The role of vascular density in pulmonary rehabilitation of PASC patients

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BACKGROUND

Patients suffering from Post-Acute Sequelae of SARS CoV-2 (PASC) infection may benefit from a pulmonary rehabilitation program(PRP). However, patients respond differently to the protocols. Treatment selection based on sensitive endpoints remains arbitrary.

AIM

Can quantitative CT play a role in providing a safe, effective PRP?

METHODS

Two patients admitted for PRP were tested. A low dose quantitative CT scan was taken. Functional respiratory imaging (FRI) was performed on the scans. FRI, Lung function and blood vessel analysis were used for clinical decision making in treatment protocol.

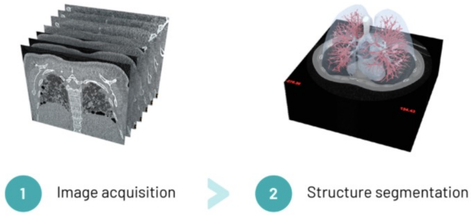
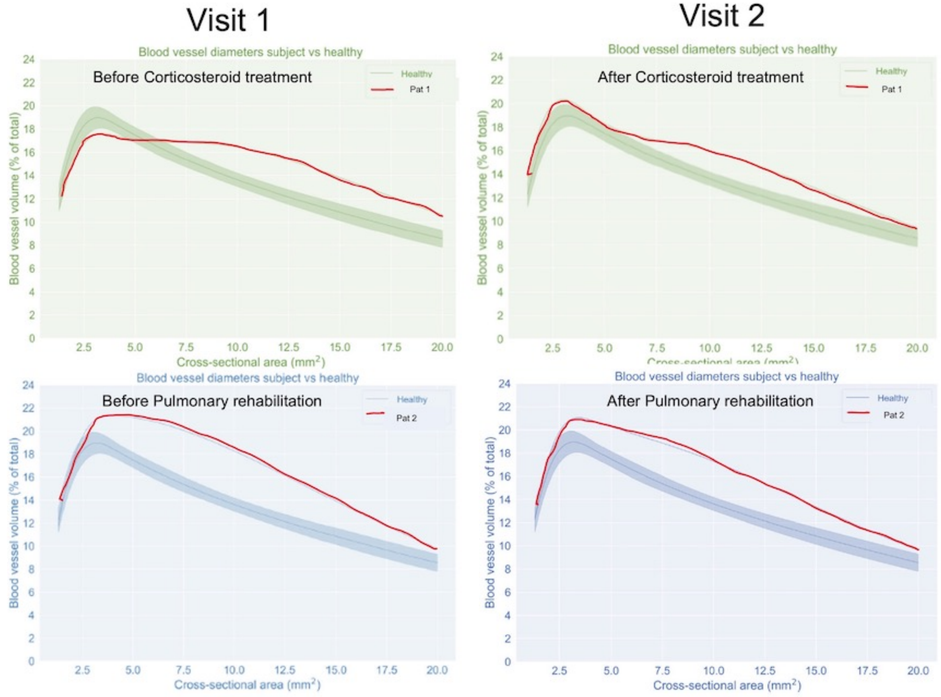


Figure 1. Functional Respiratory Imaging (FRI)

RESULTS

Patient 2 showed no deviations on the proportion of blood volume in vessels with a cross-sectional area between 1.25 and 5mm^2 (BV5%) and enrolled in the PRP. Patient 1 showed a significant decrease in small blood vessel volume and increased volume for the larger vessels at baseline (fig 1). This vascular redistribution resulted in cardiac disturbances. Therefore, patient 1 was treated with corticosteroids. Patients were re-evaluated after 3 months. Patient 2 improved significantly, recovered, and showed normalized results in BV5. In Patient 2 V02max changed from 1728 to 2738 ml/min from 52% to 84% predicted after 3 months PR.



Conclusions

Vascular density endpoints as BV5% can be considered as identifier for selection of patient for a PRP in long-COVID, and potentially other pathologies. Once normalized, patients can safely enroll in a PRP.

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