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The relationship between calving, colostrum management and passive immune transfer

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Failure of passive immune transfer is a widespread problem in dairy farming. Recent scientific recommendations and welfare requisites indicate that passive immune transfer (PIT) should not be treated as a binary variable but as a continuous variable. In other words, the calf benefits from the best immunization possible. So, the objective of this study was to investigate the management factors associated with the PIT in dairy calves. Blood sampling was performed in 35 calves within 24 to 72 h after birth, from 2 dairy farms in Alentejo, Portugal, and total protein in serum (TPS) was measured with a refractometer. A corresponding sample of the first colostrum meal was collected and Brix % was measured with a Brix refractometer. Heart girth (HG) was measured in every calf within 72h of birth. Calving difficulty (CD), calving time (CT), colostrum volume (Vcol) and delivery time (Tcol) were recorded. Correlations and a multi-regression model were performed to analyze the influence of Brix, Tcol, Vcol and HG on TPS. The influence of CD and CT on TPS was tested in a two-way ANCOVA, using Brix as a covariate. 78.1% of calving events occurred with “No assistance” and 21.9% with “Easy assistance”. CT was not measured in 14.3%, from the remaining, 73.3% was less than 60 min and 26.7% more than 60 min. Vcol variated from 2.9 to 4 L, with a mean of 3.8 L, being administered between 50 to 455 min after birth, with a mean value of 141.6 min and a mean Brix of 25.6 % (17.7 to 34.6 %). Calves HG variated between 59.5 and 84.5 cm (mean of 76.3 cm). TPS had a mean of 6.7 and ranged from 5.2 to 8.6 g/dL. Brix was the only variable with a significative correlation with TPS. Vcol, Tcol, CD and CT did not influence the TPS in this study. For each increase in 1% of Brix, TPS is expected to increase by 0.179 g/dL ($r=0.728$; $R^2=0.53$). These results suggest that colostrum quality is the most crucial factor intervening in PIT process for calves born and managed under the conditions described in this study.

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