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Ceftiofur as an Intrauterine Therapy in Treating Endometritis in Cows

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Abstract

Aims:

Recognition the efficacy of ceftiofur antibiotic as intrauterine therapy in treating clinical endometritis and the range of its influence on the fertility of treated cows.

Methods:

Twenty multiparous cows suffering from clinical endometritis(CE) came to the veterinary clinic exist in the college and veterinary clinics located in Diyala province. Rectal palpation was made to diagnose the clinical endometritis, all these cows were treated by intra-uterine injection of ceftiofur during estrus phase. After the coming of all treated cows to estrus they were inseminated artificially, and then the rectal palpation was carried out to confirm the pregnancy in these treated cows.

Results:

The number of multiparous cows had clinical endometritis and treated with ceftiofur intra-uterine which were 20. All these cows came estrus within 18-23 days post treatment, and inseminated artificially. Eight cows were return to estrus within 20-22 days after last insemination and re-inseminated again. After 55-60 days of last insemination all cows were examined by rectal palpation and being pregnant.

Key words: Cows, Ceftiofur, Clinical endometritis , Fertility

Introduction

Clinical endometritis (CE) is the inflammation of the endometrial layer of the uterus without an association to systemic signs (1), (2). An increased rectal temperature may or may not be present depending upon the extent of the inflammatory process and stress level of the cow at the time of the examination. CE is characterized by muco-purulent and purulent vaginal discharge around 20 to 40 days postpartum (3). CE has been known as the presence of muco-purulent uterine discharge (>50 % purulent material) after 26 days in milk or a diameter of cervix greater than 7.5 cm (by rectal examination (3, 4). Involution of the uterus begins immediately post-partum and the diameter of the uterine horns should be less than 3-4 cm and the cervical diameter should measure <5 cm by 40 days in milk (5). The diagnosis of CE relies on appropriate visual characterization of the uterine discharges noted at 21 days postpartum. Vaginoscopy is a practical method used for the diagnosis of clinical endometritis(CE) (uterine discharge)(6,7)scored using a 0-3 scale

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(0 = normal uterine discharge, 1 = flakes of purulent exudate in the uterine discharge, 2 = <50% of the uterine discharge is made up of purulent exudate, 3 = uterine discharge mixed with >50% purulent exudate(8)). Palpation of the uterus per rectum to estimate the uterine diameter and the presence of intraluminal fluid is commonly the sole method used for diagnosing CE. Palpation per rectum combined with vaginoscopy results in a more accurate method of diagnosis than palpation alone (9,11).

The incidence rate for endometritis in cows varies considerably among studies, perhaps owing to different methods used to classify the disease. A review of the literature shows that the percentage of cows affected with endometritis can be as high as 50% at 40–60 days in milk (10). Additional studies have reported a range of 16.9% to 34% prevalence of CE for cows examined between 21 and 28 days postpartum(12,8,3). however, based on the method used (cytology, biopsy, vaginoscopy, or rectal palpation) for diagnosis, the incidence of endometritis likely lies between 7.5% to 34% (10). A diagnosis of endometritis based on unspecified criteria has been reported to be 7.8–13.8 % (13, 14). An 18% incidence of endometritis was reported when the diagnosis was made using palpation per rectum. A mini-review published in 2009 summarized the rates and diagnostic criteria for endometritis (4).

Impact of clinical endometritis on the cow's fertility

Under normal circumstances, the genital tract of dairy cows should have recovered and able to establish and maintain a new pregnancy 45 days post-calving (4). Cows that exhibit CE take approximately 27% longer to get pregnant than normal cows (7) and are 1.7 times more likely to be culled due to reproductive failure (10). Cows with CE had a 17% reduction in pregnancy rate relative to cows with normal uterine discharge (7). Cows with endometritis have a calving interval that is 30 days longer than cows without endometritis (15). Endometritis is responsible for increased culling of cows due to reproductive failure (4). Purulent or mucopurulent discharge was associated with significantly lower pregnancy and first service conception rates (6).

Ceftiofur is a third-generation cephalosporin, an important class of antimicrobial drugs used in veterinary medicine (16). Furthermore, intrauterine infusion of ceftiofur hydrochloride positively affected uterine health in dairy cows (17). Ceftiofur has high effectiveness against all gram-positive and gram-negative pathogenic microorganisms (18). In the liver, it is converted (by hydrolysis process) into desfuroyl-ceftiofur-acetamide (**DCA**), which is an active metabolite that is protected from fast renal remove through protein binding (17).

