Metritis in early lactation in dairy cows: energy balance, ovarian function, incidence of subclinical endometritis and reproductive performance

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Uterine inflammatory diseases are prevalent in bovine dairy herds and responsible for major economic losses. In Israel, dairy cows are routinely examined by farm veterinarians at 5 - 12 days in milk (DIM); metritis is defined as presence of a fetid, watery to purulent vaginal discharge and an enlarged uterus. Objective was to compare healthy cows to those with metritis, based on indicators of energy balance, ovarian function, incidence of subclinical endometritis and reproductive performance. Holstein-Friesian cows (n = 66) were included in a case-control study [healthy (n = 33) and metritis (n = 33)]. Clinical examinations (transrectal and vaginal examinations) and sampling (endometrial cytology and blood) were performed at 5 - 12, 30 - 37 and 60 - 70 DIM. Ovarian function was assessed by neck tag activity records (SCR heat-detection) and serum concentrations of progesterone and anti mullerian hormone (AMH). Body Condition Scores (BCS) and serum concentration of non-esterified fatty acids (NEFA) and beta-hydroxybutyrate (BHBA) were analyzed. Compared to healthy cows, metritis cows had reduced ($p < 0.05$) reproductive performance (pregnancy rate at 150 DIM: 60 versus 33.3%; interval from AI to conception: 47 ± 9 versus 64 ± 10 days); and a trend ($p = 0.08$) towards less milk yield by 90 DIM (4062 ± 134 versus 3883 ± 108 liters). Among primiparous cows, those with metritis at 5 - 12 DIM had higher ($p < 0.05$) incidence of cytological endometritis at 30 - 37 DIM (healthy: 8% versus metritis: 58%), whereas among multiparous cows there was no difference. Overall, serum NEFA, BHBA and AMH did not differ between healthy and metritis groups; however, AMH was higher ($p < 0.05$) in multiparous cows compared to primiparous cows. Among primiparous cows, the first detected estrus tended to be earlier in healthy compared to metritis cows (45 ± 6 versus 73 ± 12 DIM), with more estruses detected by 70 DIM (1.5 ± 0.3 versus 0.8 ± 0.3). Overall, cows that had estrus prior to 50 DIM had higher ($p < 0.05$) pregnancy rate at 150 DIM than cows that had estrus later (63.6 versus 25%). In summary, early metritis (5 - 12 DIM) was associated with alteration of ovarian activity, higher incidence of subclinical endometritis and poor reproductive performance later in lactation.

Keywords: Bovine, metritis, endometritis, energy balance