

Responses of testosterone hormone concentration, semen quality, and its related pro-inflammatory cytokines in bucks following *Corynebacterium pseudotuberculosis* and its mycolic acid infection

ABSTRACT

Corynebacterium pseudotuberculosis is the causative agent of caseous lymphadenitis, a debilitating chronic disease of sheep and goats. Little is known about the buck's reproductive pathophysiology with respect to inoculation with *Corynebacterium pseudotuberculosis* and its immunogen mycolic acid extract. Therefore, this present study was designed to determine the concentration of testosterone hormone, pro-inflammatory cytokines, and semen quality of the experimental animals. A total of 12 bucks, divided into groups 1, 2, and 3 (Negative control group, Positive control group and Mycolic acid group respectively), were enrolled in this study. Following inoculation, all goats were observed for clinical responses and monitored for 60 days post-challenge and were then sacrificed. Blood samples were collected via the jugular once before inoculation and on a weekly basis post-challenge. Semen samples were collected 2 weeks post-challenge and prior to the sacrifice of the experimental animals. During the post inoculation period of 60 days, the concentration of testosterone hormone for group 2 was increased significantly ($p < 0.05$) in weeks 5, 6, and 9 but decreased in weeks 2 and 7 post inoculation. In group 3, the mean concentration of testosterone was increased significantly ($p < 0.05$) in weeks 5, 6, 7, and 9 post inoculation but decreased in week 2. The concentration of interleukin 6 (IL 6) in treated group 2 did not show any significant difference ($p > 0.05$) but increased significantly ($p < 0.05$) in week 2 post inoculation in group 3. For concentration of interleukin 1 β (IL1 β) in both treated groups 2 and 3 showed significant difference ($p < 0.05$) in weeks 2 and 3 post inoculation. The tumor necrosis factor-alpha (TNF- α) concentration in both treated groups 2 and 3 did not show any significant difference ($p > 0.05$) as compared to group 1. The concentration of interferon- γ (IFN γ) significantly increased ($p < 0.05$) for group 2 for weeks 2, 3, 4, and 5 where else for group 3 was not in significant difference ($p > 0.05$) compared to group 1. Both group 2 and group 3 showed a reduction in semen qualities as compared to group 1, but the severity was more intense in group 2 if compared to group 3. In conclusion, therefore, the present study concluded that the mycolic acid group revealed significant responses of testosterone hormone concentration, semen quality, and its related pro-inflammatory cytokines in bucks following infection but the severity lesser compared to *Corynebacterium pseudotuberculosis* group.

Keyword: *C. pseudotuberculosis*; Mycolic acid; Pro-inflammatory cytokines; Testosterone hormone; Semen quality and bucks