Investigation of body condition score and insulin sensitivity (RQUICKY) in downer cow syndrome

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Downer cow syndrome is a condition frequently observed in dairy cattle herds in the early post-partum. The aetiology, mainly of metabolic origin, is not often well determined, as it can be related to the energetic or ionic (Ca, P, K) metabolism, as well as infectious diseases or trauma.

The aim of this study was to assess one of the metabolic pathway, in determining the Revised Quantitative Insulin Sensitivity Check Index (RQUICKY), as well as the body condition score (BCS) in downer cows.

A prospective study was undertaken on 342 dairy downer cows. Plasmatic glucose, insulin and free fatty acids (FFA) were assayed in all the cows, in order to calculate the RQUICKY, as follows: 1 / [log (insulin) + log (glucose) + log (FFA)]. BCS was also noted on a scale from 1 to 5. Comparison with 237 healthy dairy cattle was made according to data from the literature (*t*-test). Influence of BCS on RQUICKY was assessed in downer cows using least squares means comparisons and ANOVA-test.

A significant difference ($p<0.001$) between healthy cattle (0.5 ± 0.15, mean ± SD) and downer cows (0.35 ± 0.07) was observed for RQUICKY. Concentration of glucose, FFA and insulin in downer cows were respectively 4.52 ± 2.83 mmol/L (3.23 ± 0.10 in healthy cows), 0.92 ± 0.42 mmol/L (0.26 ± 0.03 in healthy cows) and 16.52 ± 8.80 mU/L (8.84 ± 0.9 in healthy cows). There was no significant correlation between BCS and RQUICKY in downer cows in this study ($p>0.1$).

RQUICKY seems to be a new interesting tool to assess metabolic disorders in milking dairy cattle, especially in downer cow syndrome. There is a lack of reference values in sick or healthy cattle for RQUICKY. Nevertheless, in healthy cattle, some authors have observed good correlation between RQUICKY and BCS. Further research must be done to determine a predictive value of metabolic disorders such downer cow syndrome with the evolution of BCS and RQUICKY.