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Evaluation of the birth impact in the newborn dairy calf using ethophysiological measurements

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The calving moment is one of the most stressful events in the calf's life. Therefore, evaluating the level of the birth impact in the calf can provide valuable information for both nursery and research activities. The evaluation can be performed by measuring calf's vitality, or vigor, using ethologic and physiological parameters. However, there is a lack of general agreement regarding which measures are more suitable. In this paper, we aimed to evaluate the dairy calf's ethophysiological profile (EPP), taking into consideration calving time and calving difficulty. The EEP from twenty-five calves belonging to two dairy farms were evaluated after birth in a scoring system from 0 to 3, with 0 being the normal state and 3 being the most impaired condition. The EEP consisted in measuring six variables: i) meconium staining; ii) head and tongue swelling; iii) intensity of response to a stimulus (straw in nostril); iv) sucking reflex; v) time until independent locomotion and vi) rectal temperature. All scores were combined into one global score, with higher scores representing a worse vigor condition. Oxygen-carrying capacity was assessed through hematocrit determination. Calf delivering time and calving difficulty were also registered. Total serum proteins (TSP) were measured 24h after birth for passive immune transfer (PIT) analysis. Descriptive statistics, Pearson correlations and principal component analysis (PCA) were performed to determine the possible association between all the parameters. The PCA showed that meconium staining, head and tongue swelling and intensity of response to a stimulus were positively correlated with calving difficulty and calving time. Rectal temperature was inversely correlated with calving ease. Calves with delayed independent locomotion were associated with lower hematocrit, which can be related to hypoxia. TSP mean was 5.23 ± 0.69 g/dL, indicating a sufficient level of PIT. Occurrence of calves with better vigor was correlated with higher scores of TSP. Although further evaluations are required to enlighten some physiologic results, this trial showed that the ethophysiological traits measured in this preliminary study were feasible to evaluate the impact of the birth in the newborn dairy calf. Also, a more vigorous state at birth can lead to a better PIT.