Comparison the Effect of Single Intra-uterine Administration of Three Antibiotics for the Treatment of Endometritis on the Conception Rate of a Dairy Herd

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Introduction
Several periparturient factors including dystocia, retained fetal membranes and twinning, affect the incidence of uterine infections. The post partum endometritis in dairy cows reduces reproductive performance and potential profit. Bacterial contamination of the uterus occurs during the first week after calving; subsequent inflammation of the endometrium occurs during the second through fourth postpartum weeks. Uterine infections are usually detected by rectal palpation and vaginal speculum examination. There are many approaches for preventing and controlling postpartum endometritis including intrauterine infusions of antibiotics and also systemic administrations of antibiotics, antiseptics, enzymes and hormonal therapy including estrogens, prostaglandins and/or GnRH (6-8, 10). Arcanobacterium pyogenes in the uterus beyond 3 weeks post-calving was significantly associated with uterine discharge (12), persistent inflammation, infection (2, 4) and impaired reproductive performance (1). The objective of present study was to evaluate the effect of single IU infusion of three routine used antibiotic (oxytetracycline, cephalosporine and penicillin) for treatment of cow endometritis and assessment of its effects on their conception rate.

Material and Methods
This study was conducted in a large (2500 cows) lactating Holstein Frisian farm in the north of Mazandaran state, Iran that calved in late summer environment was used as many years ago for treatment of uterine infection, but its milk residua was always remarked by practitioners. Based on its irritating characteristic, it cause to inflammatory response and regeneration reaction. Some believed that it can stimulate the defensive reaction of uterine and PMN infiltration to the lumen of the uterus.

alternatively to one of three treatment groups: 1) intra-uterine infusion of oxytetracycline (5%, 2500 mg), 2) intra-uterine infusion of cephalosporine (metricure) 3) intra-uterine infusion of penicillin G procaine (10.000.000 IU). The treated cows re-examined 10 days later and also at the time of AI to evaluate the response to the treatments by examining estrus mucus and/or rectal palpation. All cows with clear estrus mucus (at least 42 days after parturition) were artificially inseminated and pregnancy diagnosis was done by rectal palpation on day 45 after AI. As this study is carrying out in the farm now, the other indices of the three treatment groups like total pregnancy rate, culling rate, days open and service/conception will published later on. Chi-square test was used to analyse the data.

Results and Discussion
The effect of treatment on clinical endometritis in a large dairy herd with mentioned antibiotics is shown in table 1. The 1st and 2nd service conception rate in three treatment groups are shown separately in each grade of endometritis in the table. When all cows were considered, excluding diagnostic categories, the overall conception rate after the 2nd AI in groups A, B and C was 77.7%, 76% and 66.6% respectively. There was not any significant difference among three groups in the 1st, 2nd and overall conception rates (p>0.05).

The objective of this study was to determine whether there is any significant difference between three choice antibiotics to treat clinical endometritis (grade 1 and 2). It has been discussed controversially in the literature if cows with signs of mild endometritis should be treated or not. Due to reasons mentioned above, we had no untreated control group in this study.

Oxytetracyclin as a broad spectrus antibiotic which is active in abormal (mucopurulent and anaerobic) environment was used as many years ago for treatment of uterine infection, but its milk residua was always remarked by practitioners. Based on its irritating characteristic, it cause to inflammatory response and regeneration reaction. Some believed that it can stimulate the defensive reaction of uterine and PMN infiltration to the lumen of the uterus.
So it can be very beneficial antibiotics for treatment of endometritis especially chronic endometritis. But the meat and milk residua for about at least 48 h up to 144 h, make it not to be used by some practitioners recently. Its absorption from uterus to peripheral blood circulation occurs within 12 h, so its administration by practitioner in the farm just can be arranged on the basis of cases and herd policy (8). Cephalosporine as a first generation of cephalosporine in brand mark of metricure is intra-uterine treatment of subacute and acute endometritis, appeared to be a suitable antibiotic choice for IU infusion which one of the good characteristics of this intra-uterine antibiotics is low MIC’s for relevant pathogens, also in anaerobic environment and effective concentration in endometrium and penicillinase resistancy (3, 8).

Penicillin as an antibiotic which is effective on gram positive bacteria from many years was used for intra-uterine infusion for treatment of uterine chronic infections. It’s not so broad spectrum antibiotics and its milk residua and withdrawal time limited its usage in the farm.

There are few controlled clinical trials examining the effects of antibiotic treatment in cows with endometritis. Furthermore, results on the effect of antibiotic treatment in cows with endometritis on clinical cure and reproductive performance are inconsistent. Steffan et al. concluded that there was an increase in the cure rate and a decrease in calving to conception interval in cows that received antibiotic treatment compared to control. LeBlanc et al performed rectal palpation and vaginoscopy between 20 and 33 DIM, and classified cows with abnormal discharge as clinical endometritis cases. In cows with clinical endometritis, intravaginal antibiotic administration of 0.5 g cephaloridine between 27 and 33 DIM resulted in a higher pregnancy rate than untreated controls. For an intravaginal antibiotic to be successful, the formulations should be effective against the pathogens present, not inhibit the uterine defense mechanisms, be effective in a pyogenic environment, have no milk or meat residue, have an adequate concentration, adequate number of treatments and be cost-effective (13).

It seems that metricure is a suitable treatment regime to treat clinical endometritis due to no milk withdrawal time and also its resistant against penicillinase plus better result than penicillin group (although without any significant difference), but the treatment selection is up to the practitioner based on the herd policy.

Due to growing consumers concerns towards hormones and antibiotics further research is required to develop new strategies for the treatment of endometritis.

Acknowledgements

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References


Table 1 (The effect of oxytetracycline, metricure and penicillin administration between 28 and 45 DIM on conception rate of the cows)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>grade</th>
<th>No. of cows</th>
<th>1st SCR (%)</th>
<th>2nd SCR (%)</th>
<th>Total CR per 2 services (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Oxytetracyline</td>
<td>grade 1</td>
<td>59</td>
<td>12/20 (60)</td>
<td>16/36 (45)</td>
<td>28/36 (77.7)</td>
</tr>
<tr>
<td></td>
<td>grade 2</td>
<td>23</td>
<td>9/14 (64.3)</td>
<td>9/23 (39.3)</td>
<td>18/22 (78.2)</td>
</tr>
<tr>
<td>B) Metricure</td>
<td>grade 1</td>
<td>25</td>
<td>5/12 (41.7)</td>
<td>3/8 (37.5)</td>
<td>11/12 (91.7)</td>
</tr>
<tr>
<td></td>
<td>grade 2</td>
<td>13</td>
<td>5/13 (38.5)</td>
<td>3/8 (37.5)</td>
<td>8/13 (61.5)</td>
</tr>
<tr>
<td>C) Penicillin</td>
<td>grade 1</td>
<td>30</td>
<td>6/11 (54.5)</td>
<td>5/13 (38.5)</td>
<td>12/17 (70.6)</td>
</tr>
<tr>
<td></td>
<td>grade 2</td>
<td>17</td>
<td>5/11 (45.5)</td>
<td>3/8 (37.5)</td>
<td>8/13 (61.5)</td>
</tr>
</tbody>
</table>

SCR= Service Conception Rate Values in columns with similar letter (a) do not differ significantly (P > 0.05)