

EFFECTS OF RETAINED PLACENTA ON THE FERTILITY IN TREATED DAIRY COWS

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Abstract

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The objective of this study was to evaluate an effect of the retained placenta on reproductive performance of 222 multiparous cows. The animals with retained placenta (RP) were divided into three treatment groups (TI; n=65, TII; n=47, TIII; n=30) and control group (n=80, without RP). In RP groups, 48-72 h after calving fetal membranes were manually separated. No administered in any drugs cows in TI group. All cows in T2 and T3 groups received intrauterine 2 g chlortetracycline boluses for 3 d. All cows in T3 group received systemic antibiotic treatment consisted of 10mg/ kg oxtetracycline that was administered for 4 d and cows with fewer on day 4th received oxtetracycline for an additional 3 d. Reproductive performance data were collected until pregnancy diagnosis or at six months post-partum and documented were days of the first service, first service conception rate, days open, services per conception rate. No significantly differences were found in all groups for non-pregnant cows after 180 d after post-partum. All the reproductive parameters were obtained in treatment groups were significant differences than the control group (P<0.05). This study indicated that RP in multiparous cows resulted negative impact on the reproductive performance in all treatment groups.

Key words: cows, placenta, retention, treatment

Introduction

In a normal physiological birth three stages are recognized: dilatation of parturient canal, delivery of the fetus and expulsion of the fetal membranes. The fetal membranes are usually expelled within two to eight hours of parturition. Any retention beyond 12 hours may be considered pathological

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(Wetherill, 1965). The incidence of retained placenta varies from 4-18% of calving (Paisley et al., 1986; Eiler, 1997; Noakes et al., 2001). Although a variety of incidental factors related to management and health have been associated with retained fetal membranes, the aetiology has not been identified (Sharpe et al., 1990). The uterus normally contracts approximately fourteen times an hour immediately

following parturition but the frequency gradually diminishes to once every hour at 42 hours. With delayed involution at the uterus, which is associated with retention of the membranes, the rate of contractions is often increased but the contractions tend to be tetanic. Uterine inertia disposes to retained placenta (Wetherill, 1965).

Certain etiological factors are self-evident and anything that disposes to retained placenta (RP). There are a number of common factors, which include mechanical, nutritional; management and infectious causes affect cattle. Mechanical causes of RP include difficult birth, caesarean section, uterine torsion, abortion, stillbirth, emphysematous fetus and twin birth. Nutritional causes of RP include energy and protein, selenium, iodine, vitamin A and E and calcium deficiency during pregnancy. Management causes of retained placenta include stress hereditary, high environmental factor and obesity. Infectious placental retention is often related with a zoonosis like brucellosis, salmonellosis, leptospirosis, and listeriosis. Some viral diseases such as IBR/IPV and BVD as well as fungal diseases are also known to induce retention secundinarum (Krizanec and Kosec, 2003).

Some investigators indicated that RP is one of the main causes of endometritis in cattle (Kanee and Miller, 1995; Philips, 2004; Han and Kim, 2005). When the RP occurs vulva opens the more, fecal material and fecal microorganisms are pulled in to vagina and uterus. These microorganisms set up an active site of infection in the uterus and this can create a number of potential reproductive problems (Philips, 2004). Some authors explain a negative impact of retained placenta on reproductive performance of dairy cows (Lee et al., 1989; Joosten et al., 1998; Fourichon et al., 2000; Grohn and Rajala, 2000). However, others have reported that retained placenta does not significantly alter fertility (Halpern and Erb, 1985; Kaneko et al., 1997). The purpose of the present study was to investigate the effect of the RP on reproductive performance in treated dairy cows.

Material and Methods

The study was conducted in commercial dairy herds in region of Bursa. Cows that retained their placenta for the least 24 h after calving were included in the study. Cows undergoing a caesarean section and cows that were not supposed to be bred after calving were not included in the study. All cows were fed a consisting of corn silage, grass silage, hay, concentrates, minerals and salt. Cows for any no healthy problem except RP were included to this study.

One hundred and forty two multiparous cows with retained placenta were divided into three treatment groups and 80 calving healthy cows were occurred control group.

T I (n=65): 48-72 hours after calving each placenta was removed by manual extraction. Additional treatment was not applied.

T II (n=47): 48-72 hours after calving each placenta was removed by manual extraction and intrauterine chlortetracycline boluses (2g, Devamisin, Vetas, Turkey) were administered for three days.

