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Introduction:
The aim of this study was to establish quantitative CT (qCT) parameters for pathophysiological understanding and clinical use in patients with ARDS. The most promising parameter is introduced.

Methods:
28 intubated patients with ARDS obtained a conventional and a dual energy CT scan under an end-expiratory hold manoeuvre. Following manual segmentation, 138 volume-, perfusion- and lung weight-related qCT parameters were correlated with 71 anaesthesiological parameters such as applied ventilation pressures (PEEP, Pdrive), the patients’ oxygen supply (sO₂, PaO₂/FiO₂) and established status and prognosis scores (SOFA, SAPS II).

Multiple regression analysis was then performed to enable the prediction of these scores by a single CT scan.

Results:
Of all examined qCT parameters, excess lung weight (ELW) displayed the most significant results [1]. ELW correlates positively with the amount of extravascular lung water (r=0.72), atelectatic lung volume (r=0.92), applied PEEP (r=0.37) and negatively with the lung’s mean CM-Enhancement (r=−0.65; all p<0.05). More significantly than any other anaesthesiological parameter it correlates with the patient’s SOFA- (p<0.0001, r=0.69) and SAPS II-Score (p=0.0005, r=0.62).

A combination of ELW, mean CM and Pdrive can predict SOFA up to r²=87.95%.

Conclusion:
ELW constitutes the best parameter to assess pathophysiology and status of patients with ARDS. It can help the clinician to predict outcome and mortality with higher accuracy than current standard Horowitz index (PaO₂/FiO₂) and should therefore be considered a first range diagnostic tool during the first hours of ICU treatment.

References:
1. Cressoni M et al. Critical Care 17:R93, 2013