POSTER PRESENTATION

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Cytomegalovirus reactivation enhances the virulence of a staphylococcus aureus pneumonia in a mouse model

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Introduction

Cytomegalovirus (CMV) reactivation is common in immunocompetent mechanically ventilated patients. Lungs are a frequent site of reactivation. CMV reactivation may be associated with higher mortality among these patients [1]. Some studies have suggested that CMV reactivation may be associated with higher incidence of nosocomial pneumonia [2,3].

Objectives

The aim of this study was to assess the virulence of a staphylococcal pneumonia developed during CMV reactivation in a mouse model.

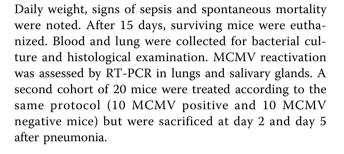
Methods

The study was approved by our local ethic committee. Female BALB/c mice were used in all experiments. CMV primo-infection was obtained by intra-peritoneal inoculation of 2 x 10⁴ PFU of murine CMV (MCMV) Smith strain. Seropositivity was confirmed by immunofluorescence in serum. MCMV was considered to be latent 4 months later. Reactivation was triggered by cecal ligature and puncture. Mice were considered to have a CMV reactivation 2 weeks later [4]. After this, 20 MCMV positive mice underwent an intra-nasal inoculation with 5 × 10⁸ CFU of Staphylococcus aureus to induce pneumonia. Twenty MCMV negative BALB/c mice were treated according to the same protocol, including cecal ligature and puncture (control group).

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Results

No mortality from staphylococcal pneumonia was observed in the control group whereas the mortality rate was of 10 % in the MCMV group (p = 0.15). Mean weight loss at day 1 was higher in MCMV mice than in control (1.5 g versus 0.9 g respectively). Macroscopic observation and bacteriological analysis of lungs showed staphylococcal abscesses in 4/20 (20%) mice in MCMV group as compared to 0/20 in control group at day 15. At day 5, 3/5 mice had lung abscesses in MCMV group as compared to 0/5 in control group. No lung abscesses were present at day 2 after pneumonia. Overall, 7/30 (23%) mice had lung staphylococcal abscesses in MCMV group as compared to 0% in control group (p = 0,005). Mean lung bacterial count was significantly higher in MCMV mice as compared to control at day 2 (2.4 \times 10⁵ vs. 2.4×10^2 CFU/ lung, p = 0.009), day 5 (2.1 × 10⁵ vs. 5.5×10^2 CFU/lung, p = 0.02) and day 15 (5.5×10^1 vs. 0 CFU/lung, p = 0.04).

Conclusions

In a mouse model, CMV reactivation leads to the switch from a non lethal to a lethal staphylococcal pneumonia,



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increases bacterial lung count and favors the occurrence of staphylococcal lung abscesses.

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