

Early Postpartum Biochemical Parameters Related to Dairy Cow Removal

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Purpose: A large proportion of dairy cow death is concentrated within the early postpartum period. Detection of discriminating characteristics within this period may be useful for defining cows at risk for premature removal from a herd.

Materials and Methods: This study explored the value of analyzing standard biochemistry and management characteristics of early postpartum cows in determining features related to removal (death and culling). Serum was collected from cows at 3 to 5 days postpartum on two intensive, Colorado dairies. Biochemistry panels for 47 cows that were removed from the dairies within 30 days of parturition (cases) were compared with herd cohorts surviving through 100 days in milk (controls), matched by calving date and lactation.

Results: Wilcoxon signed-rank test analysis demonstrated that levels of calcium, total protein, albumin, total bilirubin (TB), creatine kinase (CK), aspartate aminotransferase (AST), potassium, and anion gaps differed significantly between cases and controls ($P < 0.05$). Associations between dairy cow removal and biochemical (19) and animal management characteristics (4) were evaluated univariately via a Chi-square test. Ten variables with $P < 0.15$ were selected for ordinal logistic regression analysis. Stepwise backward and forward selection resulted in four significant variables ($P < 0.1$): TB, CK, AST, and drench administration. The odds of removal were 3.3, 2.8, and 5.7 times higher among cows with elevated levels of TB, CK, and AST. The odds of removal were 5.7 times higher among cows that were assessed to need systemic treatment in the form of a drench.

Conclusions: Appropriate fresh cow management may be guided through adjunctive biochemical analysis, highlighting areas that require modification in an effort to improve postpartum health, such as transition cow and calving management, post-partum cow-side evaluation, and therapy protocols. Similarly, fresh cow assessment that recognizes discriminating systemic characteristics (as evidenced by the application of a drench in this study) may provide insight into useful modifications for individual sick cow management.