

First-phase ejection fraction, a measure of pre-clinical heart failure, is strongly associated with increased mortality in patients with COVID-19

H. Gu¹, C. Chiara², A. Nabeebaccus³, Z. Sun⁴, L. Fang⁴, Y. Xie⁴, L. Zhang⁴, G. Carr-White², A. Shah¹, M. Xie⁴, P. Chowienczyk¹

¹King's College London, London, United Kingdom; ²St Thomas' Hospital, Cardiology, London, United Kingdom; ³King's College Hospital NHS Foundation Trust, London, United Kingdom; ⁴Wuhan Union Hospital, Wuhan, China

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Introduction: Presence of heart failure is associated with a poor prognosis in patients with COVID-19. The aim of the present study was to examine whether first-phase ejection fraction (EF1), the ejection fraction measured in early systole up to the time of peak aortic velocity, a sensitive measure of pre-clinical heart failure, is associated with survival in patients hospitalised with COVID-19.

Methods: A retrospective outcome study was performed in patients hospitalised with COVID-19 who underwent echocardiography (n=380) at the West Branch of the Union Hospital, Wuhan, China and in patients admitted to King's Health Partners in South London UK. Association of EF1 with survival was performed using Cox proportional hazards regression. EF1 was compared in patients with COVID-19 and in historical controls with similar co-morbidities (n=266) who had undergone echocardiography before the COVID-19 pandemic.

Results: In patients with COVID-19, EF1 was a strong predictor of survival in each patient group (Wuhan and London). In the combined group, EF1 was a stronger predictor of survival than other clinical, laboratory and echocardiographic characteristics including age, co-morbidities and biochemical markers (figure 1). A cut-off value of 25% for EF1 gave a hazard ratio of 5.23 (95% CI: 2.85–9.60, p<0.001) unadjusted and 4.83 (95% CI: 2.35–9.95, p<0.001) when adjusted for demographics, co-morbidities, hs-cTnI and CRP (figure 2). EF1 was similar in patients with and without COVID-19 (23.2±7.3 vs 22.0±7.6%, p=0.092, adjusted for prevalence of risk factors and co-morbidities).

Conclusion: Impaired first-phase ejection fraction is strongly associated with mortality in COVID-19 and probably reflects pre-existing, pre-clinical heart failure.

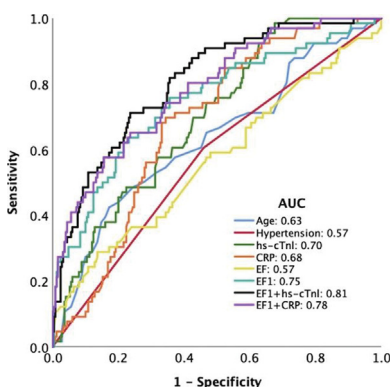


Figure 1. ROC curve for prediction of mortality

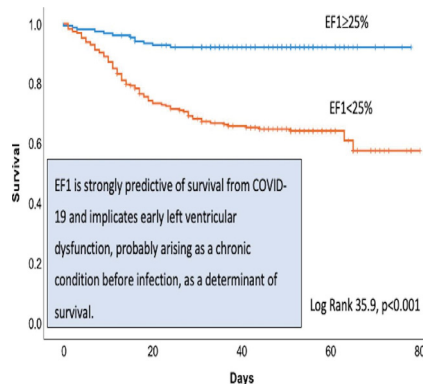


Figure 2. Kaplan-Meier Curve of EF1 (cut-off 25%)