Session 2.1: Advances on monitoring welfare at group and individual level.

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## IDENTIFICATION OF BEHAVIORAL PATTERNS ASSOCIATED WITH ACIDOSIS IN DAIRY COWS

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Acidosis is a major health and welfare issue, especially in high-producing dairy cows. During acidosis, rumination is affected, as early as a few days before diagnosis. For this reason, behavioral patterns can be considered as promising indicators for the early detection of acidosis. However, the power of behavior analysis to predict acidosis can go much further, and behavioral patterns of healthy dairy cows, weeks or months before the onset of acidosis, could be used as a risk factor for the disease. The aim of this study was to determine whether cows that will subsequently develop acidosis, show early distinctive behavioral patterns associated with the disease compared to healthy cows. Daily hours spent standing, lying down, walking, ruminating and eating were recorded from calving to 15d prior acidosis using accelerometer collars on two commercial farms in Spain and two others in Italy. The acidosis group (n=10) included cows that suffered an episode of acidosis during lactation. Acidosis was diagnosed by veterinary records in both countries. In Spanish farms, acidosis cases were confirmed by rumen pH measured by boluses (smaXtec Animal Care GmBH, Graz, Austria; a cow was confirmed as suffering from acidosis when exhibiting a rumen pH below 5.6 for at least 50 min/day). A control group of healthy cows (n=10) balanced for parity and lactation stage was constituted afterwards. The daily milk production before the diagnosis of acidosis was similar in both groups. The group effect (acidosis vs. healthy) on the intercept and the slope of the regression curve of each individual cow for all behaviors was analyzed using ANOVA. The group significantly affected the intercept of the regression curve for the ruminating, lying down and eating duration showing that cows in the acidosis group spent more time lying (10.55 vs. 10.22 h/d) and eating (3.55 vs 3.41 h/d) 85 days before the onset of acidosis ($P$<0.001), compared to control cows. In addition, the rumination duration of acidosis cows was higher (7.73 vs. 6.86 h/d) 115 d before the onset of acidosis, but lower (7.33 vs 7.81 h/d) 35 d before the onset of acidosis, compared to the control cows. The trend in rumination duration over time prior to acidosis was also different as shown by the lower slope coefficient for acidosis cows (P<0.001). This study suggests that cows that will subsequently suffer from acidosis might expressed distinct behavioral patterns (e.g. rumination) already three months prior to the onset of acidosis. Further research with a larger sample size is needed to confirm whether differences in behavioral patterns can be considered as promoters of acidosis. This study was conducted within the ClearFarm project which received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 862919