

Evaluation of ampicillin trihydrate for treatment of metritis and subsequent fertility in lactating dairy cows

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Introduction

Metritis affects 10%–30% of dairy cows and results in production losses, impaired fertility, and increased risk of culling and death early in lactation. Economic losses of metritis have been estimated at \$328/affected cow. Cows that develop metritis are at an increased risk to develop clinical and subclinical endometritis. *Escherichia coli* expressing fimH early postpartum (1–3 days in milk [DIM]) has been associated with development of metritis, which suggests this bacterium has an important role and is a virulence factor for initial tissue damage and subsequent bacterial infection and development of uterine diseases. It is possible that reduction of the amount of *E. coli* in the uterus of cows with metritis in early lactation might reduce its detrimental impact. Ampicillin is efficacious against *E. coli*, but to date, studies to evaluate the efficacy of ampicillin for the treatment of metritis in dairy cows are lacking. The objective of this study was to compare the efficacy of ampicillin trihydrate (AMP) for the treatment of metritis in dairy cows compared with that of ceftiofur hydrochloride (CEFT). Our hypothesis was that AMP would be an effective treatment for metritis in dairy cows.

Materials and Methods

During the first 12 DIM, the rectal temperature (RT) of Holstein cows was monitored daily. A RT > (102.9°F) 39.4°C was characterized as a fever. Vaginal discharge (VD) was evaluated at 4, 6, and 8 DIM, and on any day a cow had fever. Cows with VD score 5 (reddish/brownish discharge with a foul odor) were diagnosed with metritis (MET). Cows with MET (n = 528), were categorized as those with (n = 216) or without (n = 312) concurrent fever. Cows with MET were blocked by parity and MET category (with or without fever), and randomly assigned to receive AMP at 5 mg/lb (11 mg/kg) (n = 259) CEFT at 1.0 mg/lb (2.2 mg/kg) (n = 269) daily for 5 days. A cohort of healthy cows (NOMET, n = 268) was randomly selected to serve as controls. Cows with MET had RT measured on days 1 through 7, and on day 12 after treatment initiation, and VD scored on days 5, 7, and 12 after treatment initiation. Cure was defined as a VD < 5. At 32 DIM, VD was scored for diagnosis of clinical endometritis (CE, VD > 2 [ie, mucopurulent discharge]). At 53

and 67 DIM, ovaries were ultrasonographically scanned to determine cyclic status. Pregnancy per first service artificial insemination (P/AI) determined by means of ultrasonographic examination at 32 and 60 days after AI. Data were analyzed using PROC GLIMMIX of SAS.

Results

The cure rate for cows treated with AMP (43.0%) was significantly (P = 0.01) greater than the cure rate for cows treated with CEFT (29.2%) on day 5 after initiation of treatment, as well as on day 7 after initiation of treatment (AMP 62.3% vs CEFT 50.6%; P = 0.01). However, the cure rate did not differ significantly between the 2 treatment groups on day 12 after initiation of treatment (AMP 83.0% vs CEFT 85.8%; P = 0.50). The fever incidence rate did not differ significantly between the 2 treatment groups (AMP 20.8% vs CEFT 19.3%; P = 0.47) from 2 to 12 DIM, but mean RT tended to be less for cows treated with CEFT (102.4°F; 39.10°C) than that for cows treated with AMP (102.5°F; 39.15°C; P = 0.09). Prevalence of CE was significantly (P < 0.01) greater for cows previously diagnosed with MET (63.2%), compared with that for cows with NOMET (27.2%). The proportion of cows that left the herd within the first 60 DIM did not differ significantly between cows in the AMP (3.8%) and CEFT (7.2%) treatment groups. The proportion of cows cycling at 67 (AMP 75.1%; CEFT 75.2%; and NOMET 76.7%; P = 0.73), P/AI at 32 (AMP 26.5%; CEFT 31.2%; and NOMET 33.7%; P = 0.25) and 60 days (AMP 25.2%; CEFT 29.0%; and NOMET 30.5%; P = 0.60) after AI, and proportion of pregnancies lost (AMP 4.9%; CEFT 7.1%; and NOMET 9.6%; P = 0.41) did not differ among the AMP, CEFT, and NOMET groups.

Significance

Results of this study indicated ampicillin was an efficacious alternative for treatment of metritis in dairy cows, and the cure rate of cows with MET that were treated with AMP was equal to or better than that for cows with MET that were treated with CEFT. Although the incidence of CE in cows treated with AMP was decreased, compared with the incidence of CE in cows treated with CEFT, no differences in cyclic status and subsequent fertility were detected.