



# Does heart failure with mid-range ejection fraction resemble heart failure with preserved ejection fraction?

Bülent Özlek<sup>1,2</sup> · Eda Özlek<sup>1</sup>

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We have greatly enjoyed reading the recently published article by Marai et al. [1]. The authors retrospectively analyzed 664 patients with heart failure and preserved ejection fraction (HFpEF) or mid-range ejection fraction (HFmrEF), and they described clinical and echocardiographic differences among patients with HFpEF and HFmrEF. The authors found that compared to patients with HFpEF, patients with HFmrEF were more likely to be male and have ischemic heart disease (IHD). Also, they observed that patients with HFmrEF demonstrated worse structural and functional echocardiographic characteristics compared to HFpEF.

We have recently performed larger, multicenter, observational study including 1065 patients with HFpEF or HFmrEF, and compared all clinical or laboratory data [2]. The results of our study showed that, HFmrEF patients were more likely to be men, were more frequent smokers and alcohol users, were more likely to have ECG abnormalities, IHD, chronic kidney disease and history of hospitalization for heart failure (HF). On the other hand, HFpEF patients were more likely to have atrial fibrillation and obstructive sleep apnea. Higher N-terminal pro-B-type natriuretic peptide (NT-proBNP), blood urea nitrogen, creatinine, uric acid, and ferritin levels were measured in patients with HFmrEF than HFpEF; and HFmrEF patients were more likely to use  $\beta$ -blockers, aldosterone receptor antagonists, ivabradine, statins, loop diuretics, nitrates and antiaggregant drugs.

We also comprehensively analyzed all echocardiographic data [2]. Compared to patients with HFpEF, those with HFmrEF had larger left ventricle (LV) end-diastolic and end-systolic dimensions, higher left atrial volume index and LV mass index. There were more patients without mitral regurgitation in the HFpEF group. Although Marai et al.

found that [1] patients with HFmrEF demonstrated worse diastolic functions, there were no significant differences in other valvular pathologies and diastolic dysfunction parameters between the two groups in our findings. Our analysis revealed that, although ischemia was the most common cause of HF in patients with HFmrEF, atrial fibrillation and hypertension were the most frequent causes in patients with HFpEF. Multivariable logistic regression analysis showed that, ischemic ECG abnormalities, mitral regurgitation, higher NT-proBNP levels and IHD were associated with HFmrEF. However, atrial fibrillation, female gender and obstructive sleep apnea were associated with HFpEF [2].

In line with these findings, we agree with Marai et al. that, HFmrEF does not resemble HFpEF, and HFmrEF may closely resemble heart failure with reduced ejection fraction as suggested before other studies.

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## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

## References

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✉ Bülent Özlek  
bulent\_ozlek@hotmail.com

<sup>1</sup> Mugla Sitki Kocman University Training and Research Hospital, Muğla, Turkey

<sup>2</sup> Mugla Sitki Kocman Universitesi Tıp Fakültesi, Muğla, Turkey