

Associations between cortisol, γ -globulin and body weight upon arrival in veal calves

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Objective

Male dairy calves are exposed to a series of stressors before arriving at the veal facilities. An insufficient amount of maternal immunoglobulin and low body weight upon arrival have been identified as risk factors for morbidity and mortality. Measuring cortisol concentration at arrival might offer additional information to classify the disease risk. The objective of this prospective cohort study was to determine the association between cortisol, γ -globulin concentration and body weight in Holstein calves at arrival on the veal farm.

Materials & methods

A total of 105 calves were randomly selected from two consecutive production cohorts on the same veal farm. Animals were weighed upon arrival, serum cortisol concentration, total protein (TP), and protein fractions were determined. A mixed model with cohort as random effect was built.

Results

At arrival, cortisol levels were significantly higher in the second cohort ($299 \text{ nM} \pm$ standard deviation (SD) 158 vs. 243 ± 111), and ranged from 138 to 875 nM. Average arrival weight was $48.0 \text{ kg} \pm 3.1$ (Range=39.5-56.8) and average γ -globulin concentration was $10.3 \text{ g/L} \pm 4.6$ (1.4-22.2), with no significant differences between both cohorts. Of the calves, 32.3% had γ -globulin levels lower than the previously documented 7.5 g/L threshold for increased disease risk. Increasing cortisol levels were associated with reduced β -globulin concentrations ($P < 0.001$), but not with arrival weight ($P = 0.13$). Arrival weight was significantly associated with TP ($P = 0.05$) and β -globulins ($P = 0.02$). Moreover, albumin concentration at arrival was positively associated with slaughter weight ($P < 0.001$).

Conclusion

Arrival weight, γ -globulins and cortisol offer distinct information upon arrival. Further exploring the serum β -globulin fraction will be interesting for its positive association with body weight at arrival and negative association with the serum cortisol concentration.