

## Author's response

In response to the letter of Yalcinkaya et al. [1] concerning our paper “The influence of acute pulmonary embolism on early and delayed prognosis for patients with chronic heart failure” published in *Cardiology Journal* [2]. In the letter to the Editor Yalcinkaya et al. [1] underlined that the echocardiographic evaluation of the right ventricle (RV) in patients with acute pulmonary embolism (APE) limited only to the assessment of right ventricular end-diastolic diameter (RVEDD), maximal tricuspid regurgitation pressure gradient (TRPG) and tricuspid annular plane systolic excursion (TAPSE), could be insufficient. They suggest that echocardiographic examinations should also include three-dimensional projections and tissue Doppler echocardiography, assessment of RV fractional area change (RVFAC), myocardial performance index, RV dP/dl and interior vena cava diameters. These suggestions indeed are of potential value, however we would like to present our opinion on the echocardiographic evaluation of the RV in patients with APE.

First of all, we would like to underline that a standard echocardiographic examination detects signs of RV overload in approximately 50% of patients with confirmed APE, only. According to the current guidelines, echocardiography is a vital part of diagnostic process in a relatively limited group of patients with haemodynamic instability. Whereas echocardiography plays predominantly a prognostic role for patients at a low risk of early death [3]. Generally accepted parameters for the assessment of RV pressure overload include: dilatation of the RV, hypokinesia of the RV walls with the McConnell's sign, 60/60 sign, RV/LV ratio > 1.0 and decreased TAPSE [4–8]. However a precise cut off values of these parameters remain to be defined. Interestingly new echocardiographic parameters useful for APE diagnosis were reported. It is known that TAPSE is reduced, while mitral annular plane systolic excursion (MAPSE) increases, and decreased TAPSE/MAPSE ratio characterizes patients with APE [9]. Moreover in APE patients tissue Doppler echocardiography shows a reduced tricuspid annular systolic velocity and increased mitral annular systolic velocity [10–12]. APE also impairs the RV diastolic function — a significant

reduction in the early diastole of the RV is observed in these patients, whereas it normalizes after the acute phase of pulmonary embolism [12]. In our current paper we assessed RV with clinically used standard echocardiographic parameters. Indeed, we did not include tissue Doppler echocardiography parameters in to the current study. However, we can assume that, the assessment of systolic and diastolic mitral and tricuspid velocities, or intraventricular septum would allow us to evaluate the impairment of the RV function more precisely. We agree with Yalcinkaya et al. [1] that the examination of the structure and function of RV by transthoracic echocardiography is difficult due to complex geometry of this ventricle itself. We also agree that the assessment of the parameters of myocardial impairment, that is troponin, and cardiac dysfunction parameters, that is natriuretic peptides (BNP or NT-proBNP), could facilitate a better and more comprehensive evaluation of the RV function. On the other hand, we are aware that increase plasma levels of natriuretic peptides and troponins may result not only from right but left ventricular impairment in CHF patients. We also would to underline that there are not generally accepted echocardiographic criteria of RV used for risk stratification in APE patients with or without CHF. This warrants further studies in this area.

**Conflict of interest:** none declared

### References

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