Malaria ALI/ARDS is associated with parasite adherence and inflammation in mice

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Introduction and Objective: Malaria-associated acute lung injury/acute respiratory distress syndrome (ALI/ARDS) often results in morbidity and mortality. The effect of adhesion of infected erythrocytes to murine lung endothelial cells remains unknown. The aim of this study was to elucidate the effect of adhesion of infected erythrocytes to murine lung endothelial cells. Material and Methods: DBA/2 mice infected with Plasmodium berghei ANKA (PbA) were classified according the cause of death as ARDS or HP (hyperparasitemia). Perfused lungs were collected and the PbA mRNA expression was analyzed by qRT-PCR. Hemozoin concentration was analyzed in H&E lung tissue sections. DBA/2 mice were also infected with PbA luciferase to evaluate in vivo parasite distribution. Primary culture of DBA/2 mice lung endothelial cells (DBA-PMLEC) were stimulated with IFN-γ, TNF-α, VEGF, LPS or blood and mature forms of infected red blood cells (iRBC) were used to evaluate the capacity of iRBC to adhere to DBA-PMLEC. Additionally, stimulated cells were collected for flow cytometry and mRNA analyses (ICAM-1, VCAM and CD36 expression). Results and Conclusion: Lungs of ARDS mice have iRBC in close contact with endothelial cells. ARDS mice have higher levels of 18s PbA mRNA expression and hemozoin compared to HP mice. PbA-luciferase is distributed in the peripheral blood and tissues of DBA/2 mice but when perfused, the (luciferase/luciferin) signal was more concentrated in lungs and spleen. It was observed by qRT-PCR an increase in ICAM-1 and VCAM expression in stimulated cells by TNF-α and IFN-γ. Our data showed that P. berghei ANKA infected erythrocytes adhere to DBA-PMLEC and inflammatory factors suggested to be involved in increased adhesion of molecules expression.

Key words: Malaria, ARDS, adherence

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