T III (n=30): 48-72 hours after calving each placenta was removed by manual extraction. This group of cows were constituted with a body temperature high with $\geq 39.5^{\circ}\text{C}$ within the 4d after calving. Intrauterine chlortetracycline boluses (2g, Devamisin, Vetas, Turkey) were administered for three days and systemic antibiotic treatment consisted of 10 mg/ kg oxtetracycline (Primamycin, Pfizer, Turkey) was administered intramuscularly for 4d. Cows with fewer on 4th d received oxtetracycline for an additional 3d.

C (n=80): The animals calving healthy offspring and not having retained placenta at their last calving were chosen.

Genital organs were examined by rectal palpation and vaginoscopy twice within 30d postpartum. In this time each one of the all cows underwent a clinical examination to detect endometritis. The presence of the mucopurulent exudates in

the cervico-vaginal tract were evaluated an endometritis. At the same time if the presence of corpus luteum was detected by rectal palpation, 25 mg of PGF_{2α} (Dinolytic, Pfizer, Turkey) was administered intramuscularly. Those animals were treated with 0.1 g rifaksimim (Fatroximin, Vetaş, Turkey) by intrauterine infusion and 2.5-mg/kg enrofloxacin (Enrolen, Alke, Turkey) intramuscularly for 4d. In case of continued fever and mucopurulent exudates after this treatment, cows received a different antibiotic, an electrolyte and an antihistaminic as an escape therapy

Data of fertility indicators were collected until pregnancy diagnosis or at six months post-partum. Oestrus sings were monitored by two time's daily visual observation. Cows were inseminated utilizing the a.m./p.m. rule following detection of oestrus. Pregnancy examinations were performed 60 to 75 d after insemination. Days to the first service, first service conception rate, days open, services per conception and non-pregnant cows were calculated.

Statistical analyses. Data were analysed by analyses of variance (ANOVA) and the significance controls of the differences between the groups were determined by Turkey test. And proportional values were analysed by Chi-Square tests. SPSS 13 statistical program were used for the statistical analyses. (SPSS 13 for windows. SPSS Inc. 60606 Chicago IL, USA).

Results

The treatments begun 2.4±0.4 d, 2.3±0.4 d and 2.5±0.5 d after calving in TI, TII and TIII groups, respectively. Within the 4 d after calving the body temperatures of 30 cows (21%) with retained placenta were above ≥ 39.5°C. For two cows were needed escape therapy. The clinical variables in treatment groups are summarized in Table 1. The fertility parameters of each group (days to first service, first service conception rate, days open and service per conception rate) showed in Table 2.

Discussion

A variety of different methods of treatment for retained placenta in cows are used manual removal or some instrument and intrauterine or systemic antibiotic treatments with or without of oxytocine or PGF_{2α} (Mollo et al., 1997; Drillich et al., 2006a; Drillich et al., 2006b; Mordak, 2006). But there is always a high risk of portions of the placenta remain in the uterus. When the uterus becomes infected and inflamed, it takes much longer for the cow to clean and to be ready for the next breeding season. In general previously researches (Eiler, 1997; Han and Kim, 2005; Drillich et al., 2006b) indicated that retention of placenta was an important predisposing factor for development of post-partum uterus infection in dairy cows. Some authors (Mollo et al., 1997; Brooks, 2001; Han and

Table 1
Description of clinical variables in treatment and control cows

| Groups | Inseminated | | Endometritis | | Escape therapy | | Non pregnant after 180 days post-partum | |
|---------|-------------|----|--------------------|---|----------------|----|---|--|
| | n | n | % | n | % | n | % | |
| T I | 65 | 34 | 52.31 ^a | 0 | 0 | 16 | 24.61 ^a | |
| T II | 47 | 20 | 42.55 ^a | 0 | 0 | 9 | 19.15 ^a | |
| T III | 30 | 12 | 40.00 ^a | 2 | 6.67 | 9 | 30.00 ^a | |
| Control | 80 | 17 | 21.25 ^b | 0 | 0 | 13 | 16.25 ^a | |

^{a, b, c} Different superscripts in the same column indicate significant differences (P<0.05).

