



Dairy Technical Bulletin

ToDAY [®] (cephapirin sodium)	ToMORROW [®] (cephapirin benzathine)	Cefa-Lak [®] (cephapirin sodium)	Cefa-Dri [®] (cephapirin benzathine)	Hetacin-K [®] (hetacillin potassium)	Dry-Clox [®] (cloxacillin benzathine)
PYRAMID [®] Modified-Live vaccines	Triangle [®] Killed vaccines	PRISM [®] Modified-Live+Killed vaccines	Polyflex [®] (injectable ampicillin)	Factrel [®] (gonadorelin hydrochloride)	CYDECTIN [®] (moxidectin)

Bacterial Cure and Somatic Cell Count Response of Dairy Cows with a Positive California Mastitis Test at Calving to Therapy with Cephapirin Sodium

Jon B. Rosenberg, DVM
Fort Dodge Animal Health
Overland Park, KS

Brenda C. Love, DVM, PhD
Pennsylvania State University
University Park, PA

Deborah L. Patterson, PhD
GxP Consulting
Newtown, PA

Objective

The objective of this study was to evaluate the impact of an intramammary treatment with cephapirin sodium soon after the onset of lactation based upon California Mastitis Test (CMT) results. The effect of intramammary therapy with cephapirin sodium on bacteriologic cure rates, and somatic cell counts (SCC) was evaluated to 28 days post—freshening.

Materials and Methods

In a well-managed herd of approximately 1,800 lactating cows, all cows calving during a three-week period—excluding heifers and all animals exhibiting disease,— had their quarters tested by the CMT within 24 hours of calving. On Day 0, 117 of 184 quarters (63.6 percent) from 46 cows with no visible signs of clinical disease nor mastitis, tested positive by the CMT (score > 0) by on-farm testing at the second or third milking following calving. Enrolled animals were randomly allocated to either a treatment group or untreated control group. Treated animals received cephapirin sodium in CMT positive quarters following milking, with each treated quarter receiving a second treatment following the next milking, approximately 12 hours later.

Prior to milking, samples were obtained for a standardized confirmatory CMT test and bacterial culture for intramammary infection (IMI) at the Pennsylvania State University Mastitis Laboratory. Samples were also obtained for SCC, which were evaluated at DHIA, Pennsylvania. All laboratory personnel were masked to the treatments. On Day 14 (range Day 11 to 16) and Day 28 (range Day 25 to 30), all animals had individual quarter samples taken from initially (Day 0) confirmed CMT positive quarters for SCC determination and bacterial culture for IMI. Animals were maintained in their standard confined dairy housing environment throughout the study. Milk from treated animals was withheld according to the label indications for cephapirin sodium.



Results and Discussion

Agreement between on-farm CMT and the laboratory standardized CMT result was 83.3 percent for both study groups, as determined by dividing the number positive for on-farm testing by the number positive in the laboratory. A significant improvement in SCC scores and Quarter Cure Rate in those quarters treated with cephalosporin sodium at the second or third milking, as compared to untreated control quarters, was detected. Treatment improved the Quarter Cure Rate at Day 28 ($p = 0.026$). Treatment with cephalosporin sodium significantly lowered the SCC at Day 14 ($p = 0.053$) and Day 28 ($p = 0.022$). The administration of cephalosporin sodium at or soon after the onset of lactation increased the success rate in eliminating IMI by 28 days of lactation.

Table 1 – Bacteriologic isolations by sample day

	Control			Cephapirin Sodium		
	Day 0	Day 14	Day 28	Day 0	Day 14	Day 28
No Growth	28	37	37	35	46	46
CNS	20	16	14	14	6	8
Strep non-ag	6	1	4	3	2	1
Gram negative	2	4	1	2	1	0
Contaminants/misc.	5	3	5	3	2	1

Table 2 – Day 28 cure rates for Quarters that were subclinical at calving

	Control			Cephapirin Sodium		
	Day 0	Day 14	Day 28	Day 0	Day 14	Day 28
Infected quarters	27	20	16	19	9	9
Quarters cured*	-	-	9**	-	-	10
Percent cured	-	-	34.6 ^a	-	-	52.6 ^b

* Quarters positive on Day 0 that were negative on Day 28.

** Includes one clinical mastitis case; treated with cephalosporin sodium and counted as a cure.

a,b Different letters denote that Number Cured is significantly different ($p < 0.05$).

Table 3 - Treatment Group LSMEANs for Somatic Cell Counts (X1000) for Separate Days

	Day 0	Day 14	Day 28
Control	2139.8	513.3 ^a	535.7 ^c
Cephapirin sodium	2235.4	188.8 ^b	106.9 ^d

a,b Within each day, different letters denotes LSMEANs are significantly different at ($p < 0.1$).

c,d Within each day, different letters denotes LSMEANs are significantly different at ($p < 0.05$).

LSMEANs were compared using a Student's two-sided for Day 0; Student's one-sided t-test for Days 14 and 28.

Summary

In this study at a well-managed herd, cows freshened with intramammary infections with the only signs of sub-clinical mastitis being an elevated CMT score (T+) in 63.6 percent of their quarters. Somatic cell counts were determined only from CMT-positive quarters. These CMT-positive quarters were also determined in the laboratory to have a bacterial intramammary infection. Approximately 50 percent were culture positive for the presence of environmental *Strep* and *Staph* species of bacteria.

The results of this study demonstrate that early detection and treatment of intramammary infection BEFORE clinical mastitis is seen can significantly reduce bacterial infection rates and significantly reduce somatic cell counts from the infected quarters.

These results confirm earlier studies showing the rate of intramammary infection with environmental mastitis organisms at calving.⁵ The results also show a significant reduction in intramammary infection in animals treated with Cefa-Lak®/ToDAY® as compared to controls.

The International Dairy Federation estimates that each \$1 spent on mastitis prevention and control provides a direct return of approximately \$5 to the producer, not including additional savings from reduced labor, veterinary expense, and less involuntary culling and death loss associated with mastitis.

References

Barkema HW, Schukken YH, Lam TJ, Galligan DT, Beiboer ML, Brand A. Estimation of interdependence of the bovine udder with subclinical mastitis and implications for analysis. *J.Dairy Sci.* 1997 Aug; 80(8):1592-1599.

National Mastitis Council Research Committee. Laboratory Handbook on Bovine Mastitis. Rev. ed. Madison, Wis.:The Council; 1999.

Sergeant JM, Leslie KE, Shirley JE, Pulkrabek BJ, Lim GH. Sensitivity and specificity of somatic cell count and California Mastitis Test for identifying intramammary infection in early lactation. *J. Dairy Sci.* 2001 Sep;84(9):2018-2024.

Adams RS, et al. "Dairy Reference Manual," 3rd ed. NRAES 63. Ithaca, NY: Northeast Regional Agricultural Engineering Service, Cooperative Extension. 1995.

Wallace JA, et al. An Evaluation of a Diagnostic and Treatment Protocol for Intramammary Infections in Early Postpartum Cows. In: National Mastitis Council. Proceedings of the 2nd International Symposium on Mastitis and Milk Quality. 2001 Sep 13-15; Vancouver, B.C., Canada. Madison, Wis.:The Council; 2001.

