

Effect of High Somatic Cell Counts on Reproductive Performance of Chilean Dairy Cattle

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Introduction

Mastitis is caused by environmental or contagious bacteria related to poor milking procedures or hygiene, and continues as an economically important disease. Clinical mastitis may affect the interestrus interval and cause abortion by stimulating the release of inflammatory mediators and pyrexia. Subclinical mastitis results in lower reproductive performance, and a negative effect of a linear somatic cell count on embryo survival has been reported. Still, a paucity of research exists on the magnitude of the effect of subclinical mastitis on reproductive performance of lactating dairy cows. The hypothesis was that subclinical mastitis, diagnosed by an elevated somatic cell count (SCC), affects fertility and reproductive performance of dairy cattle by a reduction in conception and an increase on the risk of abortion. The objectives were to evaluate the effect of high SCC during early lactation on reproductive performance, and to determine the association between a high linear SCC (LNSCC) and the risk of abortion in a population of central-southern Chilean dairy cattle.

Materials and Methods

The study used records from a population of 157 Chilean dairy farms, and considered 1,127,405 test day records including 101,944 lactations that began between 1997 and 2006. Data were obtained by certified technicians during monthly visits to the farms. Reproductive performance was evaluated by the following outcome variables: 1) calving to first service interval (CFSI), defined as the number of days between parturition and the subsequent first breeding, 2) calving to conception interval (CCI), defined as the number of days between parturition and the breeding that resulted in pregnancy, 3) services per conception (SC), defined as the number of breedings that a cow required to conceive, 4) conception at first service (CFS), defined as the result of a first breeding after calving, and 5) abortion occurrence, defined as the loss of the conceptus after 45 d of gestation until 270 d of gestation. The explanatory variables of interest were LNSCC between calving and first ser-

vice, LNSCC between calving and a fertile service, and LNSCC in the proximity of the date of first breeding and occurrence of a high LNSCC (score ≥ 4.5) during the first 90 d of gestation. Other explanatory variables were parity, calving season, year of calving, milk production (305 d), and herd production level. General linear models, logistic regression, and survival analysis were used in the analyses.

Results

Means for CFSI, CCI, and the SC were 92.8 d, 136 d, and 1.84, respectively. Time to first breeding was 21.8 d longer in cows with at least one high LNSCC before the first breeding compared to controls. Cows with at least one high LNSCC before the fertile breeding had an increment in time to conception of 48.7 d and required on average 0.49 more services to conceive. The odds of conception at first service in cows with a high LNSCC within 30 d before [after] breeding were 0.85 (95% confidence interval (CI), 0.81 to 0.89) and [0.82] [95% CI, 0.78 to 0.87] times the odds of conception for cows without a high LNSCC during that period. The Cox proportional hazards model indicated the risk of pregnancy decreased by 44% if a high LNSCC occurred before breeding. Cows experiencing a high LNSCC (≥ 4.5) during the first 90 d of gestation had an increased risk of abortion. This group was 1.22 (95% CI, 1.07 to 1.35) times more likely to undergo an abortion than cows without a high LNSCC. The odds of abortion increased with the number of infertile breedings prior to conception and decreased with year of calving and lactation number.

Significance

Subclinical mastitis, measured by a LNSCC ≥ 4.5 , had a significant impact on reproductive performance in Chilean dairy cattle, manifested by increased CFSI, CCI, and SC. High LNSCC in the proximity of the first breedings had a detrimental effect on conception. The odds of occurrence of abortion for cows with high LNSCC during the first 90 d of gestation were increased compared to unaffected cows.