



## Social Network Structure and Atherosclerotic Cardiovascular Disease

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Social network has several downstream pathways including social support, social influence, and social engagement, and its relation with a wide range of aspects of cardiovascular diseases such as onset, survival of patients, and mortality has been examined<sup>1</sup>. Studies using network analysis has been also conducted, and Christakis and Fowler have demonstrated a spread of obesity through social ties based on the data of the Framingham Heart Study<sup>2</sup>. Thus, the number and scope of researches on social network and cardiovascular diseases are growing.

In this issue of the Journal of Atherosclerosis and Thrombosis, Joo *et al.* reported the association between social network betweenness and coronary calcium using baseline data from the Cardiovascular and Metabolic Disease Etiology Research Center-High Risk Cohort<sup>3</sup>. The authors demonstrated that deficiency in social network betweenness was closely related to coronary calcium in participants with a high risk of cardiovascular disease.

Social network betweenness is a type of social structure, which is evaluated by a module called name generator. The authors defined two binary indicators, namely, only-family network and no-cutpoint network, as deficiencies of social network betweenness. Only-family network indicates that participants do not have any member other than their family in their list of network members, and no-cutpoint network indicates that participants cannot act as a cutpoint of

networks. The study revealed that no-cutpoint network had a significant association with higher coronary artery calcium scores, particularly among older and female participants.

Coronary artery calcium is a surrogate of atherosclerotic cardiovascular disease<sup>4</sup>. Computed tomography scanning was performed, and images were analyzed using a software (TeraRecon V. 4.4.11.82.3430. Beta; TeraRecon, Foster City, CA, USA) in the study. To minimize the effects of reversed causation in this cross-sectional study, the authors carefully excluded recently-formed social networks to check the robustness of the results. They also adopted the coarsened exact matching for a more accurate assessment of causal effects. Thus, this study is believed to provide the best-available evidence on the association between social network betweenness and coronary calcium.

In addition to awaiting prospective data of this high risk cohort, the association should be confirmed in other cohorts or countries. However, as a module of evaluation of social network structure, a name generator is rather burdensome for participants and computed tomography is basically for medical use, so other methods should be employed to examine the association between social network structure and atherosclerotic cardiovascular disease in the general population. For example, in a large cohort study, a resource generator module can be applied to evaluate the social capital of individuals<sup>5</sup>. Further studies using different evaluation methods in different populations will provide new insights on social network structure and atherosclerotic cardiovascular disease.

### Conflict of Interest

None.

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### References

- 1) Berkman LF, Krishna A: Social network epidemiology. In: Berkman LF, Kawachi I, Glymour MM, eds. *Social Epidemiology*, 2nd ed. New York; Oxford University Press: p.234-289
- 2) Christakis NA, Fowler JH: The spread of obesity in a large social network over 32 years. *N Engl J Med*, 2007; 357: 370-379
- 3) Joo WT, Lee CJ, Oh J, Kim IC, Lee SH, Kang SM, Kim HC, Park S, Youm Y: The association between social network betweenness and coronary calcium: A baseline study of patients with a high risk of cardiovascular disease. *J Atheroscler Thromb*, 2018; 25: 131-141
- 4) Zaid M, Fujiyoshi A, Kadota A, Abbott RD, Miura K: Coronary artery calcium and carotid artery intima media thickness and plaque: Clinical use in need of clarification. *J Atheroscler Thromb*, 2017; 24: 227-239
- 5) Kobayashi T, Kawachi I, Iwase T, Suzuki E, Takao S: Individual-level social capital and self-rated health in Japan: an application of the Resource Generator. *Soc Sci Med*, 2013; 85: 32-37