

The single intradermal cervical comparative test and Johne's disease ELISA diagnostics

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Infection with *Mycobacterium avium* subspecies paratuberculosis (MAP) causes Johne's disease (JD); an incurable enteritis in ruminants. Enzyme-linked immunosorbent assays (ELISA) of milk and blood samples are routinely used to screen herds for exposure to MAP. Such serological investigations, however, have been shown in a single controlled study to be impacted by administration of avian and bovine purified protein derivative (aPPD and bPPD). PPD is administered to cattle during the single intradermal cervical comparative test (SICCT) for the purposes of diagnosing bovine tuberculosis (bTB). A compulsory bTB eradication scheme has been operating in Ireland since 1962. All bovines over six weeks of age are injected intradermally with aPPD and bPPD at least once annually. The aim of the current study was to examine the impact of SICCT on MAP ELISA results in an Irish dairy herd. Blood and milk samples were taken from 139 cows pre- and post-administration of the routine annual SICCT. All samples were tested using the ID Screen Paratuberculosis Indirect Screening Test (ID Vet, France) which detects anti-MAP IgG. Prior to SICCT, 6% and 8% of the herd tested serologically positive using milk and blood ELISA, respectively. Within 14 days of PPD administration a significant increase in the ELISA S/P% ratios and prevalence of positive cows was recorded. This increase peaked at a prevalence of 39% for both sample matrices and declined subsequently. S/P% ratios remained significantly higher until day 43 post-SICCT in milk ($P=0.850$), and day 71 in blood ($P=0.602$). These results may indicate a period of reduced ELISA specificity post-SICCT with antibodies generated in response to PPD cross-reacting with the capture antigen. It should be noted that Ireland records relatively few clinical cases of JD annually, and a relatively low prevalence of MAP ELISA positive herds compared to prevalence reported internationally. It is our hypothesis that the intensive bTB testing regime implemented in Ireland may act as an annual mycobacterial antigenic stimulant (similar to a vaccine) providing immune cross-protection against MAP. Thorough investigation of this hypothesis is required as antibodies are generally regarded as ineffective in controlling MAP, but their increase post-SICCT may indicate the presence of a wider immune response that may be protective against MAP.

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