Feeding Pasteurized Non-saleable Milk did not Increase the Risk for *Mycobacterium Avium* subsp. *paratuberculosis* Infection in Adult Dairy Cows

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Introduction

While the most important route of transmission of *Mycobacterium avium* subsp. *paratuberculosis* (MAP) is generally considered to be through the ingestion of infective feces from the calf's environment, other potential sources of transmission could include shedding (or post-harvest contamination) of MAP in colostrum or milk. The importance of consuming raw milk in MAP transmission to calves has not been quantified. The objective of this study was to describe if feeding pasteurized non-saleable milk from a Johne's infected herd controlled the transmission of MAP in calves, as compared to calves fed commercial milk replacer, under conditions of natural exposure.

Materials and Methods

Calf enrollment was completed between December 2001 and October 2002. Participating farms included a large dairy in central Minnesota (850 cows, 10 to 12% seroprevalence for MAP infection), and a smaller dairy (250 cows, 17% seroprevlaence for MAP), the latter acting as the heifer grower operation for both dairies. A total of 439 heifer and bull calves born on both dairies were transported to the calf grower at one to two days of age, where they were systematically assigned to be fed either pasteurized non-saleable milk (PM, n = 222) or a conventional 20:20 milk replacer feeding program (MR, n = 217) until weaning. Non-saleable milk from the large dairy was pasteurized (145 °F x 30 min) before each feeding using a commercial batch pasteurizer (DairyTech, Inc. Windsor, CO). Analysis of preweaning performance has shown that calves fed PM had significantly higher rates of weight gain and significantly reduced treatment and mortality rates in the preweaning period vs calves fed MR (Godden et al., *JAVMA* 226:1547, 2005). Of calves originally enrolled, 104 and 116 heifer calves were weaned from the MR and PM feeding programs, respectively. Unfortunately, due to the unforeseen sale and dispersal of the larger participating dairy in late 2003, a significant number of the study heifers from the large herd were lost to follow-up. As many of these heifers as possible were tracked into their new herds. Follow-up testing was ultimately completed in 54 and 65 adult cows from the MR and PM treatment groups, respectively, in five different herds in WI, MN, IN and CA. Blood and fecal samples were collected from study cows at an average age of 25.0, 42.4 and 56.5 months of age, and tested for serum antibodies to MAP (IDEXX ELISA) and growth of the organism in feces using fecal culture. DHIA records of all calving events, total lactation milk production, and culling or death events were collected until the end of the study follow-up period on January 30, 2007. Logistic regression and survival analysis, controlling for random herd effects, was used to describe the effect of treatment on risk and age of removal from the herd, and risk and age for testing positive to infection with MAP.

Results

A first lactation calving event was reported for 119 adult animals (MR = 54; PM = 65). Of these, the proportion removed from the herd by the end of the study follow-up period (avg. 57 months) was 53.7% and 41.5% for calves originally fed MR or PM, respectively. Survival analysis showed that cows fed MR were at higher risk for removal from the herd between first calving and the end of the study follow-up period (Hazard ratioMR = 1.38, $P < 0.05$). There was no difference in risk for a positive MAP test (fecal culture, serum ELISA or both) during the follow-up period for cows fed MR (27.8%) as compared to cows fed PM (21.5%) (Hazard ratioMR = 1.378; $P = 0.36$).

Significance

Calves fed PM were not at increased risk for MAP infection, and experienced increased longevity in the herd, as compared to cows originally fed MR. These results suggest that, if raw milk is indeed an important source of MAP transmission to calves, then on-farm pasteurization was effective in destroying viable MAP in the milk or else reduced viable MAP to levels below an infective dose.