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# Reply: Impact of diabetes on coronary artery plaque volume by coronary CT angiography and subsequent adverse cardiac events

We would like to thank Dr. Kawada for his interest and effort spent to comment on our manuscript. He raises two interesting queries which we would like to respond to. His first query relates to the analysis of adverse outcome based upon quantified total plaque volume (TPV). All results presented in the manuscript were derived from Cox Regression Models. Due to the rather low number of events, the Framingham Score was incorporated into the multivariate analysis to avoid model overfitting and adjust for overall cardiovascular risk factors. An analysis investigating both diabetes and TPV as independent variables on adverse outcome in a Cox model revealed, that both diabetes (hazard ratio 1.9, $p = 0.03$) and TPV (hazard ratio 2.9, $p < 0.001$) are independent predictors of adverse outcome – an observation that is in line with results presented by various other research groups.[1] However, such an analysis does not reveal the interesting finding that outcome in diabetic and non-diabetic patients is comparable when TPV is less than 110.5 $mm^3$ and is significantly worse when TPV exceeds 110.5 $mm^3$.

The second query relates to gender differences and influence of various biomarkers on coronary artery disease burden and patterns. It is well known, that coronary artery disease is less common and appears at higher ages in women, but - when present - is associated with higher mortality and morbidity.[2,3] To account for this difference, we included gender as parameter for propensity-matching. We agree with Dr. Kawada, that an analysis investigating coronary plaque volume and it's components including non-calcified plaque volume with low attenuation values might reveal interesting differences between women and men. The effect of various biomarkers on coronary artery disease and adverse cardiac outcome is also an interesting aspect.[4] Unfortunately, simultaneous measurement of biomarkers was not performed - although we acknowledge that biomarkers could have further improved risk stratification in our patients.

## Conflicts of interest

None.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jcct.2019.01.013.

## References

1. Blanke P, Naoum C, Ahmadi A, et al. Long-term prognostic utility of coronary CT angiography in stable patients with diabetes mellitus. *JACC Cardiovasc Imaging.* 2016;9:1280–1288.
2. Shaw LJ, Bugiardini R, Merz CN. Women and ischemic heart disease: evolving knowledge. *J Am Coll Cardiol.* 2009;54:1561–1575.
3. Vaccarino V, Parsons L, Every NR, Barron HV, Krumholz HM. Sex-based differences in early mortality after myocardial infarction. National Registry of Myocardial Infarction 2 Participants. *N Engl J Med.* 1999;341:217–225.
4. Rusnak J, Fastner C, Behnes M, Mashayekhi K, Borggrefe M, Akin I. Biomarkers in stable coronary artery disease. *Curr Pharmaceut Biotechnol.* 2017;18:456–471.

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