
January	612	358
February	596	355
March	589	349
April	562	341
May	547	332
June	554	342

Graph III

Butterfat Levels in Farms A & B 1987/88



Butterfat Level Percent 1987/88

	Farm A	Farm B
July	3.86	4.11
August	3.93	4.06
September	3.93	4.13
October	3.84	4.06
November	3.64	4.03
December	3.51	3.81
January	3.49	3.75
February	3.54	3.72
March	3.69	3.83
April	3.83	3.97

survive for a short time outside the udder on the skin of the teat. It is spread at milking time from cow to cow by any fomite that may be contaminated with milk from an infected quarter, such as milkers hands, strip cups, and milk liners. As it does not invade the glandular tissues of the udder and is highly susceptible to antibiotics, it can be eradicated from most herds.

In this case, failure to foremilk will have facilitated the spread of infection from cow to cow. It can also account for the fluctuating TBC results reported by the herdowner, when milk from unobserved clinical cases may have entered the bulk tank unnoticed.

Overmilking predisposes to teat-end damage, as shown by the high incidence of teat-end lesions in this herd. This will facilitate the entry of pathogens into the udder. Pulling clusters off cows without shutting off the vacuum can create impact forces that drive milk against and even up through the teat sphincter. If this milk is contaminated with pathogens, clinical mastitis may result. It is interesting to note that the incidence of teat end lesions has dropped since the milking routine was modified.

Teat dipping will kill pathogens remaining on the teat after milking. It should be carried out immediately after the cluster is removed, while the teat sphincter is dilated. Dipping produces more effective cover than spraying, and iodine dips have the added advantage that they mark the teat and so the efficiency of cover can be monitored.

It would appear that infection spreads through the herd in November and December, as the butterfat levels dropped to 0.39% below the level of Farm B in November, while the monthly cell count peaked at 882,000 in December, with a large rise in the rolling herd cell count, as seen in Graphs II and III. This is most likely caused by a high incidence of subclinical mastitis.

Eradication

Eradication of *Strep. agalactia* is achieved by breaking the spread of infection to non-infected cows. As this occurs in the milking parlour, the implementation and monitoring of an effective milking routine is of utmost importance. Dry cow therapy should eliminate any residual infection at the end of lactation.

Benefits of blitz treatment of an entire herd are questionable. In this case the herdowner insisted that some form of blitz therapy be carried out, however, he was not prepared to treat the entire herd despite the warning that partial treatment of the herd would not remove all the infection, and that infection would spread back through the herd. The herdowner is satisfied with the results of the partial blitz therapy, and is convinced that it has been cost effective.