

Editorial

History of acute coronary syndrome: a common, maybe underestimated, risk factor for heart failure with preserved ejection fraction



Antecedentes de síndrome coronario agudo: un factor de riesgo infraestimado de insuficiencia cardíaca con función conservada

Burkert Pieske^{a,b,c,d,*} and Daniel A. Morris^{a,b,c}^a Department of Internal Medicine and Cardiology, Charité Campus Virchow Klinikum, Berlin, Germany^b DZHK (German Center for Cardiovascular Research), Partner Site Berlin, Berlin, Germany^c Berlin Institute of Health (BIH), Berlin, Germany^d Department of Internal Medicine and Cardiology, German Heart Center Berlin, Berlin, Germany

Article history:

Available online 14 January 2021

Heart failure (HF) with preserved left ventricular (LV) ejection fraction (HFpEF) remains a syndrome or disease with serious consequences for affected individuals.^{1,2} Large studies have proven that once this syndrome is present, the prognosis of these patients is poor.^{1,2} Thus, research has been conducted to identify the risk factors for this complex and heterogeneous disease. In this respect, several studies have highlighted atrial fibrillation and chronic renal failure, and comorbidities such as overweight, diabetes mellitus, and hypertension, as pivotal risk factors for the development of HFpEF.^{3–9} Nonetheless, despite these interesting and well-designed studies, there is little information on the interaction of

acute coronary syndrome (ACS) and future risk of HFpEF. In a recent article published in *Revista Española de Cardiología*, Cordero et al.¹⁰ provide new insights concerning the risk of HFpEF in this study population by analyzing a large cohort of patients with ACS.

Well-recognized risk factors for HF with reduced LV ejection fraction are a history of coronary artery disease (CAD) and myocardial infarction.^{3,6,7} However, on the other hand, little is known about the role of CAD in the setting of HFpEF. Recent studies, nonetheless, have suggested that a history of myocardial infarction could be significantly linked to the risk of HFpEF^{6,8,9} and that revascularization in patients with CAD could be associated with a better prognosis in

Table 1

Risk factors associated with the development of heart failure with preserved ejection fraction (ie, incident heart failure with preserved ejection fraction)

Risk factor	HR (95%CI)	Sample size (No.)	Follow-up (years)	Study
Atrial fibrillation	3.79 (1.64–8.77)	8592	11.5	Brouwers et al. ³
	2.47 (1.57–3.89)	12 631	8	Ho et al. ⁴
	1.39 (1.02–1.90)	42 170	13.2	Eaton et al. ⁷
	3.3 (1.9–5.7)	3847	5.6	Gong et al. ⁹
Diabetes mellitus	2.88 (2.05–4.05)	12 631	8	Ho et al. ⁴
	2.3 (1.5–3.7)	6781	11.2	Silverman et al. ⁵
	1.84 (1.41–2.39)	42 170	13.2	Eaton et al. ⁷
	1.88 (1.59–2.23)	7878	10	Zhang et al. ⁸
	3.1 (1.9–5.0)	3847	5.6	Gong et al. ⁹
Hypertension	1.8 (1.1–2.9)	6781	11.2	Silverman et al. ⁵
	1.42 (1.18–1.71)	28 820	12	Ho et al. ⁶
	1.57 (1.33–1.86)	42 170	13.2	Eaton et al. ⁷
	3.5 (1.4–8.8)	3847	5.6	Gong et al. ⁹
Chronic renal failure	2.86 (2.36–3.46)	7878	10	Zhang et al. ⁸
History of myocardial infarction	1.48 (1.12–1.96)	28 820	12	Ho et al. ⁶
	1.70 (1.37–2.11)	7878	10	Zhang et al. ⁸
	2.3 (1.4–3.8)	3847	5.6	Gong et al. ⁹

95%CI, 95% confidence interval.

SEE RELATED CONTENT:

<https://doi.org/10.1016/j.rec.2020.03.011>

* Corresponding author: Department of Internal Medicine and Cardiology, Charité University Hospital – Campus Virchow Klinikum, Augustenburger Platz 1, 13353 Berlin, Germany.

E-mail address: burkert.pieske@charite.de (B. Pieske).<https://doi.org/10.1016/j.rec.2020.12.007>

1885-5857/© 2020 Sociedad Española de Cardiología. Published by Elsevier España, S.L.U. All rights reserved.

HFpEF.¹¹ Moreover, analyzing a large cohort of 5962 patients with ACS and preserved LV ejection fraction (LVEF) without previous HF, Cordero et al.¹⁰ have shown that the prevalence of new onset HF was 9.5% during a median follow-up of 63 months (with incident HF hospitalization being 2.7% during the first year after ACS). In addition, Cordero et al.¹⁰ have also analyzed the concomitant risk factors for incident HF hospitalization after ACS in patients with preserved LVEF (namely, incident HFpEF). In this regard, atrial fibrillation and diabetes mellitus emerged as the main risk factors for incident HFpEF in their analysis. The role of atrial fibrillation and diabetes mellitus for incident HFpEF in an ACS population corroborates and strengthens earlier studies demonstrating the role of these common comorbidities as key risk factors for incident HFpEF in non-ACS populations.^{3–9} On the basis of previous studies^{6,8,9} and the findings of Cordero et al.,¹⁰ a history of ACS or myocardial infarction should be also considered as a risk factor for HFpEF (table 1). In this regard, one of the possible pathophysiological pathways linking ACS/myocardial infarction and HFpEF could be a subendocardial or midmyocardial fibrosis caused by the ACS/myocardial infarction, which would induce LV longitudinal diastolic and systolic dysfunction with consequent elevated LV filling pressures and therefore HFpEF.¹²

