A Six-Month Follow-Up Evaluation of Lung Function in Patients with Previous SARS-COV-2 Pneumonia

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Objective: This study investigated the influence of Coronavirus Disease 2019 (COVID-19) on lung function in the first six months after recovery and the correlations with chest CT. Methods: A follow-up study of SARS-CoV2 patients with COVID-19 pneumonia admitted between March and April 2020 in two hospitals of Brescia was conducted, with serial assessments including lung volumes (TLC), lung diffusion capacity for carbon monoxide (DLCO) with alveolar volume (VA) and transfer coefficient (KCO), 6-min walking test (6MWT) collected at 3 months after discharged. Patients with impaired diffusion or restrictive syndrome or both were re-evaluated at 6 months with global spirometry and chest HRCT scan. Results: Among 40 patients, 19 (48%) had normal functional tests (Group A), and 21(52%) had restrictive syndrome or decreased diffusion (Group B). In group B, 9 patients had significant desaturation during 6MWT, while none in group A. Comparing these two groups, we found differences significantly higher in group B for cough($p<0.05$), oxygen therapy, and mechanical ventilation($p<0.001$ and $p <0.05$). In 21 patients of group B, we identified 3 scenarios. Three patients had pure restrictive syndrome (group 1),12 subjects had decreased both volumes and DLCO (group 2), and 6 patients had isolated drop in DLCO (group 3). At 6 month follow-up in Group 1, although all patients improved, only one normalized TLC, VA, and DLCO, while KCO remained in the normal range. In group 2, TLC, DLCO, VA, and KCO increased significantly($p<0.01$), but only one patient reached normal functional values. In group 3, DLCO improved​​ for most patients, normalizing in 50%. Correlations between the chest CT severity score and TLC($p<0.02$), DLCO ($p<0.01$), VA($p<0.02$) were significant, with highest r^2 index for DLCO($r^2=0.40$). Conclusion: Pulmonary function tests can provide an excellent overview of respiratory function at six months. Nearly 50% of the patients did not present functional deficits in the post-critical phase. Most of those with abnormal lung function tests at 3 months improved, but only 4 patients (19%) reached normal range values at 6 months. These data suggest that lung function's natural recovery process is faster at first and tends to advance more slowly subsequently. Identification of these subjects might be useful for implementing therapeutic options to maximize the recovery of pulmonary function.