

Antimicrobial treatment of bovine subclinical mastitis during lactation

Bart van den Borne¹, Gerdien van Schaik², Theo Lam^{2,3} and Mirjam Nielen¹

1 Utrecht University, Faculty of Veterinary Medicine, Department of Farm Animal Health, Utrecht, The Netherlands

2 GD Animal Health Service, Deventer, The Netherlands

3 Dutch Udder Health Centre, Deventer, The Netherlands



Email: b.vandenborne@uu.nl

Universiteit Utrecht

UU

Faculty of Veterinary Medicine

Introduction

- Bacteriological cure rates after lactational antimicrobial treatment of bovine subclinical mastitis differ between pathogens, being low for chronic *Staphylococcus aureus* mastitis.
- Cure rates are influenced by several cow and quarter factors such as parity, number of quarters infected, lactation stage and location of quarter.
- It is unknown whether early treatment of subclinical mastitis will improve cure rates.
- Cows with a first elevated CSCC (CSCC > 250,000 cells/ml) after two consecutive low CSCC were aseptically sampled twice for bacteriological culture.
- Pathogen-specific blocks within a herd were filled to randomly allocate antimicrobial treatment to bacteriological culture positive cows. All bacteriological-positive quarters were treated within a cow.
- A quarter was defined to be cured if the prior identified pathogen was not cultured in two consecutive milk samples three and four weeks post treatment.

- Cure of penicillin-sensitive *Staphylococcus aureus* after treatment was remarkably higher than 34% as observed earlier in chronic cases in the Netherlands.
- Bacteriological cure was associated with treatment, two pathogen factors and with quarter SCC in the statistical model (Table 2).
- Previously established cow factors were not related to cure of recently acquired subclinical mastitis.
- The random herd effect was insignificant and was left out of the model.
- The ICC for the random cow effect was 0.27.

Objective

- To determine bacteriological cure rates after antimicrobial treatment of recently acquired subclinical mastitis during lactation in a randomized field trial.

- Statistics: multivariable hierarchical logistic regression model at the quarter level with corrections for random cow- and herd-effects.
- Intra-class correlation coefficients (ICC) were calculated for random effects.

Materials and Methods

- 39 herds participated in the trial and were selected based on participation in the four-weekly test day interval and on a high incidence of new elevated cow somatic cell count (CSCC) cases.

Results

- Treatment was associated with higher bacteriological cure and differed between pathogens (Table 1).

Conclusions

- Treatment of recently acquired subclinical mastitis results in higher cure rates than natural cure and had no cow factors associated with bacteriological cure.
- Previously established cow factors are therefore deemed to be related to chronic infections and do not apply for treatment of recently acquired subclinical mastitis.
- Whether treatment of recently acquired subclinical mastitis is economically attractive remains to be analyzed and should take into account transmission of pathogens within the herd.

Table 1. Crude bacteriological cure rates.

Pathogen	Control			Treatment		
	All	Cure	%	All	Cure	%
Penicillin-sensitive <i>Staph. aureus</i>	114	25	21.9	34	22	64.7
Penicillin-resistant <i>Staph. aureus</i>	35	3	8.6	12	6	50.0
Coagulase-negative staphylococci	226	66	29.2	66	52	78.8
<i>Streptococcus uberis</i>	67	27	40.3	23	15	65.2
<i>Streptococcus dysgalactiae</i>	25	8	32.0	19	15	79.0
<i>Streptococcus agalactiae</i>	16	1	6.3	7	7	100
Other streptococci	21	11	52.4	20	18	90.0
<i>Escherichia coli</i>	13	8	61.5	6	6	100

Table 2. Factors associated with bacteriological cure of recently acquired subclinical mastitis.

Variable	Category	β	P-Wald	OR	95%-CI	
Treatment	Yes	2.09	0.00	8.11	5.14	12.82
	No	-	-	ref.	-	-
Pathogen	Penicillin-sensitive <i>Staphylococcus aureus</i>	0.33	0.28	1.39	0.76	2.54
	Penicillin-resistant <i>Staphylococcus aureus</i>	-0.71	0.14	0.49	0.19	1.26
	Coagulase-negative staphylococci	0.54	0.04	1.72	1.02	2.88
	<i>Streptococcus dysgalactiae</i>	0.97	0.02	2.65	1.16	6.08
	<i>Streptococcus uberis</i> and other streptococci	-	-	ref.	-	-
Quarter SCC	Continuous (on a log scale)	-0.23	0.01	0.79	0.66	0.95
Infectious status pretreatment	Bacteriological culture-negative or other pathogen present in second sample	1.32	0.00	3.74	2.53	5.53
	Same pathogen present in second sample	-	-	ref.	-	-



Acknowledgements

- This study is part of the five year program of the Dutch Udder Health Centre and was financially supported by the Dutch Dairy Board.
- Farmers for participating.
- Laboratory personnel for performing laboratory analyses.
- Field personnel for taking milk samples.
- Vera Eerland for coordination of the field work.