Lung volumetry correlates with P/F ratio and inflammatory biomarkers in COVID-19 patients

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BACKGROUND

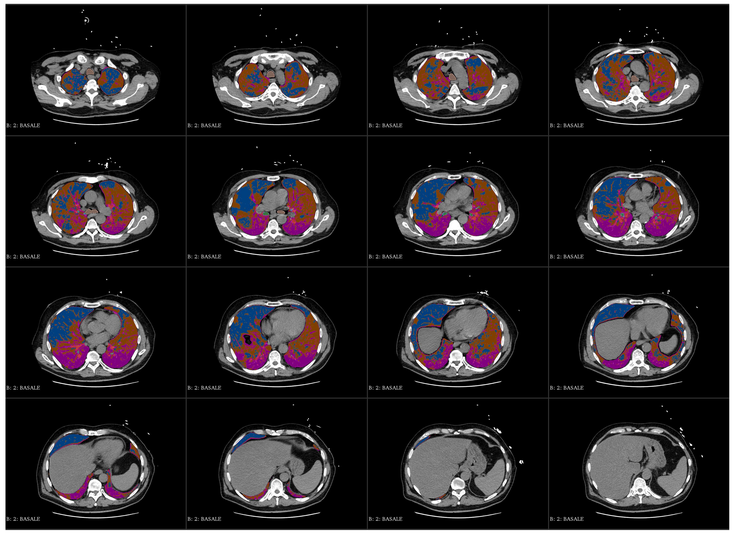
The Computed Tomography Scan (CT scan) was widely used for SARS-CoV-2 pneumonia evaluation and its correlation with clinical and laboratory findings is useful in clinical management.

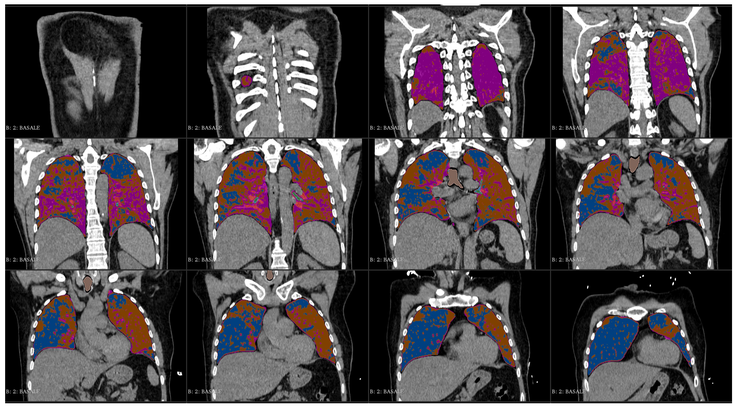
AIMS AND OBJECTIVES

This study examines the clinical and functional features of COVID-19 pneumonia in relation with the extent of ground glass (GGO) and consolidation areas defined by volumetric investigations on CT scan.

METHODS

Sixty-one patients attending the emergency department were enrolled. A semi-automatic segmentation software was used to extract volumetric data that has been compared with clinical and laboratory findings.





RESULTS

The decrease of aerated lung volume with the increase of GGO and consolidation areas were strongly related with a decrease of P/F ratio ($p<0.0001$, $p<0.0001$ and $p=0.0002$ respectively).
An inverse correlation was observed between GGO and consolidation areas with P/F ($R= -0.62$, $p<0.0001$ and $R= -0.4$ and $p=0.003$, respectively).
No significant correlation was observed between consolidation versus ground glass opacities ratio (C/GGO) and P/F.
The decrease of aerated lung volume corresponded to an increase in CRP ($R=-0.68$, $p<0.0001$) and LDH ($R=-0.55$, $p<0.0001$) and a decrease in both the absolute number and the percentage of lymphocytes (respectively: $R= 0.48$, $p<0.0001$ and $R= 0.54$, $p<0.0001$) with an increase of neutrophils (respectively: $R= -0.33$, $p=0.01$ and $R= -0.54$, $p<0.0001$). These parameters had a stronger correlation with GGO than with consolidation areas.

LUNG SEGMENTATION	
Aerated lung volume	
Consolidation areas	
Ground Glass Opacities	
Vessels	
Emphysema	

CONCLUSIONS

The extension and the characteristics in terms of GGO and consolidation of the lung lesions have a significant correlation with P/F reduction, CRP and LDH increase and lymphocytes decrease.