Cardiac Computed Tomography (CT) – Coronary Calcium

Calcium hides the clue: unraveling the diagnostic value of early coronary calcium scoring in cardiac arrest survivors

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Acute coronary syndrome (ACS) is a major cause of out-of-hospital cardiac arrest (OHCA), but the benefits of early coronary angiography (CA) in resuscitated patients (pts) without STEMI are being debated. Coronary artery calcium (CAC) is a predictor of CV events and is commonly assessed through ECG-gated cardiac CT. Notably, standard non-gated chest CT scans can also reveal CAC.

Aim: To find if CAC in non-gated CT scans performed in OHCA survivors could be a good predictor of coronary artery disease and help select those who effectively require CA. Assess the rate of CAC reporting.

Methods: Single-center, retrospective study of OHCA survivors without STEMI. We selected those who performed a non-gated chest CT as a part of an etiological study and underwent CAG due to clinical, ECG or echo suspicion of ACS. An investigator blinded to the CAG report, evaluated CAC quantitatively (with Agatston score) and qualitatively (absent, mild, moderate or severe).

Results: 45 pts were included, 71% male, mean age of 5710 years old. 88,9% of the OHCA were witnessed, with mean no-flow time of 4±7min and low-flow time of 18,3±13,6min. Most pts presented with ventricular fibrillation or non-specified shockable rhythm (22,4% each). CT scans were performed with a mean of 3,7h after first medical contact. CAC was identified in 57,8% pts and classified as mild, moderate and severe in 11,1%, 24,4% and 22,2%, respectively. Mean Agatston score: 387 322UA. 16pts (33,3%) had significant coronary lesions, of which 80% had angioplasty and 2,2% CABG.

Quantitative CAC assessment accurately predicted significant lesions (AUC=0,873; 95%CI 0,773-0,974, p<0,001). In fact, of the 19 pts without calcification, none showed significant lesions on CAG. Moderate or severe CAC also predicted significant lesions (OR=13,4,95%CI 1,755- 103,68, p=0,012). There was also a good and significant correlation between the vessel with moderate calcification in CT-scan (Agatston score >100]) and the vessel identified as culprit in CAG (kappa=0,615, p<0,001). The CAC was reported in only 7,7% CT exams, all with severe calcification.

Conclusion: Assessment of CAC in chest CT scans proved to be feasible and had a strong correlation with the presence, severity and location of CAD. Its routine use upfront showed to be an important complement to CT scans report to guide patient care – avoiding time consuming invasive procedure and focusing on neuro-protection.

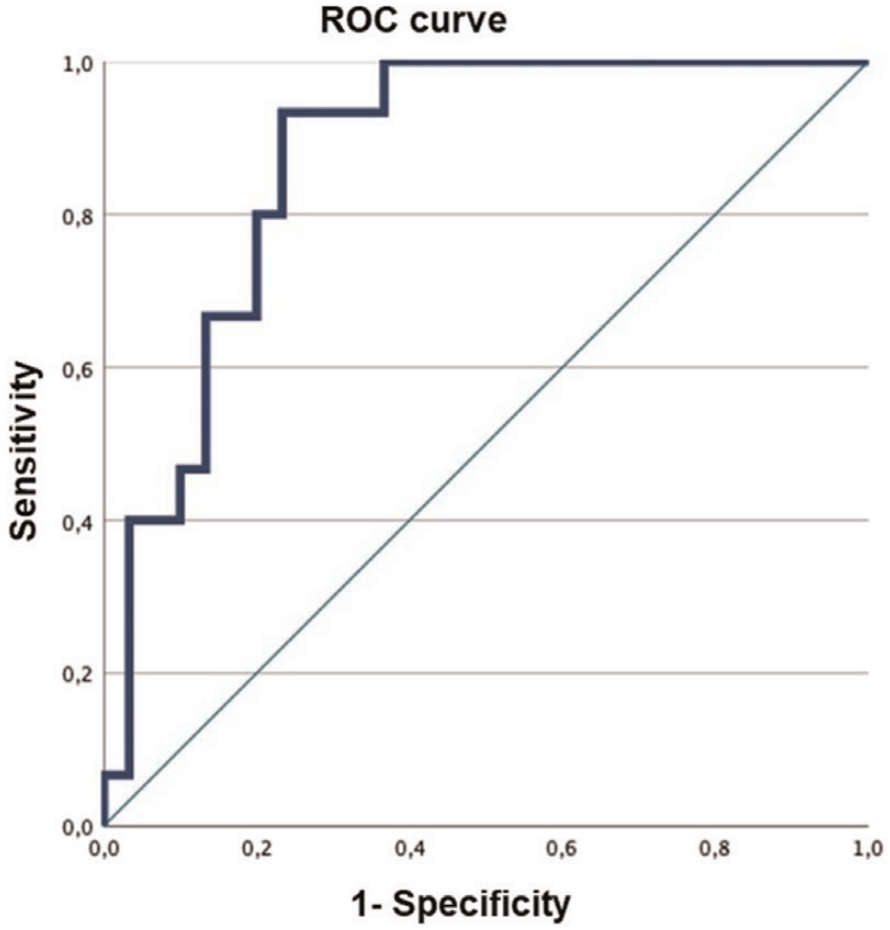

Figure 1 – ROC curve analysis of Coronary Calcium Score evaluation in predicting significant lesions in coronary angiography in OHCA survivors