MEDICAL UNIVERSITY OF VIENNA

Effects of SARS-CoV-2 Infection on Cardiac Function- Preliminary Data on **Echocardiographic Parameters after COVID-19**

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Background and aim: Infections with the Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-COV-2) are most commonly associated with respiratory symptoms ranging from a mild cough to severe pneumonia and respiratory failure. Increasing amounts of data suggest that other organs including the heart may also be affected in patients have signs of cardiac involvement, which may develop into severe myocarditis. While there is an increasing amount of data describing COVID-19 associated myocarditis. While there is an increasing amount of data describing COVID-19 associated myocarditis. cardiac parameters during a post-infection follow-up. Furthermore, it is not clear, whether subclinical forms of cardiac involvement may cause remaining cardiac impairment, even in patients with only mild symptoms during the acute phase of COVID-19. The aim of this study was to assess subclinical myocardial dysfunction by measuring left ventricular strain as well as conventional echocardiographic parameters in patients after COVID-19.

Methods: We included patients after a verified infection with the SARS-CoV-2 virus, who had been discharged from the hospital. Baseline parameters including clinical history, vital signs and symptoms were assessed. Inn addition, we measured laboratory parameters and a transthoracic echocardiography exam was performed in an apical long-axis-, four- and two-chamber view. In addition, standardized 2D and Doppler measurements were performed in each patient to describe cardiac dimensions, as well as systolic, diastolic and valvular function. Assessed parameters were compared between two groups, which were divided by median length of hospital stay in days, which was considered as a surrogate for severity of disease.

Results: In total, 46 patients were included in this study. The median duration of hospitalization was 8.0 days (IQR 4.0-14.0). The maximum number of in-hospital days was 84 days and the shortest hospitalized longer were older (p=0.003) and had a higher body mass index (p=0.013). At the performed study visit, these patients presented with higher levels of N-terminal pro brain natriuretic peptide (p=0.0016), C-reactive protein (p=0.0016), C-reactive protein (p=0.0016), C-reactive protein (p=0.0016), C-reactive protein (p=0.005) and gamma-glutamyltransferase (p=0.002). Echocardiographic evaluation showed that patients who had longer hospital stays also had more impaired LV-GLS values, as well as diastolic, as well as diastolic dysfunction (Table 1). Linear regression analysis was able to show a positive correlation between LV-GLS as well as E/e' and days in hospital (R=0.35, p=0.024 and R=0.38, p=0.030, respectively. Figure 1, panel A and B).

	Total study population (n=46)	Hospital stay > 8 days (n= 22)	Hospital stay ≤ 8 days (n=24)	p-value
seline characteristics				
e, years	47.5 (34.0-58.0)	54.5 (46.7-67.0)	40.0 (30.11-48.5)	0.003
nale sex	19 (41.3)	7 (31.8)	12 (50.0)	0.211
I, kg/m ²	26.8 (23.2-30.7)	29.3 (26.6-32.0)	25.1 (23.1-27.7)	0.013
tolic blood pressure, mmHg	134.0 (120.0-150.0)	139.0 (124.0-150.0)	128.0 (120.0-152.0)	0.440
stolic blood pressure, mmHg	84.0 (76.0-96.0)	83.0 (77.0-94.0)	84.0 (73.0-98.0)	0.648
rt rate, bpm	72.0 (63.0-80.0)	72.0 (65.0-80.0)	70.0 (62.0-79.0)	0.496
2, %	98.0 (97.0-98.0)	97.0 (97.0-98.0)	98.0 (98.0-99.0)	0.137
ilation				<0.001
one	22 (47.8)	3 (13.6)	19 (79.2)	
insufflation	16 (34.8)	11 (50.0)	5 (20.8)	
NC	1 (2.2)	1 (4.5)	0 (0.0)	
AP	1 (2.2)	1 (4.5)	0 (0.0)	
vasive ventilation	6 (13.0)	6 (27.3)	0 (0.0)	
otoms at visit 1				
noea	16 (34.8)	11 (50.0)	5 (20.8)	0.038
	6 (13.0)	5 (22.7)	1 (4.2)	0.089
pain	5 (10.9)	3 (13.6)	2 (8.3)	0.613
le	22 (47.8)	13 (59.1)	9 (37.5)	0.287
rv deficit	8 (17.4)	3 13.6)	5 (20.8)	0.391
atory parameters at visit 1				
mg/dl	0.07 (0.05-0.2)	0 11 (0 07-0 30)	0.05 (0.04-0.11)	0.005
$ml/min/1.73^2$	85.4 (66.4-105.2)	79.2 (64.4-94.2)	94.0 (70.4-108.2)	0.113
ro BNP. pg/ml	60.3 (28.3-123.0)	100.0 (41.0-175.0)	36.4 (22.6-89.4)	0.016
onin T. ng/L	5.0 (4.0-8.3)	5.0 (4.0-6.0)	5.0 (4.0-9.0)	0.925
ma GT II/I.	220(158-423)	34 5 (19 0-85 0)	180(130-255)	0.002
ardioaranhy narameters at visit	1	51.5 (17.6 65.6)	10.0 (10.0 20.0)	0.002
mm	45.0 (41.3-48.0)	455(415-480)	44 0 (41 5-47 5)	0.653
Dmm	29.0 (28.0-32.0)	29.0 (27.0-31.0)	29 5 (28 0-32 5)	0 371
ngth.mm	45.0 (42.3-49.0)	47.0 (44 5-55 0)	44.0 (40.5-47.0)	0.014
ngth mm	45 0 (40 5-47 0)	45 5 (39 0-51 0)	45 0 (41 0-47 0)	0 407
ngen, mm	11.0 (9.0-12.3)	11.0 (10.0-13.0)	11.0 (9.0-12.0)	0.496
96	56.0 (52.0-63.0)	55 5 (51 5-63 0)	57.0 (52.0-62.0)	0.804
LS -%	18.0 (19.98-16.4)	17 2 (18 8-15 5)	194 (20 5-17 0)	0.037
median	57(46-83)	80(63-87)	49(45-57)	0.004
	250(265-223)	257(270-220)	250(260-228)	0.909
E mm	21.0 (19.0-25.0)	21.0 (18.0-24.0)	22.0 (19.0-25.0)	0 724
DI m/s	0 14 (0 12-0 16)	0.15(0.12-0.16)	0 14 (0 12-0 15)	0.222
- ms	120 0 (126 5 150 0)	120 0 (110 0 142 0)	140 5 (124 0 166 0)	0.323
mmHg	130.0 [120.5 - 158.0]	320(200240)	140.5 (134.0-100.0)	0.237
mmig	20.0 (21.3-33.0)	32.0 (30.0-34.0)	23.0 (19.0-29.0)	0.070

Figure 1- Panel A shows the correlation of LV-GLS and length of hospital stay during the acute SARS-CoV-2 infection. Panel B shows the correlation of E/e' and length of hospital stay during the acute SARS-CoV-2 infection.

Conclusion: We were able to show, that during a follow-up visit after COVID-19, myocardial systolic and diastolic function as measured by LV-GLS and E/e' was more severe in patients who were hospitalized longer during the acute SARS-CoV-2 infection.



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R=0.35	5, p=0.024		
ays	80	100	
	•		
•			
R=	0.38, p=0.03	80	