Intima–Media Thickness in Children—Need for More Parameters?

To the Editor:

Carotid artery intima–media thickness (IMT) measurements and their interpretation in the pediatric age group represent a special challenge. We appreciate, therefore, the data given by Doyon et al.1 on reference values for carotid artery IMT and distensibility.2 Given the wide variety of normal values of IMT published up to date, the large patient group included in the study of Doyon et al.1 deserves special attention and should guarantee reliable results. We regret, however, that the method applied for IMT measurement seems to raise questions about the comparability of the results. The authors describe their method according to the so-called caliper method, in which manual measurement of the IMT complex is performed and punctual manual measurements (how many?) are considered for calculation of the mean IMT. We would like to emphasize that, according to internationally published guidelines, this method should be replaced by more sophisticated algorithms. Because of the small distances measured, especially in the pediatric patient, the use of contour detection algorithms based on semiautomated software is strongly warranted. The advantage of these tools is undoubtedly present because the contours of the IMT are detected and measured on a pixel basis within a sample volume of 10 mm (as recommended) of the common carotid artery immediately adjacent to the carotid bulb. Thus, the IMT value calculated is based on 64 single measurements. Especially when small distances are considered (ie, in a child, the IMT value may be of 0.36 mm), the advantage of such algorithms is striking. Maybe that the different methods applied partially explain also the fact that the data given by the authors differ significantly from normative data published by other groups previously. Three studies included children, and 1 study investigated also subjects at an age of <10 years. One of these studies reports on 160 subjects aged 10 to 18 years and a mean IMT value between 0.48±0.04 mm and 0.50±0.04 mm. The authors do not state, however, how the measurements have been performed (manually or with computed system).3 Another recent study involved >200 subjects at an age of 10 to 20 years.4 These authors measured the IMT manually and report on IMT values between 0.38±0.04 mm and 0.40±0.03 mm. The most recent study included 267 subjects aged from 6 to 17 years and used a semiautomated contour detection system. The authors report on an IMT between 0.48±0.01 mm and 0.59±0.08 mm.5 Given the differences of normative values in a comparable population, questions about the comparability of the normative data with special attention to the ultrasound systems and measurement methods applied raise.

If so, clinicians and researchers will have to look for other robust methods to estimate or calculate IMT in childhood. We had the impression that beyond the IMT calculated from diameters measured in end-diastolic still frames, a parameter considering the IMT throughout the heart cycle and calculating the IMT based on the measurements in diastole and systole showed accurate and reproducible results. We called this parameter average IMT6 and published first results. Of course, we strongly recommend conducting further studies investigating the reliability of new parameters such as the proposed average IMT. However, end-diastolic IMT does not seem to fulfill all criteria of a parameter in terms of reproducibility and comparability at least in the pediatric age group.

Disclosures

None.

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