

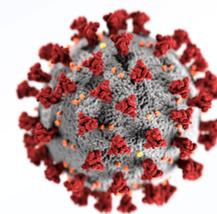
# POST-COVID SYNDROME IN PATIENTS WITH A

## MILD COURSE OF COVID-19

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### Introduction

Patients with COVID-19 experience a wide range of symptoms during the acute course, from mild symptoms such as cough, sore throat, malaise, fever, headache, muscle pain, nausea, vomiting, diarrhoea and anosmia, to severe symptoms such as dyspnoea and signs of respiratory failure. However, overcoming the infection often does not lead to complete relief and many patients in the so-called post-acute COVID period (>12 weeks after the acute illness) have various persistent difficulties.

### Aim of study

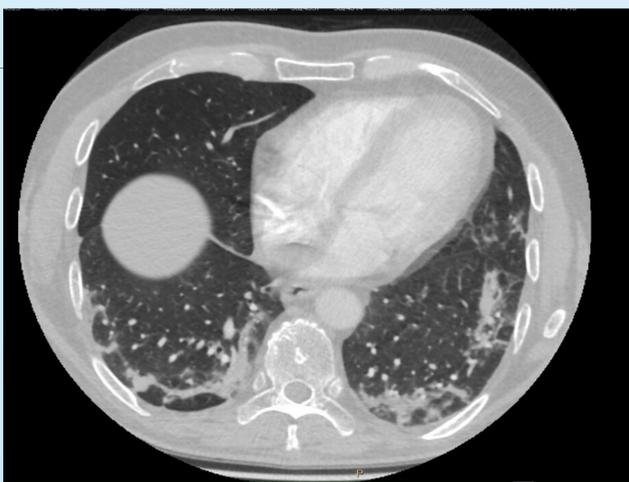
To evaluate the rate of the most common post-COVID symptoms in patients after a mild course of COVID-19.

### Material and Methods

The study included patients who tested positive on the PCR test for SARS-CoV-2 and were recruited between March 1<sup>st</sup>, 2020, and December 25<sup>th</sup>, 2020, when the first cases of the British mutation were discovered in the Czech Republic. All the subjects had completed a physical examination, detailed anamnesis, anteroposterior chest x-ray, pulmonary function tests and selected laboratory examinations. Only subjects with a mild course of the disease were included. In patients with significant reduction of diffusing capacity (under 60% of predicted values), or other signs of possible interstitial damage (based on the chest x-ray or auscultation finding) high resolution computed tomography (HRCT) scans were performed. The subjects were divided into 3 groups according to the disease severity – asymptomatic and mild (group 1), moderate (group 2) and severe or critical (group 3). Comparison of qualitative parameters in the groups according to the disease severity was done by using Kruskal-Wallis test and post-hoc Mann-Whitney test with Bonferroni correction of the significance. All the tests were performed using statistical significance  $p = 0.05$ .

|                  | Group 1          | Group 2         | Group 3         | p        |
|------------------|------------------|-----------------|-----------------|----------|
| <b>N</b>         | 440              | 166             | 179             | -        |
| <b>Males</b>     | 161 (36.6%)      | 82 (49.4%)      | 102 (57.2%)     | < 0.0001 |
| <b>Age</b>       | 47.5 ± 13.3      | 57.6 ± 12.6     | 63.0 ± 12.5     | < 0.0001 |
| <b>Smoking</b>   | 44 (10.6%)       | 9 (5.8%)        | 8 (5%)          | 0.08     |
| <b>Dyspnoea</b>  | 40%              | 51.8%           | 63.7%           | < 0.0001 |
| <b>Cough</b>     | 30.9%            | 36.7%           | 26.3%           | 0.109    |
| <b>Anosmia</b>   | 199 (45.2%)      | 33 (19.9%)      | 8 (4.5%)        | < 0.0001 |
| <b>Fatigue</b>   | 86 (19.5%)       | 44 (26.5%)      | 47 (26.3%)      | 0.075    |
| <b>Dyspepsia</b> | 79 (18.0%)       | 27 (16.3%)      | 30 (16.8%)      | 0.864    |
| <b>VC (%)</b>    | 105.2 (66 - 143) | 98.9 (59 - 149) | 92.2 (34-141)   | < 0.0001 |
| <b>FEV1 (%)</b>  | 105.0 (66 - 154) | 101 (48 - 148)  | 94.3 (31 - 150) | < 0.0001 |
| <b>DLCO (%)</b>  | 85 (34 - 130)    | 77 (6-119)      | 68 (23-113)     | < 0.0001 |
| <b>KCO (%)</b>   | 87.8 (42 - 131)  | 88.0 (38-145)   | 83.7 (35-153)   | 0.006    |
| <b>AC</b>        | 35 (8.0%)        | 46 (27.7%)      | 72 (40.2%)      | < 0.0001 |
| <b>IC</b>        | 9 (2.0%)         | 13 (7.8%)       | 38 (21.2%)      | < 0.0001 |