There are few previous studies about using ceftiofur for treatment clinical endometritis in dairy cows, so this study will test this drug for treatment the cows that suffered from endometritis.

Materials and Methods

This study was conducted in college of Veterinary Medicine in Diyala governorate in a period extends from 15/2/2024 until 1/9/2024, and included twenty multiparous cows suffering from clinical endometritis(CE), and came to the veterinary clinic exist in the college and other veterinary clinics located in the province. After the taking the case history of these cows, rectal palpation was made to diagnose the clinical endometritis, which

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characterized by mucopurulent and purulent vaginal discharge and with a cervical diameter greater than 7.5 cm. after the diagnosis of (CE), all these cows were treated by intra-uterine injection of one thousands mgs (20 ml) of ceftiofur (CEFTIOFUR-VS, ((VETSINTEZ)) LLC, Kharkiv-Ukraine)(each 1ml contains 50 mg Ceftiofur hydrochloride), during estrus phase. All treated cows came to estrus within 18-23 days post treatment and were inseminated artificially, and after 20-22 days of insemination 8 cows were return and re-inseminated. After 55-60 days of late, insemination the pregnancy diagnosis was done rectally to confirm the gestation.

Statistical Analysis

The data were analyzed statistically by using Chi-square to significant compare the results at (0.05) in this study (19).

Results

As shown in table (1) the number of multiparous cows had clinical endometritis and treated with ceftiofur intra-uterine which were 20. All these cows came to estrus within 18-23 days after treatment, and had been inseminated, 8 cows were return to estrus within 20-22 days after last insemination and re-inseminated again and after 55-60 days of last insemination all cows were examined by rectal palpation and being pregnant.

Table 1: Distribution of sample study according to onset of estrus after treatment with ceftiofur.

	No and Period	No and Period	P-value
Cows	20 cows treated with ceftiofur	12 cows not return to estrus (60.00%)	0.0349 *
		8 cows return to estrus (40.00%)	
Time of onset of estrus after treatment	18- 23 days	20 - 22 days	---
Rectal palpation after last insemination	55- 60 days	20 (100%) pregnant	---
* ($P \leq 0.05$).			

Discussion

The findings of the current study showed that all twenty cows suffering from endometritis responded to the treatment by ceftiofur intrauterine therapy and came to estrus after 18-23 days after treatment and inseminated by using artificial insemination (AI). twelve (60.00%) cows not return to estrus secondly, whilst eight (40.00%) cows return to estrus within 20-22 days after last insemination and re-inseminated again and all inseminated treated cows being pregnant after 55-60 days of artificial insemination. This reveals that the cefitiofur was efficient to treat clinical endometritis in treated cows in this study.

These results are in accord with many studies indicated that cefitiofur has good efficacy in treating uterine disease such the metritis and clinical endometritis and has good role in

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enhancement of uterine health in the cows infected with uterine disease(20,21,22). However another studies disagreed with these results and demonstrated that ceftiofur hydrochloride has no effect on the reproductive performance of infected cows with endometritis(17,23). (Coto and Lucy, 2018) believed that ceftiofur was effective only in cows that did not suffer retained placenta and with two or more parturitions. Ceftiofur was efficient in removing the most causative agents of clinical endometritis more than its ability to enhance reproductive performance of treated cows suffering endometritis, and the ability of this antibiotic may be potentiated if is associated with the usage of uterine tonic hormones like oxytocin or prostaglandinF2α(24). Many previous studies that had employed ceftiofur in treating of uterine diseases like clinical endometritis and puerperal metritis recommended using this antibiotic parentally either intramuscularly or subcutaneously; as this antibiotic was highly effective in treating uterine disease in cows if it was used by this method of administration (21, 22, 26, 27). The dose of ceftiofur used in this study was relatively high (1ooo mgs) and led to good percentage of recovery which was 60%. It was well known that the highly dose of antibiotic or drug would reinforce the response to the antibiotic by the treated animals and this resulted in enhancement of reproductive performance of the involved cows in this study which reflected on the overall pregnancy rate which, was high(27, 28, 29).

Conclusion:

From these results we can concluded that antibiotic ceftiofur was highly efficient in treating clinical endometritis in cows intra-uterine, with better results if it is used with highly doses.

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