



## IS CAROTID INTIMA-MEDIA THICKNESS ASSOCIATED WITH LOWER LEVELS OF VITAMIN D LEVELS IN CHILDREN AND ADOLESCENTS WITH OBESITY?

*Dear Editor,*

Liu et al. published in the July issue an article titled “Lower levels of vitamin D are associated with an increase in carotid intima-media thickness in children and adolescents with obesity” (1). The authors investigated in children and adolescents with obesity the correlation between vitamin D levels and carotid intima-media thickness (cIMT), a surrogate marker of pre-clinical atherosclerosis (1). Included were 440 children and adolescents aged 6-16 with obesity, divided into three groups: 119 patients had vitamin D deficiency (79 males and 40 females; median age, 11.68 years); 228 patients had vitamin D insufficiency (155 males and 73 females; median age, 11.34 years), and 93 patients had vitamin D sufficiency (70 males and 23 females; median age, 11.35 years) (1). All subjects had bilateral carotid ultrasound to assess cIMT (1). The study “showed a significant negative correlation between vitamin D levels and cIMT in the low vitamin D level group, even after adjusting for various confounding factors ( $p < 0.05$ )”. The authors concluded “that vitamin D deficiency exacerbates the risk of CIMT abnormalities in children and adolescents with obesity” (1). Some comments are needed to evaluate the results of this study in a more balanced way.

The authors measured cIMT bilaterally at the common carotid artery (CCA) “at its thickest part 1 cm proximal to the bifurcation” (1). CIMT was expressed as the average value of the left and right cIMT (1). However, the authors failed to mention and to discuss that there is no agreement on the cIMT measurement protocol. It is important to recall that there are two main thoughts as to cIMT measurement protocols: one is to measure at one single site, namely the distal wall of the CCA in the proximity of the bifurcation (2) while another is to measure at multiple sites, involving all or a combination of different CA sections (proximal/distal walls) of the CCA, bifurcation and internal CA (3,4). A distal wall CCA measure is mostly based on the higher spatial resolution of the distal CCA wall (2), while a composite measure reflects the asymmetric manifestation of atherosclerosis more accurately, and arguably the actual cIMT (3,5). A further point that Liu et al. (1) failed to specify is whether measurements occurred, as recommended (2), synchronized with the cardiac end-diastolic phase. This is a critical aspect as cIMT values vary according to vessel-diameter changes during the cardiac cycle (6). Therefore, without synchronization, measurements in the three groups of the Liu et al. study (1) will have occurred randomly in both cardiac phases, rendering the cIMT values incomparable.

As sub-millimetric differences will categorize subjects into different cIMT categories, a meticulous measurement protocol and a detailed reporting of cIMT data acquisition are essential; only in this way the scientific community is able to

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evaluate the results. Given these methodological flaws, the cIMT results and the conclusion of this study "Vitamin D deficiency may be an independent risk factor for atherosclerosis in children and adolescents with obesity" (1) should be considered with caution.

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