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Title: Pulmonary response to salbutamol inhalation using dynamic OE-MRI in patients with asthma

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Body: PURPOSE To evaluate pulmonary oxygenation before and after salbutamol inhalation using dynamic oxygen enhanced magnetic resonance imaging (OE-MRI). METHODS 8 severe asthmatics, 5 mild asthmatics and 3 healthy volunteers underwent dynamic OE-MRI on a 1.5T scanner prior to, 15 min after and 30 min after inhalation of 400ug salbutamol. A rescan was performed within 1 week without salbutamol inhalation. Images were collected during subject inhaling medical air and 100% oxygen. The maximal change in the partial pressure of O_2 (ΔPO_{2max}) after gas switchover in the tissue water of the lung parenchyma, a parameter to reflect local ventilation-perfusion imbalance, was extracted and compared among each time point. RESULTS Severe asthmatics showed lower baseline FEV_1%pred and higher airway reversibility than healthy and mild asthmatics (table1). In severe asthmatics, but not mild asthmatics or healthy volunteers, the ΔPO_{2max} maps became more heterogeneous with a significantly decreased whole-lung mean value at 30 min post-bronchodilator compared with baseline. This difference was not found in the non-salbutamol scan (table 2, figure 1 and 2). CONCLUSIONS OE-MRI revealed a heterogeneous pattern of decreased oxygenation of the lung in severe asthmatics as a response to salbutamol, which might due to the worsening in regional ventilation-perfusion imbalance [1]. REFERENCE 1. Ballester, E., et al., Am Rev Resp Dis, 1990. 141(3): 558-62.