

American Journal of Veterinary Research. Sept 1991. v. 52 (9) p. 1492-1496.

Effect of vaccination with the R mutant Escherichia coli (J5) antigen on morbidity and mortality of dairy calves.

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A prospective cohort study was undertaken to determine the efficacy of Escherichia coli 0111:B4 (J5) vaccination in dairy calves. Calves on 2 units were vaccinated when they were 2 to 3 days old and 2 weeks later with the J5 antigen or they were left unvaccinated, and were observed during the first 60 days of age for morbidity and mortality. Events recorded were death, the first case of illness, the first sign of a respiratory tract condition, the first sign of diarrhea, and the first treatment. The time to death or to a morbid event was examined as a function of vaccination status, using the Cox model of survival analysis, where serum IgG concentration at 2 to 3 days of age and gender of the calf were included to control confounding. Signs of morbidity in 517 calves were followed, 189 from unit 1 and 328 from unit 2. Vaccination was associated with a 2.15-fold reduction in risk of death on unit 2 ($P = 0.042$), but with a 2.43-fold increase in risk of death on unit 1 ($P = 0.0035$). The only association found between vaccination and morbidity was a 1.34-fold reduction in risk of respiratory tract signs for vaccinated calves on unit 2 ($P = 0.055$). Necropsy results and clinical investigations indicated that calves on unit 1 were poorly nourished and emaciated. Antibodies to J5 2 weeks after vaccination were significantly ($P = 0.0002$) lower in calves on unit 1 than in calves on unit 2. The findings offered a possible explanation for the adverse vaccination effect in calves on unit 1. Results suggested that vaccination with J5 antigen may be highly beneficial in preventing deaths of reasonably well-managed calves, but may be contraindicated in poorly managed calves.
