Abstract: Cardiovascular risk, aortic valve microcalcification and macrocalcification: is there a link?

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Background and objective: 18F-sodium fluoride (18F-NaF) has been used to evaluate aortic stenosis. It is known that its uptake is related with microcalcification. The purpose of this study is to assess the relationship between 18F-NaF uptake by the aortic valve, aortic valve calcium score and cardiovascular risk.

Methods and Results: Twenty-five hypertensive patients without known cardiovascular disease or aortic stenosis underwent PET-CT with 18F-NaF. Cardiovascular risk was assessed through the ASCVD risk calculator. The patients had a mean age of 64.0± 8.6 years and 56% were males. The mean ASCVD risk was of 28.8 ±19.0 (IQR: 10 – 48.5). The aortic valve calcium score (AoV score) was of 53.2 ± 164.4(IQR: 0 - 29.8), the uptake of 18F-NaF assessed through the corrected uptake per lesion (CUL = max SUV – mean blood-pool SUV) was of 0.49 ± 0.14 (IQR: 0.44 – 0.57). The patients were classified according to the ASCVD: Group A: patients with a risk above the 50thpercentile of the ASCVD risk distribution (50thpercentile=25: 12 patients) and Group B: patients with a risk under or equal to the 50thpercentile of the ASCVD risk distribution, 13 patients.

The uptake of 18F-NaF and the aortic valve calcium score were evaluated in both groups: A vs B: CUL = 0.57 ± 0.09 vs0. 42 ± 0.14, p=0.005; AoV score= 102.4 ± 231.7 vs7.8 ± 13.2, p=0.15.

Conclusion: In this study microcalcification, evaluated through 18F-NaF uptake, was related with cardiovascular risk as was reported with vulnerable atherosclerotic plaques reinforcing the importance of cardiovascular risk prevention in aortic valve degeneration. Although the score of calcium seems to be higher in higher cardiovascular risk patients, no significant difference was found in this study.