

**\*Ibrahim El-Battrawy, MD**  
**Martin Borggreffe, MD**  
**Ibrahim Akin, MD**

\*First Department of Medicine  
University Medical Centre Mannheim  
Theodor-Kutzer-Ufer 1-3  
68167 Mannheim, Germany

E-mail: [ibrahim.el-battrawy@medma.uni-heidelberg.de](mailto:ibrahim.el-battrawy@medma.uni-heidelberg.de)  
<http://dx.doi.org/10.1016/j.jacc.2017.07.797>

Please note: The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

#### REFERENCES

1. Hall PS, Nah G, Howard BV, et al. Reproductive factors and incidence of heart failure hospitalization in the Women's Health Initiative. *J Am Coll Cardiol* 2017;69:2517-26.
2. Templin C, Ghadri JR, Diekmann J, et al. Clinical features and outcomes of takotsubo (stress) cardiomyopathy. *N Engl J Med* 2015;373:929-38.
3. El-Battrawy I, Borggreffe M, Akin I. Predictors of mortality in Takotsubo cardiomyopathy. *Eur J Heart Fail* 2017;19:158.

#### REPLY: Hormone Status Correlates With Incidence of Heart Failure



We thank Dr. El-Battrawy and colleagues for their interest in our work, as well as for proposing a potential mechanism that may underlie the association between a longer period of exposure to endogenous sex hormones and a lower risk of heart failure after menopause (1). We had hypothesized that endogenous sex hormones may directly confer a protective effect, and we do agree with their suggestion that this effect may be related to a lower incidence of Takotsubo cardiomyopathy. The cause of heart failure was not adjudicated in the Women's Health Initiative population,

and we are unable to evaluate directly whether the association was driven by a reduction in Takotsubo cardiomyopathy among women with a longer reproductive period. Given that Takotsubo cardiomyopathy is classically associated with a transient reduction in left ventricular systolic function, we are doubtful that it can fully account for the association we demonstrated between nulliparity and a higher risk of heart failure with preserved ejection fraction (2). We agree that further investigations are warranted to evaluate the potential mechanisms linking women's exposure to endogenous sex hormones with their subsequent risk of cardiovascular disease.

**\*Nisha I. Parikh, MD, MPH**  
**Philip S. Hall, MD**

\*Department of Cardiovascular Surgery  
University of California San Francisco Medical Center  
555 Mission Bay Boulevard South 352T  
San Francisco, California, 94158

E-mail: [nisha.parikh@ucsf.edu](mailto:nisha.parikh@ucsf.edu)  
<http://dx.doi.org/10.1016/j.jacc.2017.08.059>

Please note: This work was supported by the American College of Cardiology ACC Merck Award (to Dr. Hall), American Heart Association Grant 13CRP17350002 (to Dr. Parikh), National Institutes of Health (NIH) Grant Support provided by NIH grant 7R21HL115398 (to Dr. Parikh). The Women's Health Initiative program is funded by the National Heart, Lung, and Blood Institute, NIH, U.S. Department of Health and Human Services through contracts, HHSN268201600018C, HHSN268201600001C, HHSN268201600002C, HHSN268201600003C, and HHSN268201600004C.

#### REFERENCES

1. Hall PS, Nah G, Howard BV, et al. Reproductive factors and incidence of heart failure hospitalization in the Women's Health Initiative. *J Am Coll Cardiol* 2017;69:2517-26.
2. Templin C, Ghadri JR, Diekmann J, et al. Clinical features and outcomes of takotsubo (stress) cardiomyopathy. *N Engl J Med* 2015;373:929-38.