trol group. Of 573 adult cows, 290 were treated with cephaparin sodium (administered by partial insertion [OptiSert®] following full teat and teat end preparation) and 283 adult cows served as a control group. Daily milk production measurements were collected through 15 weeks of lactation. Somatic cell count measurements were determined from individual animal composite milk samples at twice weekly intervals for the first 10 to 14 days of lactation, and then at monthly intervals through 15 weeks of lactation.

Results

Data will be summarized and analyzed pending final collection in April 2005. The results of the project will be available for presentation at the 2005 Annual Meeting of the AABP.

Significance

The results of this study should help veterinarians better evaluate management strategies, including routine pre-partum metaphylactic intramammary antibiotic therapy, to improve udder health and production in dairy cows.

Development of a New Diagnostic Test for the Detection of Passively Acquired Immunoglobulin G1 (IgG1) in Newborn Calves Using Immunostick ELISA Technology

D.P. Mackie, *MVB, PhD, MRCVS*[1,2]; **E.F. Logan,** *PhD, BVMS, FRCVS*[3]
[1] *Department of Veterinary Science, Faculty of Agriculture & Science, Queen's University Belfast, Belfast BT4 3SD, Northern Ireland*
[2] *Department of Agriculture & Rural Development for Northern Ireland, Veterinary Sciences Division, Stoney Road, Belfast BT4 3SD, Northern Ireland*
[3] *Linnodee Animal Care, Oakmount, Holestone Road, Ballyclare, Co. Antrim, BT39 OTJ, Northern Ireland*

Introduction

It is generally accepted that there is no transfer of immunity *in utero* in the bovine. The calf is dependent on ingestion and absorption of immunoglobulins (antibodies) from colostrum by the endothelial cells of the small intestine for protection against neonatal disease. Absorption of immunoglobulins (Ig) is maximal at birth, declines rapidly and ceases by 24 hours post-partum. Because of modern dairy herd management practices worldwide, a high percentage of calves receive insufficient amounts of colostrum, and thus are deficient in protective antibodies and very susceptible to neonatal disease, particularly colisepticemia and diarrhea. Currently the level of immunity can be assessed by measuring the levels of IgG1 in the blood, but these tests frequently must be conducted in a veterinary laboratory. Because of the lag time in obtaining a result, the calf is often already 24 hours old, immunoglobulin absorption has ceased and it is too late to correct the deficiency by feeding additional colostrum. This new test is non-invasive and measures the level of IgG1 in nasal mucus. The test can be conducted on the farm, and takes 35 minutes to complete. If immunity is minimal, then the calf can be immediately fed colostrum to boost its immunity.

Materials and Methods

With this new immunostick ELISA, IgG1 if present in the nasal mucus, is captured by a murine anti-bovine IgG1 monoclonal antibody (MAB). The presence of IgG1 is then detected visually using a murine anti-bovine light chain biotin conjugate and peroxidase labelled streptavidin. The test is partially quantitative, and the depth of color change is indicative of the level of IgG1 in the nasal mucus. Validation was carried out using serum and nasal mucus samples collected from 30 purchased calves within 24 hours of birth, and 200 healthy, colostrums-fed dairy calves between three and seven

days of age. Initially it was necessary to establish that there was a direct relationship between the serum IgG1 levels and those in the nasal mucus. Serum samples were tested using the zinc sulphate turbidty test (ZST), single radial immunodiffusion (SRID) and by an ELISA. The IgG1 levels present in nasal mucus samples were tested using the immunostick ELISA.

Results

Results demonstrate that: 1) there is a good relationship between the concentration of the whole Ig in serum as determined by ZST and that of IgG1 in nasal secretion as determined by the immunostick ELISA within the first 24 hours post partum; and 2) there is a very good relationship (r = 0.97) between the concentrations of IgG1 in serum as measured by single radial immunodiffusion (SRID) and in nasal secretion as determined by the immunostick ELISA within the first 24 hours post partum. Following colostrum feeding, colostral IgG1 first appears in the nasal mucus approximately four to seven hours later, depending on the amount of colostrum fed. The level slowly rises until it reaches a maximum at 24-28 hours after feeding. A calf given three liters of colostrum immediately after birth will have a nasal IgG1 concentration of at least 15 μg/ml six hours later, and will have a low risk of subsequent disease. A calf with a nasal mucus concentration of less than 15 μg/ml six hours after birth will have a medium to high risk of disease, and should be given at least two liters of colostrum. Nasal mucus samples taken at 24 hours will give a very good indication of the level of the immunity acquired from colostrum and the consequent risk of disease.

Significance

The relationship between nasal mucus IgG1 and serum IgG1 suggests that the two are significantly related, and that the measurement of nasal mucus IgG1 can be used as a non-invasive method of estimating serum IgG1, and for detecting the level of colostrum immunity in newborn calves. Utilising immunostick technology, the ELISA can be used on the farm and results are available in approximately 35 minutes.