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Atherosclerosis is a gradually developing disease with deadly complications in which the arteries are narrowed due to plaque buildup. Thickening of the vessel walls is a preclinical marker of atherosclerosis. Usually the thickening begins from the dorsal wall of abdominal aorta, the site where the later plaque also often locate. Atherosclerosis has been widely studied, but the interest has now turned into the early burden of cardiovascular diseases since infancy or even prenatal period. According to previous studies, infant aortic intima-media thickness (aIMT) may be linked to maternal smoking during pregnancy, maternal history of diabetes and hypercholesterolemia, fetal growth restriction, infant birth weight and early microbial exposure.

The aim of this study was to evaluate the determinants of infant abdominal aortic intima-media thickness. Infant intima-media thickness and arterial distensibility was studied with ultrasonography at the age of 6-8 weeks postpartum. Additionally, infant weight and blood pressure were measured and maternal breast milk sample was collected. Maternal prenatal stress was queried and postnatal stress defined from the breast milk cortisol. Parental history of cardiovascular risk factor and cardiometabolic diseases, smoking and alcohol use were queried. Statistical analyzes were conducted using SAS 9.4.

Paternal smoking during pregnancy was associated with higher infant intima-media thickness. There were no statistically significant associations with maternal pre- or postnatal stress, maternal age, pre-pregnancy BMI, parental history of high blood pressure, hypercholesterolemia or diabetes, maternal smoking during pregnancy or parental alcohol use during pregnancy. Infant birth weight, gestation weeks or mode of delivery were not significantly associated with aIMT.

In this study we found that paternal smoking during pregnancy associate with higher infant aIMT. Possible pathways behind the association could be maternal passive smoking or epigenetical changes to paternal germ cells. This study implicates that health counselling, focused especially on smoking should be targeted to both parents before and during pregnancy in order to promote offspring vascular health.

Keywords: atherosclerosis, aortic intima-media thickness, infancy, ultrasound