Table 1 - overall study groups characteristics: (%pred) = % of predicted values; VC = vital capacity; FEV1 = forced expiratory volume 1s; DLCO = diffusion transfer factor; KCO = diffusion transfer coefficient; AC = alveolar changes; IC = interstitial changes



Pic.1 - Post-COVID Lung (HRCT)

| Severity        | Parameters | Males             | Females            | p        |
|-----------------|------------|-------------------|--------------------|----------|
| <b>Mild</b>     | Age        | 47.1 ± 14.1       | 47.7 ± 12.8        | 0.676    |
|                 | Smoking    | 11.50%            | 10.00%             | 0.231    |
|                 | Dyspnoea   | 32.30%            | 44.40%             | 0.012    |
|                 | Cough      | 23.60%            | 35.10%             | 0.012    |
|                 | Anosmia    | 41.00%            | 47.70%             | 0.175    |
|                 | Fatigue    | 15.50%            | 21.90%             | 0.106    |
|                 | VC (%)     | 101.1 (74 – 138)  | 108.5 (66 – 143)   | <0.0001  |
|                 | FEV1 (%)   | 102.9 (73 – 139)  | 105.3 (66 – 154)   | 0.293    |
|                 | IgM Ab     | 1.6 (0.06 – 99.6) | 1.02 (0.06 – 50.8) | 0.035    |
|                 | IgG Ab     | 57 (3.8 – 400)    | 48 (3.8 – 400)     | 0.699    |
| <b>Moderate</b> | Age        | 57.6 ± 12.6       | 56.7 ± 12.3        | 0.385    |
|                 | Smoking    | 9.20%             | 2.50%              | 0.01     |
|                 | Dyspnoea   | 51.40%            | 51.20%             | 0.872    |
|                 | Cough      | 46.30%            | 27.40%             | 0.011    |
|                 | Anosmia    | 20.70%            | 19.00%             | 0.786    |
|                 | Fatigue    | 19.50%            | 33.30%             | 0.044    |
|                 | VC (%)     | 92.7 (58 – 130)   | 104.7 (70 – 149)   | < 0.0001 |
|                 | FEV1 (%)   | 98.7 (48 – 132)   | 101.9 (67 – 148)   | 0.073    |
|                 | IgM Ab     | 7.4 (0.17 – 99.6) | 3.4 (0.05 – 104)   | 0.0004   |
|                 | IgG Ab     | 133 (3.8 – 400)   | 127 (3.8 – 400)    | 0.728    |
| <b>Severe</b>   | Age        | 63.3 ± 12.5       | 62.5 ± 12.5        | 0.65     |
|                 | Smoking    | 3.40%             | 6.90%              | 0.394    |
|                 | Dyspnoea   | 65.70%            | 61.00%             | 0.522    |
|                 | Cough      | 25.50%            | 27.30%             | 0.788    |
|                 | Anosmia    | 2.90%             | 6.50%              | 0.292    |
|                 | Fatigue    | 17.60%            | 37.00%             | 0.003    |
|                 | VC (%)     | 85.3 (43 – 140)   | 97.5 (56 – 135)    | < 0.0001 |
|                 | FEV1 (%)   | 91.9 (31 – 145)   | 98.6 (61 – 150)    | 0.002    |
|                 | IgM Ab     | 6.27 (0.14 – 111) | 4.06 (0.08 – 90)   | 0.162    |
|                 | IgG Ab     | 161 (5.7 – 400)   | 152 (14.3 – 400)   | 0.246    |

Table 2 - Comparison of parameters in males and females

### Results

In total 785 subjects were examined, from whom 440 had a mild course. The sex ratio (males/females) was lowest in the mild covid group (0.58), compared to those in moderate (0.98) and severe (1.32) groups. Similarly, the age was increasing with the disease severity (47.5;57.6 and 63 were the median ages for mild, moderate and severe COVID-19 respectively). The most common post-COVID symptom was dyspnoea, which was more common in females (44.4% vs 32.3%,  $p = 0.012$ ) and similarly, coughing (35.1% vs 23.6%,  $p = 0.012$ ). On the other hand, vital capacity was significantly higher in females (108.5% of predicted values vs 101.1%,  $p = 0.0001$ ). Anosmia was highest in patients in the mild group (45.2%,  $p = < 0.0001$ ). Patients that had a history of smoking were highest in the mild group (10.6%,  $p = 0.08$ ). Significantly higher levels of SARS-CoV-2 IgG are noted in moderate and severe courses than in the mild course ( $p < 0.0001$ ), similarly significantly higher levels of SARS-CoV-2 IgM are noted in the moderate and severe courses than in the mild course ( $p <= 0.0001$ ).

### Conclusion

Patients with mild COVID-19 disease, may still have significant and disabling symptoms. Despite the better pulmonary function test results, dyspnoea and coughing seem to be more common in females. The most prominent risk factors appear to be advanced age and male sex. Anosmia may be a sign of a milder clinical course, as this symptom was present in the highest proportion in the asymptomatic/mild group (group1). According to the findings, smokers are more common among individuals in asymptomatic/mild group. As the severity of disease increased, the vital capacity values were lower, however, vital capacity was significantly higher in females in all groups.