CRT-100.44

Quantitative Flow Reserve Computed from Invasive Coronary Angiography as a Risk Predictor for Cardiac Allograft Vasculopathy in Cardiac Transplant Patients

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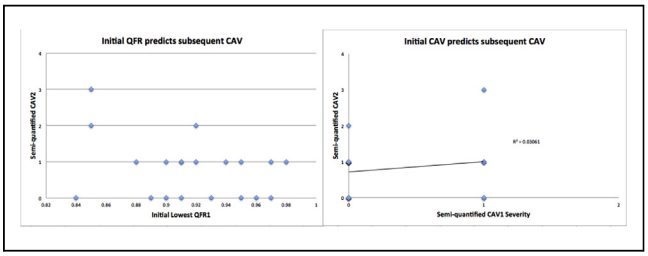
BACKGROUND Cardiac allograft vasculopathy (CAV) is a leading cause of morbidity after cardiac transplantation. Coronary angiography (ICA) with intravascular ultrasound (IVUS) is the gold standard test for CAV but has low sensitivity for early CAV. Fractional flow reserve (FFR) correlates with IVUS and is frequently abnormal in cardiac transplant recipients despite normal angiograms. We derived vessel quantitative flow ratio (QFR), an FFR-like parameter, retrospectively from ICA and hypothesized that QFR would predict subsequent CAV.

METHODS/RESULTS We reviewed 22 consecutive orthotropic heart transplantation recipients who underwent two separate routine coronary angiograms from January 2013 to April 2016. Coronary angiograms and IVUS were performed per local protocol at 1, 2, 3, and 5 years post-transplant. QFR was calculated using dedicated offline software (Medis, Leiden, the Netherlands), a validated algorithm not available for clinical use in the USA. CAV was assessed semi-quantitatively based on manual review of the ICA procedure report (0: none, 1: trivial, 2: non-obstructive CAV, 3: obstructive CAV). Median time from transplant to first included ICA was 2.1 years. QFR from the first ICA (QFR1) correlated well with the CAV score derived from the second ICA (CAV2) with a relative clustering of CAV at lower QFR1 values [Figure]. In an ROC analysis, an optimal QFR threshold of 0.88 yielded a sensitivity of 0.94 and a specificity of 0.67 (AUC 0.79) for at least non-obstructive subsequent CAV. We also found angiographically derived CAV severity poorly predicted subsequent CAV [Figure].

CONCLUSION QFR is easily derived from invasive angiography and may predict subsequent early CAV in cardiac transplant patients. However, this finding is only exploratory, as QFR is not yet clinically available and needs to be assessed in a larger prospective cohort.



CRT-100.45

Relationship Between Plaque Characteristics As Determined By OCT And Their Physiological Impact Assessed With FFR

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BACKGROUND OCT is a high resolution intracoronary imaging technique that allows evaluation of plaque characteristics. FFR assesses the functional significance of stenoses. The relationship between plaque characteristics and FFR is not well established. We aimed to evaluate the differences in plaque characteristics between physiologically significant and non-significant stenosis. A second objective was to evaluate the impact of plaque composition on cardiovascular outcomes.

METHODS Ninety-one lesions in 79 patients were evaluated with OCT and FFR; lesions were treated according to functional significance. Plaque characteristics were evaluted with OCT, including detailed analysis of plaque composition (Table 1). Patients were followed up clinically.

RESULTS Of the 91 lesions assessed, 49 were FFR positive and 42 negative. There were no significant differences in the baseline characteristics of the two groups. Patients were followed up for a median of 65 months (IQR 41-78). Table 1 shows detailed plaque analysis with no significant differences in plaque composition between groups. There was a trend toward increased MI and all-cause revascularisation in the TCFA group, though not statistically significant.

CONCLUSIONS In this population, no differences in plaque characteristics were found in relation to the functional significance of a stenosis. An association between plaque type and events was not seen even though there was a trend toward increased MI and all-cause revascularisation in patients with TCFA.

Plaque Characteristics by FFR group

Plaque characteristics	Overall	FFR <0.8	FFR >0.8	p value
MaximumCap Thickness(μm)	0.083±0.114	0.083±0.112	0.084±0.118	0.975
MaximumLipidArc(°)	61.02±80.20	55.19±71.47	67.99±89.96	0.463
LipidVolumeIndex	310.68±579.33	271.13±447.43	356.82±705.90	0.5
MaximumCalciumArc(°)	78±71.3823.78±71.38	84.51±69.08	70.41±74.08	0.353
MaximumMacrophages (quadrants)	1.78±1.20	1.88±1.18	1.67±1.22	0.408
Maximum Microchannels (quadrants)	0.34±0.64	0.35±0.72	0.33±0.53	0.551
Plaquerupture	6(6.59%)	5(10.2%)	1(2.38%)	0.212
Thrombus	1(1.1%)	1(2.0%)	0(0%)	1

CRT-100.46

Utility Of Imaging Modalities In Coronary Lesions With Borderline Fractional Flow Reserve

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BACKGROUND Coronary intervention is routinely deferred in intermediate coronary lesions with fractional flow reserve (FFR) ≥0.80. Recently, patients with borderline FFR (0.80-0.85) who were initially deferred have been shown to have higher risk of future interventions; however, the data are limited, and the long-term prognosis in these patients remains unknown. We assessed the utility of imaging guidance to determine the need for intervention in lesions with borderline FFR.

METHODS We retrospectively evaluated consecutive patients who underwent cardiac catheterization at Einstein Medical Center from January 2013 to April 2016. All patients with borderline FFR (0.80-0.85) were included. Patients were divided into Defer or Perform intervention groups. The Perform group was further stratified into intervention With or Without imaging guidance (i.e., intravascular ultrasound, optical coherence tomography, echocardiography, or pharmacologic stress test). The follow-up data were collected for all patients until April 2017, which included future target lesion revascularization (TLR) and major adverse cardiac events (MACE; cardiovascular mortality and acute coronary syndromes).

RESULTS A total of 196 patients were eligible. The median (IQR) FFR in Perform and Defer groups was 0.81 (0.8-0.83) and 0.84 (0.82-0.85), respectively. The median (IQR) duration of follow-up was 21 (13-29) and 25 (15-36) months, respectively. The overall MACE rate in Perform group (n=101) was 8.9% (n=9) and Defer group (n=95) was 5.2% (n=5). The stratified MACE rate in With imaging guidance (n=57) was 7% (n=4) and Without imaging guidance (n=44) was 11.4% (n=5). Overall, the FFR-only guided management (n=196) led to MACE rate of 7.1% (n=14), whereas FFR With imaging guidance (n = 136) led to MACE rate of 6.6% (n=9). For reference, in the FAME study, MACE rate in FFR-guided cohort was 13.2% compared with angiography-guided cohort rate of 18.4%. The p-values were non-significant in each of the above group comparisons due to relatively low numbers with trends as noted.

CONCLUSIONS Our study suggests that intervention of coronary lesions with borderline FFR under imaging guidance trends toward improved cardiovascular outcomes compared with intervention in this group without imaging. Overall, the use of imaging in borderline FFR lesions appears to help guide need for intervention for optimal outcomes. These findings need to be further validated in a large-scale prospective study.