

## INCIDENCE OF SUBCLINICAL ENDOMETRITIS AND ITS EFFECT ON PREGNANCY OUTCOME IN ZEBU AND HF CROSSBRED COWS

K. SUNNY PRAVEEN, A. KUMARESAN\* and S. JEYAKUMAR<sup>1</sup>

Theriogenology Laboratory, <sup>1</sup>Livestock Research Centre,  
Southern Regional Station of ICAR-National Dairy Research Institute, Bengaluru-560030, Karnataka, India

Received: 12.08.2021; Accepted: 24.09.2021

### ABSTRACT

The present investigation was conducted on Zebu and Holstein Friesian crossbred dairy cows (n=18 each) to study the incidence of subclinical endometritis (SCE) and its effect on the pregnancy outcome. It was found that the overall incidence of subclinical endometritis was 28% (5 out of 18 cows in both zebu and crossbred cows) and there was no difference between the breeds. The effect of SCE on the pregnancy outcome was also investigated and results clearly revealed that the risk of low-pregnancy rates were recorded in both Zebu ( $\chi^2=6.785$ ;  $P=0.009$ ) and HF crossbred cows ( $\chi^2=4.923$ ;  $P=0.026$ ) affected with subclinical endometritis.

**Keywords:** Cytobrush cytology, Dairy cows, Incidence, Pregnancy outcome, Subclinical endometritis, Uterus

**How to cite:** Sunny Praveen, K., Kumaresan, A. and Jeyakumar, S. (2022). Incidence of subclinical endometritis and its effect on pregnancy outcome in zebu and HF crossbred cows. *Haryana Vet.* 61(SI): 114-116.

Subclinical endometritis (SCE) is one of the leading causes of infertility in dairy cows. It is associated with increased number of services per conception leading to significant financial loss to the dairy industry (Kenide *et al.*, 2016). SCE affects ovarian follicular growth, resulting in poor estrus expression due to altered estrogen synthesis (Srivastava and Kumaresan, 2016). If it remains undiagnosed, SCE develops into clinical endometritis resulting in loss of milk production and subsequent cow culling from the herd (Sheldon *et al.*, 2006). The present study aims to determine the incidence rate of SCE in Zebu and HF crossbred cows and its effect on pregnancy outcomes.

The experiment was conducted on Zebu (Deoni breed; n=18) and Crossbred (Holstein Friesian crossbred; n=18) cows aged 4 to 6 years at the Institute farm. From 21 days postpartum, all of the experimental cows were monitored daily for estrus signs. Ultrasonography was used to confirm the presence of dominant follicle on the ovary in those cows with behavioural oestrus. The typical arborization pattern of cervical mucus confirmed the presence of estrus further.

Cervico-vaginal discharge was collected on the day of estrus and evaluated for clinical uterine infection using the scale given by Sheldon *et al.* (2006). Cows with clear cervico-vaginal discharge (Grade 0) and a typical fern pattern in cervical mucus discharge underwent endometrial cytobrush cytology. Endometrial cytobrush cytology was done by using the modified cytobrush assembly fitted with Universal AI gun as per the method given by Gahlot *et al.* (2017). Cows with clear cervico-vaginal discharge and

less than 5% PMN cells in cytobrush cytology smears were considered normal, whereas those with clear cervico-vaginal discharge and more than 5% PMN cells in cytobrush cytology smears were classified as having subclinical endometritis (Dutt *et al.*, 2017).

This study also looked at the impact of subclinical endometritis on cow reproductive performance. Following sampling, the cows were inseminated on the same day and pregnancy diagnosis was performed at the appointed time. The effect of subclinical endometritis on the risk of pregnancy in dairy cows was determined using the Chi-squared test. The results showed that Zebu (n = 13) and HF crossbred (n = 13) cows were found to be normal, but 5 cows each from both Zebu and HF crossbred breeds were found to have subclinical endometritis based on the proportion of PMN cells to endometrial epithelial cells (Fig. 1). The PMN percentage in endometrial cytology samples from Zebu and HF crossbred cows is shown in Table 1A and 1B, respectively. We used  $\geq 5\%$  PMN as cut off value in uterine cytology samples to classify the cows as subclinical endometritis which is in accordance with Madoz *et al.* (2013), who reported a minimum of  $\geq 5\%$  PMN for the confirmation of subclinical endometritis in dairy cows. In the present study, overall incidence of subclinical endometritis was 27% in both Zebu and HF crossbred cows which is in line with the findings of Kumari *et al.* (2016), who reported an overall incidence of uterine disease ranging from 10.3 to 22.6% in crossbred and Zebu cattle. In line with our observations, Pascottini *et al.* (2018) also reported that the incidence of SCE was 27.8% in dairy cows.

