Intima-Media Thickness Side Differences Are Limited to the Common Carotid Artery

To the Editor:

We read with interest the article by Rodríguez Hernández et al.1 describing a significant difference between left and right common carotid artery intima-media thickness (mean CCA-IMT=SD, 0.75±0.11 mm versus 0.71±0.11 mm; P<0.001) in 102 untreated hypertensive patients. Furthermore, the authors found a significantly higher rate of left-sided nonlacunar ischemic strokes in a population-based stroke registry sample (odds ratio [OR]=1.39 for atherosclerotic and OR=1.46 for cardioembolic strokes, respectively; P<0.001).2,3 They concluded from their findings that potential left side predilection for cerebrovascular events may be eventually related to increased hemodynamic stress and intimal damage as indicated by a significantly increased left CCA-IMT compared with the right side.1

We do not entirely agree with the interpretation of the reported findings. Based on an analyses of the Carotid Atherosclerosis Progression Study community-based sample of 6972 subjects (age 51.0±12.9 years, 50.8% female),2,3 we confirm the finding of a significantly higher CCA-IMT on the left side (0.716±0.165 mm versus 0.688±0.147 mm; P<0.001). This was also the case in hypertensive patients (n=1399; 0.786±0.201 mm versus 0.751±0.169 mm; P<0.001). In contrast, we did not find any significant IMT differences at the carotid bifurcation (BIF-IMT) or at the internal carotid artery (ICA) bulb (BULB-IMT), respectively: BIF-IMT, 0.864±0.315 mm versus 0.864±0.313 mm; P=1.000; BULB-IMT, 0.719±0.254 mm versus 0.721±0.252 mm; P=0.424. In hypertensives, the findings were similar: BIF-IMT, 0.972±0.379 mm versus 0.968±0.375 mm; P=0.373; BULB-IMT, 0.785±0.290 mm versus 0.792±0.286 mm; P=0.242. Thus, we found that significant IMT differences favoring the left side were restricted to the CCA segment of the carotid system. Furthermore, this conclusion is supported by the finding that atherosclerotic plaque formation in the ICA bulb was present in 4.0% on the left side and in 4.6% on the right side (P=0.034). And also in hypertensives, we found no significant L/R difference in plaque prevalence (9.1% versus 9.7%; P=0.509).

Prospective studies reported an independent predictive value of CCA-IMT in view of future vascular events.4,5 Otherwise, from a pathophysiological point of view, increased CCA-IMT is more an indicator of vascular risk than a lesion, which itself may produce arterio-arterial thromboembolism.6,7 If increased left CCA-IMT may indicate a higher risk of atherosclerotic lesion formation across the left carotid system, a higher prevalence of atherosclerotic plaque should be present around the bifurcation. Unfortunately, that was indeed not the case. Thus, we would propose an alternative interpretation favoring increased CCA-IMT on the left side as a more adaptive vascular modeling driven by side differences concerning blood pressure, local shear forces, and vascular anatomy, but not as an indicator of a side-specific increased atherosclerotic risk on its own. Therefore, the link between significant L/R CCA-IMT differences and a higher frequency of cerebral ischemic events in the left hemisphere may be not stringent. The finding of this study, that only nonlacunar strokes (including cardioembolic strokes) were more often on the left side, casts further doubt on a meaningful relationship. Furthermore, the fact that only embolic infarctions with involvement of cortical structures were left side preferential may indicate that underrecognition of right-sided territorial infarctions because of neglect or that anosognosia may also play a significant role and should be further investigated.

Christian Foerch, Alexandra Buehler, Stephan von Kegler, Matthias Sitzer
Department of Neurology
Johann Wolfgang Goethe-University
Frankfurt am Main, Germany

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