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Clinical accuracy of annual cardiac computed tomography angiography to predict coronary event in adult and pediatric heart transplant recipients.

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Introduction: Cardiac allograft vasculopathy (CAV) is a major cause of late heart graft failure. Because the transplanted heart often remains denervated, the first symptom of myocardial ischemia can be sudden death, and routine periodic screening is thus recommended. Computed tomography coronary angiography (CTCA) has replaced conventional coronary angiography (CCA) for annual screening of heart transplant patients in our institution since September 2003, and has demonstrated a good sensibility and negative predictive value compared to CCA.

The aim of this study was to evaluate accuracy of CTCA annual screening to predict coronary events in heart transplant recipients.

Method & Results: From September 2003 to September 2016, 628 CTCA were performed annually in 110 patients including 47 children transplanted under 18. Age at first CTCA was 37.2 +/- 17.8 years; mean follow-up duration was 12.4 +/- 6.3 years. All patients had immunosuppressive tritherapy (anticalcineurins, mycophenolate mofetil, corticoids).

All CTCA were interpretable but 20 with uncertainties: poor visibility of distal coronary network in 14, artifacts in 6. Sixty-two patients had at least 1 pathological CTCA, requiring 41 CCA in 35. Coronary lesions were analyzed according to ISHLT classification. Both examinations were concordant in 27/41; Lesions were overestimated by CTCA in 11, underestimated in 3. Twenty-one patients experienced at least 1 coronary event: necessity of percutaneous revascularization in 17, sudden death in 3 (coronary origin not proved), myocardial infarction in 1. No proved coronary event happened in children. Risk factors for coronary events were usual cardiovascular risk factors (body mass index >2SD, dyslipidemia, diabetes), ischemic cardiomyopathy as the cause for transplantation, and age >18 years at transplantation. Positive CTCA <1 year-interval with stenosis >50% can predict the occurrence of a proved coronary event in heart transplant recipients with a sensitivity of 100%, a specificity of 75%, a negative predictive value of 100%, and a positive predictive value of 45 %.

Conclusion: The sensitivity and negative predictive value of annual CTCA to predict proved coronary events after heart transplantation is excellent. This confirms the use of CCTA as a non-invasive and lower cost alternative to CCA for detection of CAV in heart transplant patients.