Comparative study of immunopathophysiological responses induced by B. melitensis and its lipopolysaccharide in mouse model infected via intranasal route of exposure

ABSTRACT

In this study, we developed a mouse model and characterized the effects of intranasal inoculation of virulent Brucella melitensis strain 16M and its lipopolysaccharide (LPS). The effects of the exposure were compared with respective control groups. Both Brucella melitensis-infected and LPS-infected groups showed no significant clinical presentation with minor relevance in the mortality associated with the infection. In Brucella melitensis-infected group, significant histopathological changes in comparison to the LPS infected group with increase bacterial burden in the lungs, reproductive and reticuloendothelial organs were observed. However, both infected groups showed elevated levels of pro-inflammatory cytokine expression (IL-1β and IL6) and antibody production (IgM an IgG) as early as 3 days post-infection with predominance in LPS infected group. In contrast, low levels of sex related hormonal changes was recorded in both infected groups throughout the experimental period. This is the first detailed investigation comparing the infection progression and host responses in relation to the immunopathophysiological aspects in mouse model after intranasal inoculation with B. melitensis and its lipopolysaccharide. The study revealed a significant difference between infected and control groups with overlap in clinical, pathological, and immunological responses as well as sex related hormonal changes resulting from the infections.

Keyword: Brucella melitensis; Lipopolysaccharide; Mouse model; Intranasal route of infection; Clinicopathological; Histopathology; Cytokine; Antibody; Hormone; PCR