

Are there any long-term cardio-pulmonary limitations of hospitalized Covid-19 patients?

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Funding Acknowledgement: Type of funding sources: None.

Background: The Covid-19 pandemic has affected our lives for over a year and almost 500.000 people in Austria have been infected. Although many of them only had low or mild symptoms some had to be treated in the hospital. Even months after their infection some patients complain about fatigue, exercise intolerance and dyspnoea.

The aim of this study was to perform a follow-up cardiopulmonary exercise test (CPET) on those patients, at 6 months after their hospitalization to find out if there are long-term cardio-pulmonary limitations (CPL) of Covid-19.

We also wanted to check if there is any difference in outcome and CPL between patients who received oxygen therapy vs. without oxygen therapy.

Methods: 40 patients were included into this study (16 women = 40%; 24 men = 60%). All patients were hospitalized during their infection with Covid-19 (5 patients at ICU) and underwent CPET 6±2 month after discharge. 20 patients (50%) received oxygen therapy or ventilation during their hospitalization.

CPET data were assessed at rest, during exercise and at recovery. Blood parameters including NT-pro BNP were collected and an interview and examination were performed.

CPL was defined as VO₂% of Predicted ≤84%, VE/CO₂ Slope ≥34 and RER at peak of exercise ≥1.1.

Results: Median age of all patients was 46 years [interquartile range (IQR): 35.3–55.8], median BMI was 26.0 m²/kg [IQR: 23.0–29.0] and the median NTproBNP was 53.1 pg/mL [IQR: 24.0–95.6].

When comparing the two groups, we found higher percentage of CPL in patients who received oxygen therapy during their hospitalization (10% with oxygen vs. 5% without oxygen). Notably, the number of patients with a BMI ≥25 m²/kg was higher in the oxygen therapy group than in those without oxygen (80% vs. 45%). The median BMI without oxygen therapy was 24.0 [IQR: 20.3–26.8] vs. 29.0 [IQR: 25.0–31.0] with oxygen therapy (p=0.004). There were no significant differences in NT-proBNP levels (p=0.545).

The median VO₂% of predicted was 88.0% [72.5–98.0] without oxygen therapy vs. 84.5% [IQR: 70.8–91.8] with oxygen therapy (p=0.289), the median HR percentage of predicted was 92.5% [IQR: 85.5–97.8] without oxygen therapy vs. 94.5% [IQR: 88.3–103.5] with oxygen therapy (p=0.478), the median physical performance in watt in patients without oxygen therapy was 130.0 [IQR: 108.5–197.5] vs. 135.0 [IQR: 97.0–188.3] with oxygen therapy (p=0.820).

Conclusion: The findings of our study did not show any statistically significant difference in long-term CPL between patients who received oxygen therapy vs. those who didn't.

Therefore, other causes of the exercise intolerance and dyspnoea have to be discussed multidisciplinary.

Subclinical CPL in the absence of significant clinical symptoms represent a concern after a Covid-19 infection. Overall, 7.5% of our patients showed CPL although those patients didn't have any clinical symptoms. Therefore, CPET is a good method to discover asymptomatic patients with CPL.

Overview cardio-pulmonary limitation

	With oxygen therapy (n=20)	Without oxygen therapy (n=20)
Female	07 (35%)	09 (45%)
Male	13 (65%)	11 (55%)
BMI ≥ 25	16 (80 %)	09 (45%)
VO ₂ ≤84 % of predicted	10 (50 %)	07 (35%)
VE/CO ₂ -slope ≥34	03 (15 %)	01 (05%)
VO ₂ % of predicted ≤ 84 & VE/CO ₂ -Slope ≥ 34 & RER ≥ 1.1	02 (10 %)	01 (05%)
HR % of predicted ≥ 85 at peak of exercise	17 (85%)	16 (80%)
NT-pro BNP (pg/ml) median	54.8	51.4