

Vaginoscopy and Ultrasonography for Diagnosing Endometritis and its Therapeutic Management in Repeat Breeder Cows

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Abstract

Endometritis was evaluated in repeat breeding crossbred cows (n=40) by either by vaginoscopy or ultrasonography. The efficiency of vaginoscopic examination was high and ultrasonographic findings could only supplement the vaginoscopic findings. Intrauterine infusion of Oxytetracycline resulted in highest recovery from endometritis and subsequent conception rates compared to Ofloxacin plus Ornidazole combination, Azithromycin plus Neomycin combination or Povidone iodine.

Keywords: Endometritis; repeat breeding; ultrasonography; vaginoscopy

Introduction

A significant proportion of bovine reproduction problems can be attributed to varying degrees of endometritis during postpartum period (Yavari *et al.*, 2009). The post partum bovine uterus is often contaminated with microbes such as *E. coli*, *Staphylococci* and *Corynebacteria* (Li Xiang *et al.*, 2013). The clearance of infection is dependent on immune functions of uterus and many other factors. Bacteria often persist slowing down the uterine involution and with resultant endometritis. The consequences of endometritis could be little effects on reproductive performance to permanent sterility (Yavari *et al.*, 2009). Clinical endometritis is also known to affect the general health of animals and adversely affects their reproductive performance (Amiridis *et al.*, 2003). In dairy herds the outcome of endometritis is observed as increased days to first breeding, decreased conception rate and pregnancy rate and increased culling (LeBlanc *et al.*, 2002). Postpartum cows often evidence endometritis, 6-8 weeks postpartum (Le Blanc *et al.*, 2002a) and many of these cows may evidence repeat breeding as a clinical entity later (Rao, 1982; Purohit, 2008; Janowski *et al.*, 2013).

The diagnosis of clinical endometritis had been a subject of investigations and often when the clinical evidence of purulent or mucopurulent cervico-vaginal discharge is absent, the diagnosis remains

difficult. Traditionally trans-rectal palpation and vaginoscopy have been used as methods of diagnosis however; some studies reflect poor diagnostic efficiency of vaginoscopy (Leutert *et al.*, 2012) and transrectal palpation (Le Blanc *et al.*, 2002) compared to ultrasonography (Barlund *et al.*, 2008). Thus most diagnostic approaches for endometritis present sub-optimal sensitivity and specificity. Many type of antibiotic infusions have been suggested for therapy of endometritis such as Fluroquinolones (Purohit *et al.*, 2003; Purohit and Sharma, 2007), Oxytetracyclines (Bretzlaf, 1987) and others. The present study evaluated the existence of endometritis in repeat breeding cows by vaginoscopy and ultrasonography and evaluates suitability of therapies.

Materials and Methods

Experimental animals

Crossbred cows between 2nd to 6th parity (n=40) presented with history of repeat breeding or abnormal vaginal discharge 6-8 weeks postpartum were included in our study.

Experimental procedure

The presented cows were examined sequentially by transrectal palpation, vaginoscopy and transrectal ultrasonography. Cows with ovarian cysts were excluded the study. Vaginoscopy, transrectal examinations and transrectal ultrasonography was performed as described previously (Kumar and Purohit, 2009; Kumar *et al.*, 2013). Cows were treated randomly by either Intrauterine infusion of either 1.5 gm (30 ml) Oxytetracycline^a, a suspension of 3.0 gm Ofloxacin + 7.5 gm Ornidazole (60 mL Oflokind Oz^b), a suspension of 6.0 gm Azithromycin + 5.0 gm

