

POSTER PRESENTATION

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Lung inhomogeneities, inflation and [^{18}F]FDG uptake rate in ards

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Introduction

In ARDS lung parenchyma presents great variability in inflation, lung inhomogeneities and [^{18}F]FDG uptake. In fact, inflation progressively decreases along the sternum-vertebral axis^[1] leading to further inhomogeneities that may act as “stress raiser”.^[2] That can activate a local inflammatory response leading to edema.

Objectives

We aimed to examine the voxel by voxel relationship between [^{18}F]FDG uptake and inhomogeneity according to the actual classification of ARDS.

Methods

20 ARDS patients underwent a PET-CT scan at 10 cmH₂O. [^{18}F]FDG uptake was determined with the graphical Patlak approach^[3] voxel by voxel. Lung inhomogeneities were determined by measuring the gas/tissue ratio in two contiguous lung regions. We defined inhomogeneities the fraction of lung volume whose inhomogeneities were greater than 1.61.^[4]

Results

5 patients presented mild, 12 moderate and 3 severe ARDS. In mild and moderate ARDS a consistent lung fraction is homogeneous with a high [^{18}F]FDG metabolic activity ($53 \pm 14\%$ and $53 \pm 20\%$). Inhomogeneous lung fraction with a higher [^{18}F]FDG uptake increases from mild to severe ($12 \pm 3\%$, $16 \pm 9\%$ and $27 \pm 11\%$). On the other hand, the homogeneous parenchyma with normal [^{18}F]FDG uptake decreases in worse ARDS ($33 \pm 14\%$, $26 \pm 20\%$ and $5 \pm 9\%$).

Conclusions

Our findings indicate that the actual classification of ARDS from mild to severe reflects the underlying pathophysiology. In fact, while a similar sized homogeneous and inflamed/metabolically more active compartment is present in all the ARDS patients, in mild ARDS it is associated with a consistent fraction of normal lung while in severe ARDS is primarily associated with inhomogeneous, inflamed/metabolically more active lung tissue.

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