Comorbidities also play a key role in the cardiovascular prognosis of patients with HFpEF.^{12–15} Control and treatment of these comorbidities not only reduces the risk of incident HFpEF but also improves outcomes in these patients.^{12,15} Indeed, Cordero et al.¹⁰ found that optimal medical treatment (defined as the combination of antiplatelets, statins, beta-blockers, and angiotensin-receptor blockers) was associated with a significantly lower risk of HFpEF hospitalization after an ACS. Hence, based on previous studies,^{1–9,11,13,14} the findings of Cordero et al.¹⁰ and the current expert recommendations for the assessment of patients with HFpEF,^{12,15} optimal management of comorbidities, without underestimating the role of ACS, could have important benefits for this complex and heterogeneous disease, for which, so far, no effective therapies are available to reduce mortality.

CONFLICTS OF INTEREST

B. Pieske reports personal fees from Bayer Healthcare, Novartis, Merck, Daiichi-Sankyo, NSD, Sanofi-Aventis, Stealth Peptides, and Vifor Pharma. D.A. Morris has no conflicts of interest.

REFERENCES

- Owan TE, Hodge DO, Herges RM, Jacobsen SJ, Roger VL, Redfield MM. Trends in prevalence and outcome of heart failure with preserved ejection fraction. *N Engl J Med*. 2006;355:251–259.
- Bhatia RS, Tu JV, Lee DS, Austin PC, Fang J, Haouzi A, Gong Y, Liu PP. Outcome of heart failure with preserved ejection fraction in a population-based study. *N Engl J Med*. 2006;355:260–269.
- Brouwers FP, de Boer RA, van der Harst P, et al. Incidence and epidemiology of new onset heart failure with preserved vs. reduced ejection fraction in a community-based cohort: 11-year follow-up of PREVEND. *Eur Heart J*. 2013;34:1424–1431.
- Ho JE, Lyass A, Lee DS, et al. Predictors of new-onset heart failure: differences in preserved versus reduced ejection fraction. *Circ Heart Fail*. 2013;6:279–286.
- Silverman MG, Patel B, Blankstein R, et al. Impact of Race, Ethnicity, and Multimodality Biomarkers on the Incidence of New-Onset Heart Failure With Preserved Ejection Fraction (from the Multi-Ethnic Study of Atherosclerosis). *Am J Cardiol*. 2016;117:1474–1481.
- Ho JE, Enserro D, Brouwers FP, et al. Predicting Heart Failure With Preserved and Reduced Ejection Fraction: The International Collaboration on Heart Failure Subtypes. *Circ Heart Fail*. 2016;9:e003116.
- Eaton CB, Pettinger M, Rossouw J, et al. Risk Factors for Incident Hospitalized Heart Failure With Preserved Versus Reduced Ejection Fraction in a Multiracial Cohort of Postmenopausal Women. *Circ Heart Fail*. 2016;9:e002883.
- Zhang L, Liebelt JJ, Madan N, Shan J, Taub CC. Comparison of Predictors of Heart Failure With Preserved Versus Reduced Ejection Fraction in a Multiracial Cohort of Preclinical Left Ventricular Diastolic Dysfunction. *Am J Cardiol*. 2017;119:1815–1820.
- Gong FF, Jelinek MV, Castro JM, et al. Risk factors for incident heart failure with preserved or reduced ejection fraction, and valvular heart failure, in a community-based cohort. *Open Heart*. 2018;5:e000782.
- Cordero A, Rodríguez-Mañero M, Bertomeu-González V, et al. New-onset heart failure after acute coronary syndrome in patients without heart failure or left ventricular dysfunction. *Rev Esp Cardiol*. 2021;74:494–501.
- Hwang SJ, Melenovsky V, Borlaug BA. Implications of coronary artery disease in heart failure with preserved ejection fraction. *J Am Coll Cardiol*. 2014;63:2817–2827.
- Pieske B, Tschöpe C, de Boer RA, et al. How to diagnose heart failure with preserved ejection fraction: the HFA-PEFF diagnostic algorithm: a consensus recommendation from the Heart Failure Association (HFA) of the European Society of Cardiology (ESC). *Eur Heart J*. 2019;40:3297–3317.
- Edelmann F, Stahrenberg R, Gelbrich G, et al. Contribution of comorbidities to functional impairment is higher in heart failure with preserved than with reduced ejection fraction. *Clin Res Cardiol*. 2011;100:755–764.
- Ergatoudes C, Schaufelberger M, Andersson B, Pivodic A, Dahlström U, Fu M. Non-cardiac comorbidities and mortality in patients with heart failure with reduced vs. preserved ejection fraction: a study using the Swedish Heart Failure Registry. *Clin Res Cardiol*. 2019;108:1025–1033.
- Ponikowski P, Voors AA, Anker SD, et al. ESC Scientific Document Group, 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. *Eur Heart J*. 2016;37:2129–2200.