18F-SODIUM FLUORIDE IS A MARKER OF ACTIVE CALCIFICATION AND DISEASE PROGRESSION IN PATIENTS WITH AORTIC STENOSIS

Poster Contributions
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Background: 18F-Sodium fluoride (18FNaF) is a promising biomarker of disease activity in aortic stenosis. We aimed to compare 18FNaF uptake with histology of the aortic valve and assess whether it predicts disease progression.

Methods: 20 patients with aortic valve disease underwent PET/CT scanning using 18FNaF and 18FFDG. Echocardiography and CT calcium scoring of the valve was performed at baseline and 1 year. A further 7 patients underwent 18FNaF PET/CT prior to aortic valve replacement. Activity was compared to excised valve tissue using immunohistochemistry for osteocalcin and alkaline phosphatase.

Results: Over 1 year aortic valve calcification increased (469±479 vs 580±576 p<0.01) in patients with a range of disease severity (6 sclerosis; 5 mild, 7 moderate, 2 severe stenosis). 18FNaF uptake correlated with disease progression: both in terms of the calcium score (r²=0.44 p<0.01) and aortic valve area (r²=0.24 P=0.03). When 18FNaF overlying existing calcium on the CT was excluded, the correlation improved further (r²=0.64 p<0.01). There were no associations between 18FFDG uptake and CT or echo measures of disease progression (r²=0.02 p=0.55). There was a good correlation between in vivo 18FNaF uptake and both alkaline phosphatase (n=7; r²=0.79 P<0.01) and osteocalcin staining (n=5; r²=0.43 P=0.22) of the excised tissue.

Conclusion: 18F-NaF is a marker of active calcification and disease progression in patients with aortic stenosis with major potential for assessing novel therapeutic strategies.