Table 2
The effect of retained placenta on reproductive performance

| Groups | n | Days to first service | First service conception rate | | Days open | Service per conception rate |
|---------|----|-------------------------------|-------------------------------|---------------------|--------------------------------|------------------------------|
| | | $\bar{x} \pm SE$ | n | % | $\bar{x} \pm SE$ | $\bar{x} \pm SE$ |
| T I | 65 | 84.45 \pm 1.27 ^a | 12 | 18.46 ^b | 133.69 \pm 2.02 ^a | 3.29 \pm 0.22 ^a |
| T II | 47 | 87.11 \pm 1.86 ^a | 10 | 27.03 ^{ab} | 129.63 \pm 2.19 ^a | 3.13 \pm 0.23 ^a |
| T III | 30 | 85.50 \pm 1.80 ^a | 5 | 16.67 ^b | 138.43 \pm 3.61 ^a | 3.38 \pm 0.33 ^a |
| Control | 80 | 78.71 \pm 1.10 ^b | 29 | 36.25 ^a | 97.40 \pm 1.82 ^b | 1.90 \pm 0.13 ^b |

^{a, b, c} Different superscripts in the same column indicate significant differences ($P < 0.05$).

Kim, 2005) reveal that incidence of endometritis after retained placenta was 64-92%. Totally in 66 cows of 142 in T1, T2 and T3 groups with retained of placenta were observed pathological vaginal discharge. This finding was in agreement with these researchers. The occurrence of endometritis significantly altered in the retained placenta group than control group ($P < 0.05$). On the other hand Risco and Hernandez (2003) described that 13% of retained placenta cows developed endometritis after preventative antibiotics treatments.

According to other studies (Stevens et al., 1995; Dinsmore et al., 1996; Drillich et al., 2006a) the incidence of fever in cows with retained placenta was high. Prevalence of fever in retained placenta cows was found 93% by Kristula et al. (2001) and 32% by Dirillich et.al. (2006b). However, the study showed that the incidence of fever was found 21% animals within the 4 d after calving. Sheldon et al. (2004) reported that significant correlation between the presence of pathogenic bacteria in the uterine lumen and high body temperature. But hygiene and or bacterial flora play an important role in the occurrence of fever.

A negative impact of retained placenta on reproductive performance of cows has been previously described (Lee et al., 1989; Han and Kim, 2005; Seifi et al., 2007). In the present study all the reproductive parameters significantly differed comparing to control group. The results of this study showed that, retained placenta was a negative affected in reproductive performance in cows.

Han and Kim (2005) and Laven and Peters (1996) indicated that retained placenta reduces fertility in two ways: firstly, by a direct effect through an unknown mechanism and secondly, by indirect effect through endometritis. Opsomer et al. (2000) demonstrated that cows with retained placenta were tended to be in risk for delayed resumption of ovarian activity. Bolinder et al. (1988) found a negative impact of a manual detachment of fetal membrane on reproductive performance. Our finding is in accordance with these researchers. On the other hand, some researchers (Kaneko et al., 1997; Heuer et al., 1999; Drillich et al., 2006a) reported that retained placenta has no negative affected on fertility.

The reproductive indicators of the control group were significantly different ($P < 0.005$) than the treatment (TI, TII, TIII) groups in our study. Days to first service of all the treatment groups was longer by 6-8 days, days open were by 32-41 days longer by and service per conception rate were higher than the control group. Our results were similar obtained by previous studies various researchers (Schindler et al., 1991; Ouweltjes et al., 1996; Han and Kim, 2005).

First service conception rate was lower in TI and TIII group and significantly after than the control. These results might explain that reproductive performance was not positive affected by these (TI, TII, TIII) treatment groups. Nevertheless some authors (Coleman et al., 1985; Kaneko et al., 1997) suggested that first service conception rate

was not related to occurrence of retained placenta but the effect of retained placenta was delayed in the days open. In the present study, days open was delayed to 32, 36 and 41 days in TI, TII and TIII groups, respectively than the control. This result was consistent with the report of Han and Kim (2005) and Borsberry and Dobson (1989). Paisley et al. (1986) showed that manual removal as well as local application of antibiotics impairs uterine defence mechanism, whereas the combination of both manipulations has a more pronounced negative effect. In the current study, TI group was consisting of manual removal and TII group was an applied intra uterine pill and TIII group was combination of both manipulations. And reproductive parameters were to regress than the healthy cows. The rate of non-pregnant cows after 180 days post-partum in treatment groups was 19-30% while control group was 16% but differences were not statistically significant. Heinomen and Heinomen (1989) reported 28-32% culling rate for retained placenta for 150 days postpartum. Our findings were in agreement with results reported by these authors (Heinomen and Heinomen, 1989).

Conclusion

The present study indicated that, retained placenta had reduced fertility and this was not changed in any way with the treatments used here. Retained placenta has detrimental effect on reproductive performance in dairy cows, independently on method of treatment.

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