

# Comparison of diagnostic methods for uterine health in dairy cattle on different days postpartum

H. Kusaka, R. Hasegawa, N. Nishimoto, M. Kawahata, H. Miura, M. Kikuchi, M. Sakaguchi

## Introduction

Reproductive performance is a key factor for the profitability of the dairy industry. As such, several methods for monitoring uterine status have been developed to improve fertility in postpartum dairy cows. Ultrasonography (UT) can be applied to confirm the presence of echogenic fluid in the uterus, and a metricheck device (MT) can be used to collect vaginal discharge – the most evident indicator to determine the presence of a genital inflammatory response.

The cytobrush (CYT) technique has recently been recommended as a more accurate method to evaluate uterine endometrial health status. However, few studies have directly compared this method with UT and MT. The aim of this study, therefore, was to compare the postpartum uterine status obtained using these three monitoring methods. A secondary aim was to evaluate the practical potential of combining UT and MT.

## Approach

Data were collected from 28 lactating Holstein cows that calved between January 2016 and December 2017 at the Livestock Research Institute of the Aomori Prefectural Industrial Technology Research Centre

**H. Kusaka, R. Hasegawa, H. Miura, M. Kikuchi, M. Sakaguchi**, Theriogenology, School of Veterinary Medicine, Kitasato University, Towada, Japan

**N. Nishimoto, M. Kawahata**, Dairy, Forage Crop and Environment Section, Livestock Research Institute of the Aomori Prefectural Industrial Technology Research Centre, Noheji, Japan

email: saka99@vmas.kitasato-u.ac.jp

This is a summary of a paper that is published in full at [veterinaryrecord.bmj.com](http://veterinaryrecord.bmj.com)

Published Online First 26 November 2019

*Veterinary Record* (2020) 186, 91

Cite as doi: 10.1136/vr.105300

## KEY FINDINGS

- The agreement between the results obtained using ultrasonography (UT), a metricheck device (MT) and a cytobrush (CYT) technique was poor up to six weeks after calving, and only at seven weeks after calving was moderate agreement achieved.
- The combined use of UT and MT provided results that were equivalent to those obtained using CYT.

in Japan. Once a week (between two and seven weeks after calving), vaginal discharge was collected from each cow by MT, and UT and CYT were performed.

Cows with echogenic uterine fluid were designated as UT-positive, and those with purulent material in the vaginal discharge were designated as MT-positive. For CYT, endometrial cytology slides were examined to determine the percentage of polymorphonuclear leucocytes present. Cows were designated as CYT-positive if the percentage exceeded 18 per cent at two or three weeks after calving, 8 per cent at four weeks after calving or 6 per cent thereafter.

The level of agreement between the three tests was then examined using the  $\kappa$  statistic. The sensitivity and specificity of UT and MT were also calculated, using CYT as a reference.

## Results

The percentage of cows that were MT-positive, UT-positive or CYT-positive decreased dramatically at three, four and five weeks after calving, respectively. The agreement between the results of the three tests was poor up to six weeks after calving ( $\kappa=0.09-0.35$ ), and only at

seven weeks after calving was moderate agreement ( $\kappa=0.60-0.70$ ) achieved. For more than 30 per cent of the cows, there was disagreement in the UT and MT results obtained from samples taken between three and six weeks after calving.

When using a combination of UT and MT to diagnose uterine health, the results were similar to those obtained using CYT. The highest sensitivity was achieved when positive individuals were identified as either MT-positive or UT-positive, while the highest specificity was achieved when both MT and UT were positive.

## Interpretation

The findings of this study demonstrate that there is generally a poor agreement between the three diagnostic methods tested. This is likely to result in inaccuracies when evaluating the uterine health status of cows under field conditions, which could lead to reduced reproductive performance. However, the number of cows examined in this study was small. As such, care should be taken when extrapolating the findings to a larger population.

The results also indicate that the combined use of UT and MT can provide similar results to the use of CYT. Where cost or convenience prohibits the use of the more accurate CYT, using a combination of UT and MT could be a useful approach for routine evaluation of uterine health in dairy cattle.

## Significance of findings

The accuracy of methods to evaluate early postpartum uterine health status was found to vary substantially depending on the time elapsed since calving and the diagnostic method used. To help ensure an accurate, early diagnosis under field conditions, it is recommended that UT and MT are used in combination.