Summary of reproductive status in Zebu and HF

Corresponding author: ogkumaresan@gmail.com; A.Kumaresan@icar.gov.in

**Table 1**  
**PMN percentage in endometrial cytology samples of Zebu and HF crossbred cows**

<b>A. Zebu cows</b>			<b>B. HF crossbred cows</b>		
S.No.	PMN (%)	Diagnosis	S.No.	PMN (%)	Diagnosis
1	1.00	Normal	1	0.00	Normal
2	0.00	Normal	2	1.50	Normal
3	0.75	Normal	3	0.00	Normal
4	0.00	Normal	4	0.00	Normal
5	0.25	Normal	5	0.00	Normal
6	0.50	Normal	6	0.50	Normal
7	1.25	Normal	7	0.25	Normal
8	3.00	Normal	8	0.00	Normal
9	0.75	Normal	9	0.00	Normal
10	2.30	Normal	10	0.25	Normal
11	2.04	Normal	11	0.00	Normal
12	2.56	Normal	12	0.75	Normal
13	0.00	Normal	13	2.82	Normal
14	14.61	Subclinical endometritis	14	5.26	Subclinical endometritis
15	10.19	Subclinical endometritis	15	26.00	Subclinical endometritis
16	9.58	Subclinical endometritis	16	7.20	Subclinical endometritis
17	14.00	Subclinical endometritis	17	13.63	Subclinical endometritis
18	5.54	Subclinical endometritis	18	5.54	Subclinical endometritis

**Table 2A**

**Reproductive status in Zebu cows**

	Pregnant	Non pregnant	Total
Normal Zebu	11	02	13
SCE Zebu	01	04	05
			18

Yates corrected  $\chi^2 = 6.785$   
(P=0.009)

**Table 2B**

**Reproductive status in HF crossbred cows**

	Pregnant	Non pregnant	Total
Normal HF crossbred	10	03	13
SCE HF crossbred	01	04	05
			18

Yates corrected  $\chi^2 = 4.923$   
(P=0.026)

crossbred cows are given in Table 2A and 2B, respectively. The results clearly demonstrated that the risk of low-pregnancy in SCE affected Zebu ( $\chi^2=6.785$ ; P value $\leq$ 0.01) and HF crossbred ( $\chi^2 = 4.923$ ; P value  $\leq$  0.05) cows. Our findings are in agreement with Kasimanickam *et al.* (2004), who reported that the subclinical endometritis

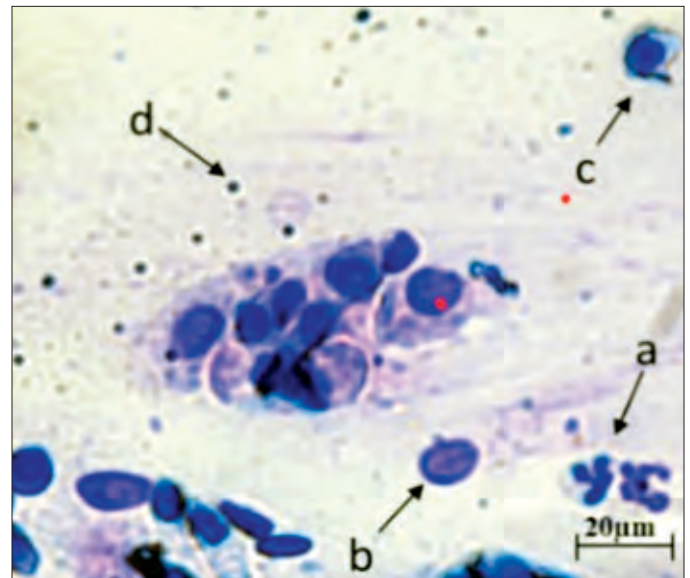


Fig. 1. Microscopic image of endometrial cytology sample.  
a : Polymorphonuclear (PMN) cell; b : Endometrial epithelial cell; c : Lymphocyte; d : Red blood cell.

