

First Episode Clinical Staphylococcus aureus Mastitis. Comparison of Two Intramammary 3-day Treatments

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Introduction

Staphylococcus aureus is probably the most harmful udder pathogen (1). S. aureus induced mastitis frequently responds poorly to antimicrobial treatment, even when parenteral and intramammary administrations are combined (1)(2), and it commonly becomes chronic. In addition, cows infected with S. aureus are an important source of contagion within the herd and raise bulk milk somatic cell counts. In Argentina, the incidence and antibiotic susceptibility of S. aureus-induced mastitis is comparable to that reported in other Western countries (3). Treatment success rates depend on host, pathogen and antibiotic-related factors (1). Among the host related variables, age of the cow, severity and duration of infection have been identified, but little data are available on the distinction between response rates in first episode- vs. multiple episode- mastitis. The most important treatment factor singled out as predictor of efficacy is duration of treatment (1), but extension of treatment over time may not be cost effective. In the current report, we extend previous observations on the importance of host factors by focusing on the first-ever episode of mastitis, and compare two commonly used intramammary antibiotic treatments on a six-dose, twice daily schedule of administration.

Materials and methods:

Experimental Area: Two commercial dairy farms in Mendoza and Buenos Aires, both in Argentina, housing 1100 lactating stall-housed cows fed on a combination of hay, corn and barley, and 550 lactating free ranging cows on pasture respectively. Data collected over 16 months consisted of 120 quarters of clinical mastitis caused by staphylococcus aureus in 120 Holando-Argentina cows, median age 4 years (first to third lactation), on twice daily milking on herringbone parlors with standard equipment.

Inclusion criteria:

- first ever episode of mastitis
- a veterinarian examined each cow when mastitis was suspected because of occurrence of small lumps or clots in the pinch (examined against a dark bottom flask)
- local and systemic clinical signs, including elevated rectal temperature and milk appearance
- no concomitant systemic disease or teat lesions; animals with gland swelling or other local signs were excluded
- bacteriological diagnosis (3) on a milk sample

Clinical trial design: random assignment (by a coin toss) to one of two treatments:

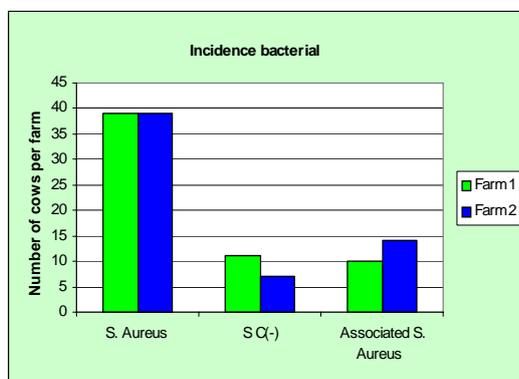
- intramammary cephalexin (100 mg)/neomycin (100 mg)/prednisolone (5 mg) (**Ceftocidin MA, Lab. Fundación, Argentina**) or
- intramammary penicillin (150 mg) / streptomycin (150 mg)/ framycetin (50 mg)/ prednisolone (25 mg) (**Mamyzin MA, Boeringher Ingelheim, Argentina**).

Each animal received six treatments following consecutive milkings (every 12 hours). Efficacy was assessed by:

- inspection of milk pinch and physical examination of the udder at days 7 and 14,
 - determination of somatic cell counting by CMT
 - bacteriological culturing at day 28 after the beginning of the treatment.
- A quarter was classified as cured if < 200.000 SCC and negative cultures were obtained at 4 weeks.

Results: No differences were seen in the prevalent causative agents (Figure 1). 102 isolates contained Staphylococcus aureus and 18 isolates contained coagulase negative

Figura: 1



Bacteriological, cytological and clinical cure rates 4 weeks after treatment are described in Table 1. Cures represent animals without clinical signs, negative somatic cell counts and negative cultures at day 28. Treatment failures are cows who failed to meet any of those criteria.

Tabla: 1

Treatment	n=	Cures	Failures	%
Cephalexin, Neomycin, Prednisolone (Ceftocidin MA, Laboratorio Fundación, Argentina)	60	48	12	80.00%
Penicillin; Streptomycin; Framycetin, Prednisolone (Mamyzin MA, Boeringher Ing, Argentina)	60	47	13	78.33%
$(\chi^2=0,098 \text{ df}=1 \text{ p} < 0.7542)$				

No significant differences in cure rates were detected between a cephalexin-based and a penicillin-based treatment.

Staphylococcus sp. Multiple isolates were relatively infrequent (Figure 2). In 10 of 60 samples from one farm, corynebacterium sp. was also isolated. Likewise, in 14 out of 60 samples from the second farm, streptococcus sp. was also associated. Notably, even though associated pathogens (corynebacterium or streptococcus) were rare isolates, they represented approximately 50 % of the treatment failures, and cure rates in these 24 cases were also just 50 % (Figure 3).

Figura: 2

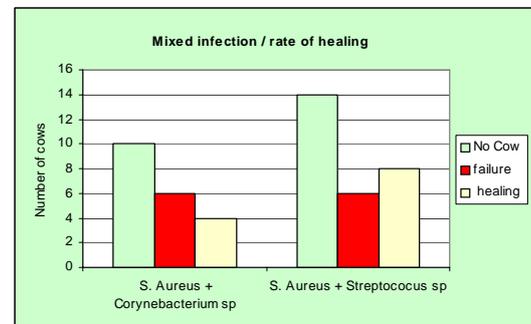
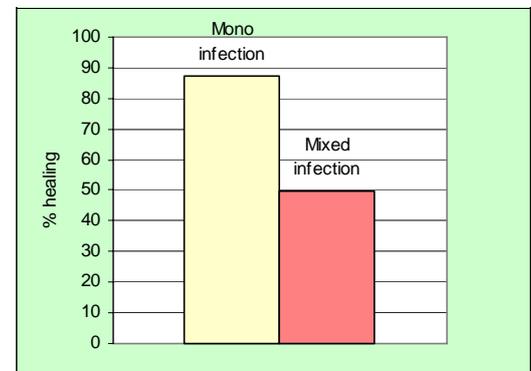


Figura: 3



Conclusions: The data presented here clearly show that treatment of the earliest signs of staphylococcus aureus mastitis in first-episode cows results in very high rates of cure. These results were obtained without prior strain characterization, although with post-hoc bacteriology, and when a reasonably cost-effective intramammary schedule is used with first generation betalactam-based preparations. The presence of additional pathogens (either corynebacterium or streptococcus species) may significantly reduce treatment efficacy.