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a - Brand of Zenex Animal Health, Ahmedabad

b - Brand of Vet Mankind Pharma, New Delhi

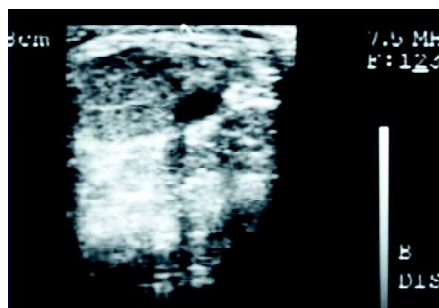


Fig. 1: Ultrasonogram of a cow 60 days post-partum showing fluid accumulation

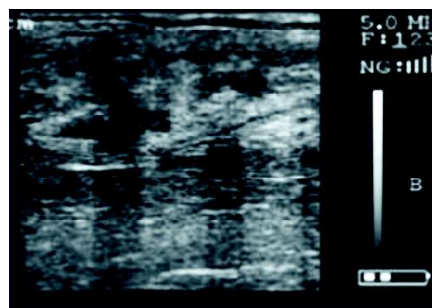


Fig. 2: Ultrasonogram showing endometrial thickening 42 days post-partum.

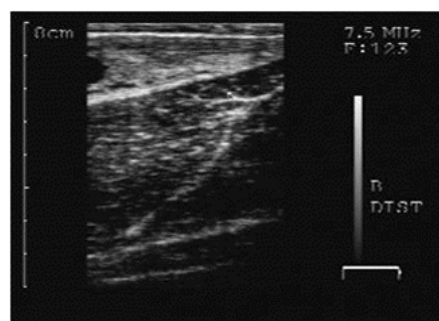


Fig. 3: Ultrasonogram of 30 days post-partum showing echogenic material in uterus

Neomycin (lural^c) or 5 percent Povidone iodine^d (30 ml) infused once daily for three days. Animals were examined again in subsequent estrus for evidence of endometritis and inseminated with frozen semen. The animals were examined again on 60th day of insemination for pregnancy to calculate the conception rates.

Vaginoscopic examination was performed using sterile vaginal speculum and light source. Transrectal sonographic examination was performed as per previously described procedures (Kumar and Purohit, 2009) using portable ultrasound machine (AGROSCAN linear, ECM 1"6 BD de la Republique, F 16000 Angouleme, FRANCE), with a linear array dual frequency probe (5.0/7.5 MHz). Transrectal ultrasonographic examination was used to evaluate accumulation of fluid in uterine lumen. Briefly, the rectum was evacuated from feces and perineal area was then washed with water. The probe of ultrasound

wrapped in disposable plastic sleeve with gel which introduced into rectum of cow and first the uterine horn of one side was scanned. The transducer was moved to another horn and entire length of horn was also scanned. Intrauterine fluid accumulation, endometrial thickening and accumulation of echogenic material were the criterion for diagnosis of endometritis using transrectal ultrasonography (Kasimanickam *et al.*, 2004; Purohit *et al.*, 2013). The images were saved in a multimedia kit attached to instrument and subsequently transferred to computer.

Results

Vaginoscopy

Endometritis was diagnosed using vaginoscopic visualization of purulent material accumulated in the vaginal vault. Flakes of pus were visible in estrual mucus in repeat breeding cows with endometritis. Of the total 40 cows presented, 30 (75 percent) cows were presented after 45 days post-partum whereas 10 (25 percent) cows were presented within 45 days of calving.

Ultrasonography

Ultrasonographic evaluation of cows suffering from endometritis revealed different degrees of changes in uterus. These included accumulation of fluid (Fig. 1), thickening of endometrial wall (Fig. 2) and presence of slight echogenic material in uterine lumen 45th day (Fig. 3). The proportion of cows showing one or all of these changes up to 45th day post-partum was 80 percent (8/10) whereas beyond 45th day post-partum none of the cows evidenced echogenic material within uterine lumen whereas the proportion of cows evidenced fluid accumulation and/or endometrial thickening was 63.33 percent (19/30).

c - Brand of Alembic Pharma Ltd., Mumbai

d - Brand of Alkem Labs, Mumbai

A comparison of the two tests for diagnosis of endometritis revealed that efficiency of vaginoscopy was high and ultrasonography can be used only as supplemental tool to detect the minor changes in uterus.

