



## Heart Failure and Cardiomyopathies

### CLINICAL VARIANTS OF MYOCARDIAL INVOLVEMENT IN COVID-19 POSITIVE PATIENTS

Moderated Poster Contributions

Monday, May 17, 2021, 10:15 a.m.-10:25 a.m.

Session Title: Heart Failure and COVID-19

Abstract Category: 11. Heart Failure and Cardiomyopathies: Special Populations

Presentation Number: 1045-07

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**Background:** Myocardial injury, diagnosed primarily by troponin elevation, is common in COVID-19 positive patients, but clinical manifestations of cardiac involvement occur less frequently.

**Methods:** We analyzed the literature on COVID-19 (2020) and systematically reviewed the cases and case series where individual patient data were presented. We searched Pubmed and Google Scholar for “COVID”, “COVID-19”, and “coronavirus” in combination with “myocarditis”, “heart failure”, “cardiomyopathy” and “cardiogenic shock”.

**Results:** We identified 88 cases of COVID-19 with myocardial involvement (age  $52.9 \pm 18.3$ , 54.5% males) diagnosed by 1) new systolic dysfunction (92%) 2) pericardial effusion with elevated troponin and B-type natriuretic peptides (1%) 3) myocarditis on magnetic resonance imaging with preserved left ventricular ejection fraction (LVEF) (6.8%) or combination of the above. Of them, 55 survived (62.5%), 19 died (21.6%), and in 14 (15.9%) the outcome was either unknown or not reported. Among patients with known outcome, mortality was 26%. LVEF decreased to  $32.3 \pm 11.7\%$  in a course of hours to 7 days, and recovered in 42 (51.8%) after a median interval of 10 days (range 2 to 54 days). In regards to wall motion characteristics, takotsubo pattern was present in 43.9%, diffuse hypokinesis in 26.8%, and reversed takotsubo in 24.4%. Moderate or large pericardial effusion was present in 16% of patients, with tamponade in 12.5%. Cardiogenic shock developed in 31 patients (32.5%). Except for older age ( $65.1 \pm 13.8$  vs  $49.8 \pm 18.4$ ,  $p=0.0018$ ), non-survivors were not different from survivors by the prevalence of cardiac risk factors or symptoms.

**Conclusion:** Myocardial involvement in COVID-19 patients most often presents as a new and rapid decrease in LVEF, although normal LVEF does not rule out myocarditis. A takotsubo-like pattern appears to be most common, followed by diffuse hypokinesis and basal hypokinesis (reversed takotsubo). Moderate and large pericardial effusion is common, and cardiac tamponade occurs in 12.5% of patients. Cardiogenic shock develops in one third of the patients. Mortality appears to be high at 26%, although many cases get reported while the outcome is still unknown.