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Editorial

Left main coronary artery calcium and mortality risk: *Repetita iuvant et magis notitia*

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In this issue of the journal, Lahti et al. [1], report on the impact of coronary artery calcium (CAC) detected in the left main trunk (LM CAC) on a screening chest computed tomography (CT) scan. In a retrospective analysis of 28,147 asymptomatic subjects followed for 12 years after the index scan, they reported a LM CAC prevalence of ~22%, and clearly demonstrated that LM CAC is independently predictive of all-cause as well as cardiovascular death, and that the risk increases as the LM CAC score increases. Additionally, LM CAC was more predictive of death than CAC located in any other artery. Of note, both prevalence and severity of LM CAC increased in direct proportion to the number of traditional risk factors carried by the study subjects, and in direct proportion with the number of vessels with CAC and the total CAC score. One could then conclude that LM CAC was highly predictive of events because it identified patients with a greater atherosclerosis burden. However, adjustment for risk factors and total CAC score did not diminish the predictive value of LM CAC. The educators in ancient Rome used to remind their pupils that "*repetita iuvant*", i.e it is helpful to repeat things. In this light, Lahti et al. [1] reminded us of information in good part already present in the medical literature, but they also added more information, i.e "*magis notitia*". The original trials that highlighted the severe prognosis inherent with LM disease go back to the late 1970s and early 80s [2–5]. In those trials of predominantly symptomatic individuals, a critical LM luminal obstruction (> 50% or > 70%, according to the trial) was associated with a much better prognosis if patients were treated with by-pass surgery than medical therapy. Nonetheless, the surgical advantage was gradually lost as time passed since the original by-pass [4], and even patients with non-obstructive LM disease suffered a high mortality rate in the mid to long term. Additionally, by-pass surgery did not improve survival in patients with low baseline risk [5]. Hence, there is large heterogeneity among patients with LM disease although its presence is a harbinger of high risk for atherosclerotic events. LM CAC was highlighted as a marker of risk in prior analyses of CT CAC screening. Williams et al. [6] showed that CAC in the LM and left anterior descending (LAD) coronary artery - but not in other vessels -is predictive of all-cause mortality, as are the number of calcified lesions distributed along the coronary artery tree. Similarly, Blaha et al. [7], Tota-Maharaj et al. [8], and Arnson et al. [9], in smaller cohorts than the population analysed by Lahti et al. [1], concluded that multiple calcified lesions distributed along the coronary arteries are more predictive of events than a similar global CAC score concentrated in fewer lesions and vessels. In addition, Tota-Maharaj et al. [8] pointed out that CAC localized in the LM and LAD is predictive of all-cause death. CAC in the proximal portion of a coronary artery is predictive of future cardiovascular events according to Ferencik et al. [10] So far *repetita iuvant*! The novel information (*magis notitia)* in the current manuscript is the excellent ability of LM CAC to predict both all-cause and cardiovascular specific mortality; the latter was never shown before. Additionally, the investigators showed that besides the location, the proportion of the total CAC score restricted to the LM is a serious harbinger of mortality: if less than 25% of the total CAC score is located in the LM the mortality risk is increased by 20%; if the LM score is greater than 25% of the total CAC score the mortality risk is 40% higher. The limitations of the report by Lahti et al. [1] are its retrospective nature, the inclusion of patients referred by physicians because of the presence of risk factors rather than an unselected group of patients from the general population, and the exclusion of about 24% of patients with CAC on the screening CT scan because of incomplete clinical or imaging information. Furthermore, the use of different CT scanners with substantially different sensitivity for the detection of CAC may have caused a bit of heterogeneity in the imaging data. What were the useful learning points of this exercise? It may be incorrect to give an equal prognostic weight to the same total CAC score if portion of the CAC is located in the LM as opposed to the mid to distal portion of the other coronary arteries. Additionally, the higher the CAC score in the LM the higher the risk of mortality. Hence, it is worth noting the presence of LM CAC in every report, since this is a marker of markedly increased risk. What this report did not provide is evidence that medical interventions directed at modifying risk, such as anti-platelet or lipid

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lowering therapies, will improve the prognosis of patients with LM CAC. That question could only be answered by prospective interventional trials. Finally, the authors were correct in stressing that their data do not support further non-invasive testing to demonstrate the presence of obstructive LM disease once LM CAC is detected. In fact, CAC scoring should never be used for that purpose in any asymptomatic population, and it should only be used to intensify preventive efforts: *repetita iuvant*!

Conflict of interest

The author declared he does not have anything to disclose regarding conflict of interest with respect to this manuscript.

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