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Is optical coherence tomography superior in comparison to coronary angiography and biopsy regarding the detection of cardiac allograft vasculopathy?

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Objectives: Cardiac allograft vasculopathy (CAV) is a crucial problem concerning the long-term prognosis after heart transplantation, in adults and in children. Up to now, coronary angiography is considered to be the gold standard for diagnosis of CAV. However, because of the longitudinal hyperplasia of the intima without circumscribed stenosis especially the early stages of CAV are very difficult to detect using coronary angiography. In what extent biopsies should be used for detection of CAV is uncertain, yet. Intravascular imaging, for example optical coherence tomography (OCT), seems to be a good alternative for early diagnosis also of mild stages of CAV. In this study, we compared the results of OCT with coronary angiography and myocardial biopsy.

Methods: Retrospective analysis of all OCT examinations after pediatric heart transplantation in the department for pediatric cardiology and intensive care medicine at the Ludwig-Maximilians-University in Munich. Comparison of these results with simultaneously performed coronary angiography and myocardial biopsy of the right ventricle.

Results: Between June 2013 and August 2016 forty-seven patients underwent altogether sixty-nine OCT-examinations. In these examinations only 5 patients showed no sign of CAV according to the OCT-examination. Stanford I was detected in 23 OCT-examinations, Stanford II and III respectively in 16 examinations and Stanford IV in 9 OCT-examinations. In contrast only 21 of 69 coronary angiographies showed pathological results. Even regarding 25 cases with moderate to severe CAV with Stanford III and IV the coronary angiography was unremarkable in 32 percent.

In nine patients, results of OCT-examination were compared with simultaneously performed myocardial biopsies. According to OCT two patients showed no CAV, three patients Stanford I, two patients Stanford II and two patients Stanford IV. In contrast myocardial biopsy was unremarkable in terms of CAV in seven cases. Two times myocardial biopsy showed a moderate, non-stenotic CAV. Interestingly in both cases OCT was unremarkable.

Conclusion: For the early detection of CAV the OCT-examination is superior to the coronary angiography. However to detect also mild changes peripheral a combination with myocardial biopsy could be helpful. To evaluate the relevance of these mild CAV regarding the long-term survival further studies are necessary.