Coronary Artery Calcium Progression and CVD Risk Among Those on Statin Therapy

Kashif Shaikh, Robyn McClelland, Venkata M Alla, Shone Almeida, Fayez Siddiqui, Khurram Nisar, Rine Nakanishi, Aiden Abidov, Moyses Szklo**,** Nathan D. Wong, Richard Kronmal, Matthew Budoff

Background: Prospective cohort studies have shown that the presence and progression of coronary artery calcification (CAC) predict the risk of cardiovascular disease (CVD) and all-cause mortality in the general population, beyond established CVD risk factors. CAC progression is an independent predictor of CV clinical events, and statins are known to reduce the risk of CVD events. However, some studies report statin use is associated with CAC progression. We evaluated whether CAC progression was as strongly associated with CVD risk in individuals on statins compared to those not taking statins.

Methods: We studied 5599 participants aged 45–84 years from the Multi-Ethnic Study of Atherosclerosis who had baseline and follow-up CAC scans approximately 2.5 ± 0.8 years apart. Median follow-up duration from the time of the second CAC scan was 12.3 years. CAC change was assessed by the annualized difference between follow-up CAC and baseline CAC. Cox proportional hazards regression was used to examine the association of a) incidence of new CAC>0; and b) annualized change in CAC among those with CAC>0 at baseline, with incident CVD events adjusting for age, gender, ethnicity, baseline calcium score, and other risk factors stratified by baseline statin use. A pooled model was used to test the interaction between statin use and CAC progression.

Results: The incidence of new CAC>0 among those with CAC=0 at baseline was similarly associated with increased CVD risk among participants taking versus not taking statins (HR 1.61 versus 1.60, P-interaction 0.85). Annualized change in CAC among those with CAC>0 at baseline was also similarly associated with risk among those taking versus not taking statins at baseline even controlling for baseline levels of CAC (HR 1.14 versus 1.16 per 100 Agatston units of annual change, P-interaction 0.39) (Table 1).

Conclusion: Our results suggest that CAC progression may be informative even among those already taking statins.

Table 1: Models control for age, gender, race/ethnicity, SBP, any anti-hypertensive medication use, total and HDL cholesterol, diabetes, smoking status, **and baseline CAC**. Overall model also controls for statin use. Outcome is CVD All (includes hard CHD, angina, and stroke).

	N at risk	N events	Overall		Baseline Statin Use?				
					No (n=2623)		**Yes (n=277)**		
			HR (95% CI)	**p-value**	**HR (95% CI)**	**p-value**	**HR (95% CI)**	**p-value**	**p-interaction**
New CAC>0									
No	**2437**	**126**	**Ref**		**Ref**		**Ref**		
Yes	**463**	**46**	**1.62 (1.14, 2.29)**	**0.007**	**1.61 (1.11, 2.33)**	**0.011**	**1.60 (0.54, 4.73)**	**0.39**	**0.85**
Average Annual CAC Change									
Per 100 units	**2699**	**551**	**1.14 (1.03, 1.26)**	**0.011**	**1.14 (1.02, 1.27)**	**0.020**	**1.16 (0.92, 1.45)**	**0.21**	**0.39**