Letter to the Editor

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RE: Prediction of the Left Ventricular Functional Outcome by Myocardial Extracellular Volume Fraction Measured Using Magnetic Resonance Imaging: Methodological Issue

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Dear Editor,

We were interested in the paper by Chen et al. (1) published in January 2019, wherein the coronary chronic total occlusion (CTO) was defined as complete occlusion, and confirmed with coronary angiography over a period of three months with a prevalence of 20% to 30%. The authors aimed to investigate the additional value of the myocardial extracellular volume fraction (ECV), derived from T1 mapping, to predict the functional recovery as compared to the standard cardiovascular magnetic resonance (CMR) measurement (1). Using this method, 30 patients with CTO underwent CMR preoperatively and six months after revascularization. Stepwise logistic regression analysis was used to determine the independent predictors of regional and global functional recovery. The authors reported that in per-segment analysis, ECV was superior to transmural extent of infarction and unenhanced rim thickness in predicting functional recovery (area under receiver operating characteristic curve: 0.86 vs. 0.75 and 0.73, respectively; all p values < 0.010). ECV emerged as the only independent predictor of the regional functional outcome (odds ratio = 0.83, 95% confidence interval: 0.77–0.89; p < 0.001) independent of collateral circulation (1).

The objectives of this study are valuable, but there are a few methodological points about the study that are worth mentioning. In order to develop and validate prediction models, we need data from two different cohorts (external validation) or at least from one cohort divided into two (internal validation). Different approaches can be applied for validation of a prediction model, including the split sample, bootstrapping, and other well-known validation methods (2-5). In predictive studies, we must also evaluate the effect of different variables on each other (interaction). Without reviewing these interactions and correlating the potential predictors, the messages could be misleading. In fact, we can identify confounding factors by using regression, and by measuring the relationships between variables (6).

The authors concluded that non-invasive assessment of ECV showed greater value as compared to the conventional CMR measures, and is the only predictor of a functional outcome both at the segmental and global levels in CTO patients. In summary, the aforementioned conclusions can be made; otherwise, incorrect results would be unavoidable. In this letter, we have discussed the methodological issues of the mentioned study.

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REFERENCES

1. Chen Y, Zheng X, Jin H, Deng S, Ren D, Greiser A, et al. Role of myocardial extracellular volume fraction measured with magnetic resonance imaging in the prediction of left ventricular functional outcome after revascularization of chronic total occlusion of coronary arteries. *Korean J Radiol* 2019;20:83-93
2. Grobbee DE, Hoes AW. *Clinical epidemiology: principles, methods, and applications for clinical research*. Jones & Bartlett Learning; 2009:297-314
3. Szklo M, Nieto FJ. *Epidemiology: beyond the basics*, 3rd ed. New York, NY: Jones and Bartlett Publisher, 2014:333
4. Abbasi M, Naderi M. What does need to know about developing clinical prediction models? *J Geriatr Oncol* 2019;10:369
5. Abbasi M, Naderi M. Prediction of surgical outcome after trabeculectomy for neovascular glaucoma with anterior-segment optical coherence tomography: a methodological issues. *J Glaucoma* 2019;28:e51-e52
6. Moons KG, Royston P, Vergouwe Y, Grobbee DE, Altman DG. Prognosis and prognostic research: what, why, and how? *BMJ* 2009;338:b375

https://doi.org/10.3348/kjr.2019.0062