negatively affects the current reproductive performance of the dairy cows in terms of decreased conception rates. The negative effects of subclinical endometritis may be due to interruption of follicular growth in the ovary and inflammation of endometrium (Kasimanickam *et al.*, 2004). Endometrial inflammation may trigger the premature release of prostaglandin transcripts from the

endometrial epithelial cells which leads to early lysis of corpus luteum on the ovary and resulting in shorter inter estrus intervals, extended days to first service and prolonged days open (Peter *et al.*, 2015).

### CONCLUSION

In conclusion, this study documented the incidence of SCE and its effect on pregnancy status in Zebu and HF crossbred cows. Early screening provides an opportunity to find the animals affected with SCE and subsequently therapeutic strategies could be designed and implemented to achieve the pregnancy, the final goal.

### ACKNOWLEDGEMENT

The authors are grateful to the Head, SRS of ICAR-NDRI, Bengaluru for providing all sort of facilities to carry out the study. The authors are also thankful to SVVU, Andhra Pradesh for providing support and guidance to carry out research at Southern Regional Station, ICAR-NDRI, Bengaluru.

### REFERENCES

Dutt, R., Singh, G., Singh, M., Sharma, M., Dalal, J. and Chandolia, R.K. (2017). Diagnosis of subclinical endometritis in murrh buffaloes through cytobrush technique. *Int. J. Curr. Microbiol. App. Sci.* **6(11)**: 494-499.

Gahlot, S.C., Kumar, S., Kumaresan, A., Chand, S., Baithalu, R.K., Lathika, S. and Mohanty, T.K. (2017). Efficiency of uterine fluid cytology in the diagnosis of subclinical endometritis in the water buffalo (*Bubalus bubalis*). *Reprod. Domest. Anim.* **52(3)**:

513-516.

Kasimanickam, R., Duffield, T.F., Foster, R.A., Gartley, C.J., Leslie, K.E., Walton, J.S. and Johnson, W.H. (2004). Endometrial cytology and ultrasonography for the detection of subclinical endometritis in postpartum dairy cows. *Theriogenology*. **62(1)**: 9-23.

Kenide, H., Getaneh, G. and Wubie, A. (2016). Subclinical endometritis and its effect on the fertility of dairy cattle. *World J. Pharm. Med. Res.* **2(5)**: 01-09.

Kumari, S., Kumaresan, A., Patbandha, T.K. and Ravi, S.K. (2016). Risk factors for metritis and its effect on productive and reproductive performance in dairy cattle and buffaloes. *Agricul. Res.* **5(1)**: 72-80.

Madoz, L.V., Giuliadori, M.J., Jaureguiberry, M., Plontzke, J., Drillich, M. and De la Sota, R.L. (2013). The relationship between endometrial cytology during estrous cycle and cutoff points for the diagnosis of subclinical endometritis in grazing dairy cows. *J. Dairy Sci.* **96(7)**: 4333-4339.

Pascottini, B., Hostens, M. and Opsomer, G. (2018). Cytological endometritis diagnosed at artificial insemination in repeat breeder dairy cows. *Reprod. Domest. Anim.* **53(2)**: 559-561.

Peter, S., Michel, G., Hahn, A., Ibrahim, M., Lubke-Becker, A., Jung, M. and Gabler, C. (2015). Puerperal influence of bovine uterine health status on the mRNA expression of pro-inflammatory factors. *J. Physiol. Pharmacol.* **66(3)**: 449-462.

Sheldon, I.M., Lewis, G.S., LeBlanc, S. and Gilbert, R.O. (2006). Defining postpartum uterine disease in cattle. *Theriogenology*. **65(8)**: 1516-1530.

Srivastava, A.K., and Kumaresan, A. (2016). Status paper on uterine infection in dairy animals. NDRI publication no. 142/2016. p. 28.