

Feeding behavior, milk yield, activity, and insulin sensitivity in lame dairy cows

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Lame dairy cows often show increased plasma levels of non-esterified fatty acids (NEFA) which may be due to pain induced decreased feed intake and hence more fat mobilization from adipose tissues or reduced insulin sensitivity. Thus, aim of the study was to investigate feeding behavior, activity and insulin sensitivity in lame dairy cows. 21 pluriparous lame dairy cows (sole ulcers or white line disease of one hind limb; lameness score ≥ 2 on a scale from 0-5) were detected by bi-weekly lameness scoring. Lame cows were matched with healthy herd mates (controls) according to parity and days in milk. All cows received functional claw trimming and lame cows additionally claw treatment of the affected claw. Feeding behavior (dry matter intake (DMI), number of trough visits, feeding rate), body weight, milk yield and milk constituents were automatically recorded on a daily basis from day -7 to day 7 related to the day of lameness detection (d0). Activity was recorded by pedometers. Blood samples were collected from d0 to d7 and analyzed for glucose, NEFA, insulin (from which RQUICKI was calculated as a surrogate insulin sensitivity index) and cortisol. Compared to controls in average lame cows showed longer lying periods (11 vs. 13 hours/d, resp., $p < 0.01$), spent less time feeding (188 vs. 155 min/d, resp., $p < 0.01$), had less trough visits (48 vs. 31/d; $p < 0.05$), and higher feeding rates (116 vs. 143 g/min, resp., $p < 0.05$). However, daily DMI, milk yield and calculated energy balance did not differ between controls and lame cows. Mean plasma concentrations of glucose, insulin, and cortisol did not differ significantly between groups. In lame compared to control cows mean plasma NEFA (340 vs 175 $\mu\text{mol/l}$, resp., $p < 0.05$) was higher and RQUICKI was significantly lower (0.44 vs. 0.58, resp., $p < 0.05$). Since DMI remained almost unchanged in cows with early detected mild lameness elevated NEFA levels may be due to reduced activity and muscular NEFA utilization or may be an expression of increased fat mobilization due to decreased insulin sensitivity. It may be also possible that cows with reduced insulin sensitivity are disposed for claw defects.

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