

Association between calving difficulty score and intrapelvic dimensions, calf hoof circumference, and calf birth weight in Holstein-Friesian cattle

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Introduction

Dystocia in cattle results in pain and suffering, and is an important cause of calf mortality and economic loss in the dairy and beef industries. Accurate prediction of dystocia will facilitate earlier intervention in cattle undergoing parturition. The objective of this study was to determine associations between calving difficulty score and intrapelvic dimensions, calf hoof circumference, and calf birth weight in Holstein-Friesian cattle.

Materials and Methods

Internal pelvic height and width were measured using a Rice Pelvimeter (Lane Manufacturing, Denver, CO, USA) in 35 primiparous and 75 multiparous Holstein-Friesian cows in the last week of gestation. Intrapelvic area was calculated by multiplying intrapelvic height by width. Calving difficulty was scored using the National Association of Animal Breeders system on a scale of 1 (no problem) to 5 (extreme difficulty). Calf forelimb hoof circumference was measured by means of a flexible measuring tape placed around the coronary band. Calf birth weight was measured on a weight scale within 2 hours after birth. Data were analyzed by means of Spearman's correlation coefficient, Student's *t*-test, and Mann-Whitney test; and values of $P < 0.05$ were considered significant.

Results

The mean calving difficulty score for primiparous cows (geometric mean, 2.9) was significantly ($P < 0.0001$) greater than that in multiparous cows (1.5). Mean intrapelvic area in primiparous cows (mean \pm SD, 41.4 \pm 5.1 inches² or 267 \pm 33 cm²) was significantly ($P < 0.0001$) less than that in multiparous cows (49.3 \pm 4.6 inches² or 318 \pm 30 cm²), whereas forelimb hoof circumference (7.0 \pm 0.36 inches or 17.8 \pm 0.9 cm; $P = 0.37$) and birth weight (97 \pm 11 lb or 44.1 \pm 5 kg; $P = 0.90$) were similar for both primiparous and multiparous cows. Calving difficulty score was positively associated with calf birth weight in primiparous ($\rho = 0.39$; $P = 0.029$) and multiparous ($\rho = 0.24$; $P = 0.037$) cows, as well as forelimb hoof circumference in primiparous cows ($\rho = 0.35$; $P = 0.044$), but was not associated with intrapelvic area in primiparous ($P = 0.73$) or multiparous ($P = 0.23$) cows. Forelimb hoof circumference was positively associated with calf birth weight ($\rho = 0.63$; $P < 0.0001$).

Significance

Measurement of forelimb hoof circumference at parturition is predictive of calf birth weight, and consequently the calving difficulty score, in primiparous Holstein-Friesian cows.