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## What is the added value of the waist-to-hip ratio on top of the BIOSTAT risk prediction model in patients with heart failure? Reply

We thank Dr. Cao for his interest in our paper. Dr. Cao addresses an important topic regarding the study design of the BIOSTAT-CHF study. Almost all patients included were Caucasian patients, and to conclude that the same association of waist-to-hip ratio (WHR) with mortality exists in other ethnicities, further studies should be performed.<sup>1</sup>

The second question raised by Dr. Cao is the additive value of WHR on top of the risk prediction model within BIOSTAT-CHF.<sup>2</sup> The prediction models were developed to assess the strongest predictors for mortality and/or heart failure hospitalization. The predictors in BIOSTAT-CHF for mortality were age, blood urea nitrogen, N-terminal pro-B-type natriuretic peptide, haemoglobin and use of

beta-blocker. In our multivariable model, we aimed to assess the independent association of WHR with all-cause mortality within male and female patients with heart failure, and therefore corrected for all confounders. The BIOSTAT-CHF prediction model contains the strongest predictors for mortality, and were also confounders in our manuscript. Therefore we included these variables in our multivariable Cox regression models, together with other confounders. We found that WHR was independently associated with all-cause mortality in female patients with heart failure.<sup>3</sup> The additive value of WHR on the risk prediction model is therefore not the aim of our manuscript, we merely aimed to investigate the independent association of WHR with all-cause mortality, and therefore corrected for the previously published risk prediction model.

The last question raised by Dr. Cao regards the association of adiposity and pro-inflammatory cytokines such as C-reactive protein. Unfortunately there are no available C-reactive protein measurements in our cohort. However, we found a strong association with a panel of inflammatory markers, especially in female heart failure patients.

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