

Evaluating the decision to not use antibiotics for management of clinical mastitis

Bill Wavrin, DVM

Ferndale Farmstead LLC, WA 98935

Abstract

Managers of livestock and their veterinarians take on a responsibility that involves “the protection of animal health and welfare, the prevention and relief of animal suffering, the conservation of animal resources, and the promotion of public health.” Prima facie, everyone involved at all levels strives to reduce incidence of any disease. Despite this, it remains true that clinical mastitis still occurs at high frequency on most farms and over most species, including humans. When these disease events occur, a conflict arises among the competing interests of improving animal wellbeing (conservation) and compromising future public and animal health through decreased effectiveness of available antimicrobial therapeutic modalities. It is well accepted that increased antimicrobial use intensity is associated with decreased antimicrobial efficacy in a range of circumstances. This discussion paper will visit that conflict and consider alternative resolutions.

Introduction

Over recent decades, much effort has been expended at academic, professional, and industry levels to decrease the frequency and effect of mastitis on human and animal lactations. Yet, a scan of the literature suggests that incidence risk at the level of the lactation across species is most often greater than 25% and commonly approaches 50% or more even at the current period.^{1,2} It has always been true that available treatment modalities do not assure timely and satisfactory resolution of these disease events. Also in recent decades, there is increasing concern about the decrease in effectiveness of antimicrobial compounds in common use in human and animal medicine. Both regulatory and peer pressure is increasing toward more prudent use of these therapies.

Clinical mastitis is a complex relationship consisting of the triad that includes host, pathogen, and environment. Causative agents are ubiquitous, even when disease is not.

Given that there may be widespread agreement that decreased antimicrobial use intensity is desirable on both a social and economic basis, there can be two pathways to reduced usage. The two pathways are reducing frequency of disease and reducing frequency of treatment even where the disease exists. Considering numerous studies suggesting the low efficacy of treatment,³ both pathways are worth considering. It is suggested that treatment should be limited to those cases where a susceptible pathogen has been identified based on culture and sensitivity laboratory testing. It is also suggested that delaying treatment has at least some tendency to reduce therapeutic success. Unless an on-farm lab is in use, culture and sensitivity testing will delay onset of treatment. The way in which resources are commonly allocated on farms, resolution of the treat or not treat conflict is usually less than ideal in any one aspect of the conflict. Farm management teams that include the veterinarian should consider all aspects of both management of the disease and satisfaction of the mission of antimicrobial stewardship. It

is unlikely that one strategy will be best suited to all farms and all management teams. While bacteriologic cure is the most common variable when evaluating treatment outcomes, other variables are also of interest and have been tested less frequently and rarely with a negative control in the studies. Those variables include return time to clinically normal milk, return to pre case somatic cell levels, degree of return to current lactation potential, and rate of herd removal over the current or subsequent lactations. Herd removal by death or culling is likely the most economically relevant and costly variable to be tested and would require an inconveniently long study period.

Mastitis management is only one of the areas where antimicrobials may be used on a farm. While this is an important disease on most farms, an overall strategy and evaluation of stewardship should include all areas where use intensity may be important. Dry cow therapy where active disease is not in evidence would seem to be a significant opportunity to reduce use intensity. The recent period has seen increasing interest in selective dry cow therapy but little discussion of forgoing dry cow therapy altogether. Algorithms have been developed based on culture, somatic cell count, and case history, among others, to decide which animals to treat.

Conclusion

Mastitis remains a vexing issue on dairy farms. A seminal treatise leading to effective reduction in frequency of the disease or highly successful therapy has yet to emerge and be widely adopted over the industry. It is likely that mastitis will remain an issue but possible that alternative treatment modalities such as probiotic or bacteriocins could be developed that will reduce the conflict between effective animal care and appropriate stewardship of the antimicrobial arsenal.

References

1. Angelopoulou A, Field D, Ryan CA, Stanton C, Hill C, Ross RP. The microbiology and treatment of human mastitis. *Med Microbiol Immunol*. 2018 Apr;207(2):83-94. doi: 10.1007/s00430-017-0532-z. Epub 2018 Jan 19. PMID: 29350290.
2. Alanis VM, Tomazi T, Santisteban C, Nydam DV, Ospina PA. Calculating clinical mastitis frequency in dairy cows: Incidence risk at cow level, incidence rate at cow level, and incidence rate at quarter level. *Prev Vet Med*, Volume 198, 2022.
3. P. Ruegg. What Is Success? A Narrative Review of Research Evaluating Outcomes of Antibiotics Used for Treatment of Clinical Mastitis. *Front Vet Sci*, 2021; 8: 63964. PMID: PMC7884469. Epub 2021

