

Editorial



Reclassification of Cardiovascular Risk Based on the Presence of Carotid Plaque Regarding Statin Eligibility in Low to Moderate Risk Patients

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Conflict of Interest

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Data Sharing Statement

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► See the article “Statins and Clinical Outcomes in Patients With Low to Moderate Risk but With Non-obstructive Carotid Plaques: The SCOPE-CP Study” in volume 52 on page 890.

Atherosclerosis is one of mainstay of pathophysiological process of atherosclerotic cardiovascular disease (ASCVD) encompassing acute coronary syndrome, peripheral artery disease, and events such as myocardial infarction and stroke. Carotid ultrasound is widely used worldwide due to its relative low cost, non-invasiveness, reproducibility and safety from radiation. It primarily detects atherosclerotic changes of artery and allows variety of parameters including intima-media thickness (IMT), arterial diameter, the presence of plaque, blood flow and velocity measurements.¹⁾

In low- and intermediate cardiovascular risk population, coronary artery calcium (CAC) scoring is known to be able to reclassify cardiovascular disease (CVD) risk upwards and downwards in addition to conventional risk factors.²⁾³⁾ Compared with carotid IMT, carotid plaque assessed by ultrasound, demonstrated a higher diagnostic accuracy for the prediction of future coronary artery disease events.⁴⁾ Although the evidence is less extensive than it is for CAC, carotid artery plaque assessment using ultrasonography probably also reclassifies CVD risk. So carotid plaque demonstrated by carotid ultrasound may be considered as a risk modifier in patients at intermediate risk when a CAC scoring is not feasible.

Carotid ultrasound is only recommended as an alternative imaging method of CAC scoring for the evaluation of cardiovascular risk measured in recent guideline.⁵⁾ Additionally, systematic use of IMT to improve risk assessment is not recommended even in the intermediate-risk group due to the difficulties of methodology although American Society of Echocardiography recently published recommendations of carotid artery assessment by ultrasound for evaluation of cardiovascular risk and to promote its technical standardization.⁶⁾

Considering recent advances, the benefits of medical therapy might have been underestimated even in asymptomatic carotid stenosis patients who need stenting or endarterectomy.⁷⁾ Mortensen et al.⁸⁾ published a study which carotid plaque burden was utilized as a tool to personalize American Heart Association (AHA)/American College of Cardiology (ACC) risk-based statin eligibility. The study subjects with more than intermediate ASCVD risk were down- or up-classified according to carotid plaque burden for statin eligibility. With carotid plaque burden guided reclassification, specificity improved

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with a minor loss in sensitivity. Withholding statins in down-classified individuals without carotid plaque could spare a significant proportion from taking a pill that would benefit only a few.⁸⁾ It shows that in the population with more than intermediate CVD risk, absence of carotid plaque demonstrated by ultrasound can be used as a tool in personalized medicine in terms of statin use. Nevertheless, in low- to intermediate-risk population ineligible for statin therapy, up-classifying according to the presence of atherosclerosis presented by carotid plaque is not justifiable and it can result in excessive use of the pill with little clinical benefit.⁹⁾

Carotid ultrasound is a useful method for detecting atherosclerotic changes of large arteries, but it only can be applied as risk stratification tool in very limited situations. Three-dimensional plaque quantification and plaque composition assessment of ultrasound enhancing agent can be the candidate for the novel risk markers of carotid ultrasound imaging.⁶⁾ These modalities are not widely applied in real clinical practices due to lack of practitioner's experience and need for special equipment and software. Carotid vascular stiffness index improved after statin treatment. So, it also has possibilities for the usage as risk modifications, but sophisticated way of calculation limits its appliance.¹⁰⁾ Further development of ultrasound imaging technique and novel software able to derive simple and reliable parameters is warranted for wider application of carotid ultrasound as a tool for CVD risk classifier.

REFERENCES

1. Kim GH, Youn HJ. Is carotid artery ultrasound still useful method for evaluation of atherosclerosis? *Korean Circ J* 2017;47:1-8.
[PUBMED](#) | [CROSSREF](#)
2. Yeboah J, McClelland RL, Polonsky TS, et al. Comparison of novel risk markers for improvement in cardiovascular risk assessment in intermediate-risk individuals. *JAMA* 2012;308:788-95.
[PUBMED](#) | [CROSSREF](#)
3. Yeboah J, Young R, McClelland RL, et al. Utility of nontraditional risk markers in atherosclerotic cardiovascular disease risk assessment. *J Am Coll Cardiol* 2016;67:139-47.
[PUBMED](#) | [CROSSREF](#)
4. Inaba Y, Chen JA, Bergmann SR. Carotid plaque, compared with carotid intima-media thickness, more accurately predicts coronary artery disease events: a meta-analysis. *Atherosclerosis* 2012;220:128-33.
[PUBMED](#) | [CROSSREF](#)
5. Visseren FLJ, Mach F, Smulders YM, et al. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. *Eur Heart J* 2021;42:3227-337.
[PUBMED](#) | [CROSSREF](#)
6. Johri AM, Nambi V, Naqvi TZ, et al. Recommendations for the assessment of carotid arterial plaque by ultrasound for the characterization of atherosclerosis and evaluation of cardiovascular risk: from the American Society of Echocardiography. *J Am Soc Echocardiogr* 2020;33:917-33.
[PUBMED](#) | [CROSSREF](#)
7. Roh JH, Cho HJ, Lee JH, et al. Role of carotid artery stenting in prevention of stroke for asymptomatic carotid stenosis: bayesian cross-design and network meta-analyses. *Korean Circ J* 2020;50:330-42.
[PUBMED](#) | [CROSSREF](#)
8. Mortensen MB, Fuster V, Muntendam P, et al. A simple disease-guided approach to personalize ACC/AHA-recommended statin allocation in elderly people: the BioImage Study. *J Am Coll Cardiol* 2016;68:881-91.
[PUBMED](#) | [CROSSREF](#)
9. Yoon M, Lee CJ, Park S, Lee SH. Statins and clinical outcomes in patients with low to moderate risk but with non-obstructive carotid plaques: the SCOPE-CP study. *Korean Circ J* 2022;52:890-900.
[CROSSREF](#)
10. Mizuguchi Y, Oishi Y, Miyoshi H, Iuchi A, Nagase N, Oki T. Impact of statin therapy on left ventricular function and carotid arterial stiffness in patients with hypercholesterolemia. *Circ J* 2008;72:538-44.
[PUBMED](#) | [CROSSREF](#)