Tritrichomonas foetus Prevention and Control in Cattle

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KEYWORDS

• Trichomoniasis • *Tritrichomonas foetus* • Venereal disease • Reproduction • Cattle

KEY POINTS

- *Tritrichomonas foetus* is an obligate parasite of the bovine reproductive tract causing a highly contagious venereal disease.
- Infection of cows with *T foetus* most often leads to pregnancy loss, but typically a return to normal fertility.
- Infection of older bulls with *T foetus* most often leads to unapparent, chronic infections and, if not detected, perpetuates the disease in the herd.
- Trichomoniasis control involves accurately identifying and removing infected bulls and managing cows appropriately.

INTRODUCTION

Bovine trichomoniasis, commonly referred to as trich, is a venereal disease of cattle caused by *Tritrichomonas foetus* that was first reported in the United States in a Pennsylvania dairy herd in 1932.[1] By the 1950s, it was reported in Western US beef herds[2] and it is now considered endemic in herds managed under range conditions with natural service breeding as found in the western United States, Florida, and worldwide. Trichomoniasis has been eliminated from many cattle populations around the world where management includes limited comingling of cattle and common use of artificial insemination for breeding.[3]

Although the management systems for cattle in areas where trichomoniasis has been eliminated differs from those used in endemic areas, it does suggest that control and potentially elimination of trichomoniasis is possible through the implementation of applicable management practices. The purpose of this article is to highlight basic information regarding trichomoniasis and suggest applications of this information in

The author has nothing to disclose.
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Vet Clin Food Anim ■ (2016) ■–■
http://dx.doi.org/10.1016/j.cvfa.2016.01.010 **vetfood.theclinics.com**
0749-0720/16/$ – see front matter

developing practical and effective herd-level control measures for beef cattle producers.

CLINICAL PRESENTATION

Individual Level

Bulls exhibit an absence of macroscopic and microscopic pathologic changes and a limited immunologic response to infection, which results in no visible clinical signs being exhibited by infected bulls[4] and the development of unapparent chronically infected bulls.[5] Although bulls do not demonstrate visible clinical signs of infection, the development of chronically infected bulls plays a significant role in the epidemiology of this disease and seems to be related to the age of the bull when it is exposed to *T foetus*.[6,7] The following studies highlight the difference in infection prevalence across age groups:

- In a survey of California beef herds, 2% of bulls 3 years of age and younger were infected with *T foetus* compared with 6.7% of bulls 4 years of age and older ($P<.025$).[8]
- An epidemiologic study in Florida found the mean age of infected bulls was 5.5 $\pm$ 1.6 years and mean age of uninfected bulls was 3.9 $\pm$ 2.3 years ($P<.001$).[9]
- Another study in Florida found bulls greater than 5 years of age were 2.2 (odds ratio, 2.2; 95% CI, 1.1–4.3; $P = .022$) times more likely to be infected than bulls 5 years of age or younger when all other factors were constant.[10]

One explanation for the relationship between age and chronically infected bulls may be the development of crypts, which are microscopic invaginations of the penile and preputial epithelium are are purported to increase in size and number as bulls age.[11–13] However, a more recent study brings into question the validity of the relationship of crypts to age-related chronic *T foetus* infections in bulls suggesting further work needs to be performed in this area.[14] Although older bulls seem to be more likely to become chronically infected with *T foetus* than young bulls, 2-year-old[15] and 3-year-old[16] bulls have been reported to be positive for *T foetus*.

Breed predisposition to *T foetus* infection has been proposed and several studies have reported *T foetus* infection prevalence by breed.[8–10,16,17] However, study bias in the form of uneven breed distribution across breeding groups and herds, which potentially affects risk of exposure leaves the validity of these findings in question.

Other unknown individual specific factors may also play a role in the development of chronic *T foetus* infections in bulls as suggested by this quote from an early trichomoniasis article, "The results indicate that there are distinct individual differences in natural resistance of bulls to infection with *T foetus*."[18]

T foetus can be isolated from the female bovine reproductive tract as soon as 4 days after introduction,[19] but does not seem to interfere with conception or maternal recognition of pregnancy[20] or express any macroscopic or microscopic lesions in the reproductive tract until after 50 days gestation.[21] As the infection progresses, mild inflammatory changes are noted with eventual fetal loss in a majority of the infected females up to 95 days after exposure.

Most fetal loss occurs within the first 5 months of gestation followed by a 2- to 6-month period of infertility as the immune system clears the parasite from the reproductive tract.[20] Complete clearance of *T foetus* from the female reproductive tract is expected in 5 to 20 weeks after infection, although some exceptions occur.[19]

Pyometras and cows with unusually long infections are the most notable exceptions to the usually limited infection. Pyometra may be one of the earliest clinical signs of