Recovery from Endometritis and Conception rates

The recovery from endometritis was adjudged by the appearance of clear cervico-vaginal mucus discharge in subsequent estrus. The proportion of cows that recovered subsequent to therapy in the Oxytetracycline, Ofloxacin and Ornidazole, Azithromycin and Neomycin and Povidone groups was 80, 60, 50 and 30 percent respectively. The maximum proportion of cows recovered in Oxytetracycline treated group and minimum proportion of cows recovered in Povidone treated group. The recovered cows were inseminated with fertile frozen semen and 62.5, 50.0, 40.0 and 33.33 percent cows conceived in the Oxytetracycline, Ofloxacin and Ornidazole, Azithromycin and Neomycin and Povidone treated groups respectively.

Discussion

Post-partum endometritis of dairy cows continues to be a major cause of poor fertility and delayed conceptions (Couto *et al.*, 2013). Diagnosis of endometritis in cattle has been hampered by lack of universally accepted definition of disease (Gilbert *et al.*, 2005; Sheldon *et al.*, 2006) and simple, effective diagnostic technique. Repeat breeding cows frequently have some degree of clinical sub-clinical endometritis hampering the establishment of normal pregnancy (Purohit, 2008). In our study, the endometritis was evaluated in post-partum dairy cows using vaginoscopy and ultrasonography. Vaginoscopy has been used to inspect the presence of pus or abnormal discharge not extruding out of vulvar lips (Runciman *et al.*, 2008a; Leutert *et al.*, 2012). In many studies, vaginoscopy has been considered more sensitive than simple external and transrectal palpation for detection of purulent discharge (Sheldon and Noakes, 1998; Le Blanc *et al.*, 2002a; Mc Dougall *et al.*, 2007; Pleticha *et al.*, 2009).

Ultrasonographic features of endometritis observed during our study such as appearance of echogenic material, fluid accumulation and endometrial thickening were similar to previous reports in cattle affected with endometritis (Kasaimanickam *et al.*, 2004; Lenz *et al.*, 2007; Oral *et al.*, 2009; Meira Junior *et al.*, 2012; Purohit *et al.*, 2013; Brodzki *et al.*, 2014).

However, echogenic pus was visible in 80 percent of affected cows only up to 45th day post-partum and in no cow beyond this period. However other sonographic diagnostic features such as anechoic fluid accumulation and endometrial thickening could be visualized in 63.33 percent of cows presented for endometritis beyond 45th day post-partum. Similar findings were previously recorded in endometritis affected cows (Kumar and Purohit, 2009; Kumar *et al.*, 2013).

During present study vaginoscopy revealed better diagnostic efficiency for diagnosis of endometritis compared to ultrasonography; the use of which was supplementary. In many previous studies, the efficiency of vaginoscopy was considered optimum for diagnosis of endometritis of cows as this approach correctly predicted uterine infections in 70-85 percent of cases (Miller *et al.*, 1980; Dohmen *et al.*, 1995; Williams *et al.*, 2005; Leutert *et al.*, 2012).

The conception rates in endometritis affected cows after recovery were highest in oxytetracycline treated cows compared to Ofloxacin and Ornidazole, Azithromycin and Neomycin or Povidone treated cows. This was probably because Oxytetracycline resulted in the best recovery as also reported previously (Makki *et al.*, 2016). Bretzlaff, (1987) had suggested that intrauterine therapy is required in post-partum cows suffering from endometritis and Tetracycline is suggested as it is active against mixed bacterial populations common during this period. The direct intrauterine administration of Oxytetracycline produces immediate therapeutic concentrations in caruncles and endometrium of both healthy and affected animals (Roncada *et al.*, 2000; Bateman *et al.*, 2002; Shams-Esfandabadi *et al.*, 2004; Kaczmarowski *et al.*, 2004) and because of its relatively lower absorption into blood stream (Roncada *et al.*, 2000), the therapeutic action is largely confined to uterine lumen and endometrium. Tetracycline are known to be active under anaerobic conditions and are partly inactivated by purulent material, cell debris found in affected uterus (Cairolì *et al.*, 1993). It was concluded that high proportion of repeat breeder cows suffer from endometritis that can be diagnosed by vaginoscopy and effectively treated by intrauterine infusions of Oxytetracycline.

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Received on: 13.11.2021
Accepted on: 15.06.2021