

Cardiovascular Subphenotypes in ARDS



Acute respiratory distress syndrome (ARDS) is a frequently observed condition in mechanically ventilated patients in ICUs and is associated with a high mortality rate. The presence of shock in ARDS indicates poor prognosis, with echocardiography studies suggesting that right ventricular dysfunction (RVD) plays a significant role in the cardiovascular dysfunction observed in this condition. However, the definition of RVD in the context of ARDS remains challenging, as it is a heterogeneous syndrome with no consensual echocardiography-based definition. Traditional cut-off values of right ventricular (RV) size or systolic function have been commonly used by clinicians to define RVD, but these cut-offs have not been validated in ARDS populations. These definitions have shown inconsistent associations with mortality in ARDS patients.

In this study, the researchers aimed to employ clustering techniques on transthoracic echocardiography (TTE) findings and haemodynamic parameters to identify distinct subphenotypes of circulatory failure and potentially uncover the underlying mechanisms in patients diagnosed with ARDS. Additionally, this study sought to examine the association between these subphenotypes and mortality compared to the current definitions of RVD.

This was a retrospective, single-centre cohort study with patients that received TTE within seven days of ARDS onset between April 2016 and December 2021. Latent class analysis (LCA) of TTE/haemodynamic parameters was performed in 801 patients (average age of 62 years old; 63% male, and 40% 90-day mortality rate).

Study researchers identified four cardiovascular subphenotypes: class 1 (43%; mostly normal left and right ventricular [LV/RV] function), class 2 (24%; mostly dilated RV with preserved systolic function), class 3 (13%, mostly dilated RV with impaired systolic function), and class 4 (21%; mostly high cardiac output, with hyperdynamic LV function). These four subphenotypes exhibited distinct characteristics and outcomes, with 90-day mortality rates of 19% in class 1, 40% in class 2, 78% in class 3, and 59% in class 4. After conducting multivariable logistic regression analysis, it was found that class 3 had the highest odds ratio for mortality compared to other RVD definitions. Various three-variable models demonstrated high diagnostic accuracy in identifying each latent subphenotype.

These findings show that LCA of TTE findings revealed the presence of four distinct cardiovascular subphenotypes in patients with ARDS. These subphenotypes were found to align more closely with circulatory failure mechanisms and mortality outcomes than current definitions of right ventricular dysfunction RVD.

Source: [Critical Care Medicine](#)

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