The clinical usefulness of GLS, MAPSE and S´ in critically ill patients

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Background: Left ventricular ejection fraction (LVEF) is the most common echocardiographic parameter for assessing LV systolic function. Other parameters, e.g., global longitudinal strain(GLS), mitral valve annular plane excursion(MAPSE) and tissue Doppler annular velocities(S´) are available but with insufficient data on their clinical usefulness. This study assess the feasibility of GLS, MAPSE, and S', as well as associations to mortality, in critically ill patients.

Methods: This is a secondary analysis of a prospective echocardiographic study in a mixed ICU population. Patients had echocardiography performed within 24 hours from admission. Three apical views were used to measure GLS. MAPSE and S´ were measured in the lateral and septal wall in A4C view. LVEF was measured using Simpsons.

Results: Out of 411 patients, MAPSE was measured in most patients (n=364), followed by S´(n=339), LVEF (n=320) and GLS (n=269). There was a positive correlation between LVEF and GLS(0.718), MAPSE(0.520), and S´(0.444). Mortality over 90 days was higher in patients with GLS>-15%, MAPSE<10mm and S´< 7.5 (Figure 1). In an logistic regression analysis with adjustments for the SAPS3, age, cardiac disease and sepsis, GLS was associated with an increased risk of death (OR 0.89, p=0.006), as was MAPSE (OR 0.11, p<0.001) and S´ (OR 0.85, p=0.005) while LVEF was not (OR 0.99, p=0.369).

Conclusions: GLS, MAPSE and S´are useful for assessing LV function with a association to LVEF and 90-days mortality. MAPSE seem to have the highest feasibility of these parameters.