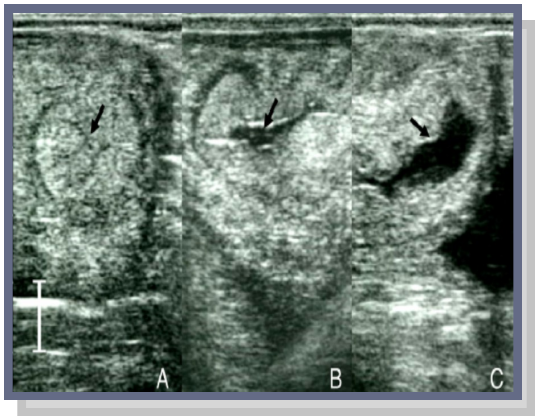
Combining ultrasonography and cytology can assist in assessing uterine inflammation

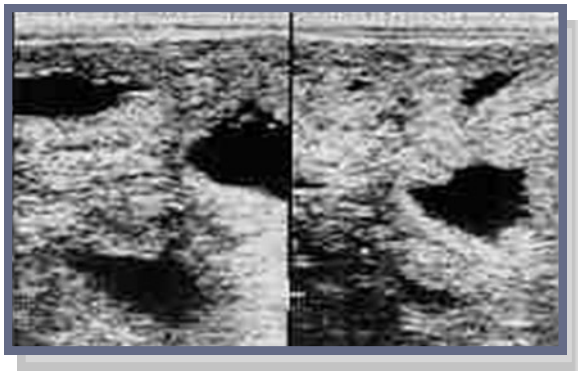
Uterine contamination negatively affects reproduction in dairy cattle

Uterine infection delays resumption of normal ovarian activities by suppressing growth of eggs, often causing significant economic losses to dairy producers. Infection is quickly followed by intensive migration of polymorphonuclear (PMN) cells into the uterus; the relative amount of these cells in relation to normal uterine cells reflects the severity of infection. The cytobrush technique is a reliable method of determining the proportion of PMN cells.



Uterine fluid groupings. (A) No fluid; (B) Small volume; (C) Large volume.

In our study, 42 lactating Holsteins were examined post-calving using ultrasonography to determine the number of days between pregnancy and ovulation. Twenty five days after calving, a cytobrush was used to obtain samples from uterine surfaces, and ultrasonography was used to measure the diameter of the uterus as an indirect measure of the amount of fluid it contained.



Ultrasound images of uterus

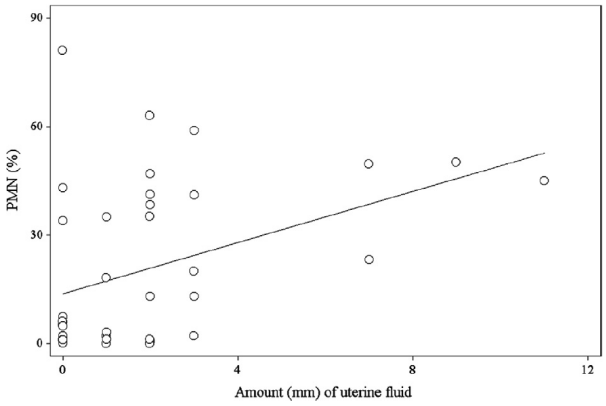
Cows with higher levels of infection experienced delayed ovulation post-calving

Cows with a high proportion (i.e. greater than 8% of all cells counted) of PMN cells had a period between calving to ovulation that was 13 days longer than those with a low proportion. In addition, more first-calf heifers experienced high PMN counts than cows who had previously had one or more calves. Moreover, these high-PMN heifers took longer to ovulate than the high-PMN cows, suggesting that uterine infection was more detrimental to the heifers than the cows.

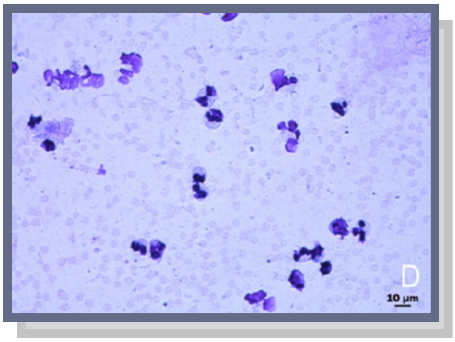
This relationship between uterine infection and delayed ovulation may be due to the effect of estrogen on reducing the incidence of infections: since the ovaries produce estrogen, the earlier resumption of ovarian activity in low PMN cows may have afforded them earlier and better protection.

Uterine fluid volume increases with an increase in PMN cells

Cows with no uterine fluid had an average of 14% PMN cells, while those with a large uterine lumen indicative of a large volume of fluid had 34% PMN. This correlation suggests that ultrasonography can be used in combination with cytological samples to determine the presence of uterine infections in dairy cows.



Increases in PMN% corresponded to increases in fluid



Cytological image of uterine fluid

Despite this relationship, the presence of uterine fluid 25 days after calving did not appear to affect the length of time between calving and first ovulation. Interestingly, cows with fluid had fewer days open and a higher rate of conception after the first insemination than those without fluid. We suspect that the presence of uterine fluid indicates that an active inflammatory process is occurring to fight off the infection, resulting in a shorter time period between calving to conception.

Acknowledgements

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Dourey, A., M. G. Colazo, P. P. Bajaras, D. J. Ambrose. *Relationships between endometrial cytology and interval to first ovulation, and pregnancy in postpartum dairy cows in a single herd*. 2011. Research in Veterinary Science 91(3): 149-153.

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