Clinical Evidence for Individual Animal Therapy for Papillomatous Digital Dermatitis (Hairy Heel Wart) and Infectious Bovine Pododermatitis (Foot Rot)

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KEYWORDS

• Papillomatous digital dermatitis • Hairy heel wart • Infectious bovine podoermatitis
• Foot rot • Interdigital necrobacillosis • Therapy • Clinical trials
• Susceptibility testing

KEY POINTS

- Clinical evidence presented here was limited to randomized, prospective clinical trials conducted in naturally occurring disease with negative controls and masked subjective evaluators.
- In the case of papillomatous digital dermatitis (PDD), these trials support the use of topical tetracycline and oxytetracycline, lincomycin, a copper-containing preparation, and a non-antimicrobial cream; there is a significant effect of stage of disease on treatment success as measured by disease recurrence.
- Susceptibility testing of *Treponema* spp isolates and parallels with *Treponema*-associated disease in humans supports the potential for systemic use of macrolides and some β-lactams, but clinical trial confirmation is needed.
- In the case of individual therapy for infectious pododermatitis (IP), trial evidence is available to support systemic treatment with ceftiofur, florfenicol, tulathromycin, and oxytetracycline; clinical trial evidence was not readily available for common IP therapies such as penicillin G, sulfadimethoxine, and tylosin.

Author Disclosures: Author has accepted research funding and consulting fees from Zoetis (maker of cefitofur, a penicillin G, tulathromycin, lincomycin, and an oxytetracycline), Elanco (maker of tylosin), and Merial (maker of gamithromycinfor).
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Vet Clin Food Anim 31 (2015) 81–95
http://dx.doi.org/10.1016/j.cvfa.2014.11.009 **vetfood.theclinics.com**
0749-0720/15/$ – see front matter

INTRODUCTION

The use of drugs to treat infectious disease, especially antimicrobials, is based on the clinician's judgment that the drug will make a difference in clinical outcome in a population over time. Clinical trial reports are the pinnacle of evidence to support this judgment, followed by physiologic reasoning such as antimicrobial susceptibility testing combined with antimicrobial pharmacokinetic and pharmacodynamic characteristics. This article evaluates clinical trial and supportive data to inform clinician decisions on individual animal treatment of 2 common infectious diseases of the bovine foot.

To be included in the evidence tables of this article, clinical trials must have met the following criteria:

- Prospective
- Randomized
- Naturally occurring disease
- Negative controls
- Masking of subjective evaluators

Strict adherence to these requirements may have eliminated some studies that met these criteria, but for which reporting was incomplete. These situations underscore the importance of adhering to reporting guidelines such as the reporting guidelines for randomized controlled trials in livestock and food safety (REFLECT) statement, which are also helpful in study design in anticipation of successful publication.[1] In particular, the requirement for masking of subjective evaluators eliminated several publications. Another observation is that investigators are well advised to consult statisticians during study design and to clarify the appropriate analysis and reporting of categorical data such as clinical scores.

The outcomes of the clinical trials were summarized and then characterized in the form of the number needed to treat (NNT) statistic.[2] The NNT is calculated by first determining the absolute risk reduction (ARR), which is the actual difference in percentage clinical success between the treated and negative control groups. The ARR is then divided into 100%, with the resulting value representing the NNT; this is the number of animals that must be treated to make a difference in 1 animal. Because the NNT is based on the difference between treated and untreated animals in the same diseased population, it represents the effect of the drug in consideration of the spontaneous cure rate of the population, which in turn gives some insight into the severity of the disease challenge. Comparison of NNT values is only valid within the same study; comparing NNT values between studies to determine the most effective drug is inappropriate because of the potential differences in the disease challenge.

The external relevance of these trials is affected by the case definitions and the time of detection of disease in relation to field applications. An attempt has been made to describe case definitions, but the reader is directed to the original articles for more detail so that external relevance of the data may be further evaluated.

PAPILLOMATOUS DIGITAL DERMATITIS (HAIRY HEEL WART, STRAWBERRY FOOT ROT)

The therapy of PDD still lacks clarity as to the breadth of etiologic agents and pathogenesis. The multifactorial cause has been documented in the literature, with a consistent finding of spirochete organisms of the genus *Treponema* as well as multiple genera and species of bacteria.[3–8]

Available clinical trials for individual animal therapy that met inclusion criteria for evidence tables were limited to topical therapy. No reports of systemic therapy for