Introduction:
In patients with acute respiratory distress syndrome (ARDS), non-aerated, poorly aerated, and normally aerated regions coexist to variable degrees in lung parenchyma. The recruitment maneuvers aim to re-open collapsed lung tissue. In a theoretical point view, this strategy may also prevent the normal aerated lung tissue hyperinflation. The objective of our study was to evaluate lung characteristics in terms of Hounsfield Units (HU), volume and elastance before and after a recruitment maneuver.

Methods:
In 37 patients with severe ARDS who underwent V-V ECMO, computed tomography scans (CT-scans) at 5 cmH\textsubscript{2}O of continuous positive airway pressure (CPAP) and 45 cmH\textsubscript{2}O were performed. The same CT image was selected at the two different levels of pressure. The distribution of lung opacities, in terms of HU, was classified using the “UCLA” colour coding table (OsiriX image processing software, Geneva, Switzerland). Correspondent lung regions of about 1020 voxels were selected. The quantitative analysis, in terms of Volume air (Vair) was performed with Maluna software (Version 3.17; Maluna, Goettingen, Germany). Elastance was calculated as the pressure(cmH\textsubscript{2}O)/ Vair (ml)ratio.

Results:
See Image 1.

Conclusion:
Lung inhomogeneity occurs also after recruiting maneuvers. Our data confirm that the elastance of recruited lung regions is higher than the elastance of the normal aerated lung regions at low peep (baby lung). On the contrary the “baby lung” frequently develops hyperinflation.
The unpredictable pattern of distribution of volume after recruitment maneuverers may explain the controversial role of positive end expiratory pressure (PEEP) during the ARDS treatment.

References:

Image:
Variations in terms of HU, Vair and elastance in the correspondent lung regions at the two different levels of CPAP.