

Intracoronary ultrasound in cardiac transplant recipients. In vivo evidence of "angiographically silent" intimal thickening.

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Abstract

Background

Accelerated coronary atherosclerosis is a major factor limiting allograft longevity in cardiac transplant recipients. Histopathology studies have demonstrated the insensitivity of coronary angiography for detecting early atheromatous disease in this patient population. Intracoronary ultrasound is a new imaging technique that provides characterization of vessel wall morphology. The purpose of this study was to compare in vivo intracoronary ultrasound with angiography in cardiac transplant recipients.

Methods and results

The left anterior descending coronary artery was studied with intracoronary ultrasound in 80 cardiac transplant recipients at the time of routine screening coronary angiography 2 weeks to 13 years after transplantation. A mean and index of intimal thickening were obtained at four coronary sites. Intimal proliferation was classified as minimal, mild, moderate, or severe according to thickness and degree of vessel circumference involved. Twenty patients were studied within 1 month of transplantation and had no angiographic evidence of coronary disease. An intimal layer was visualized by ultrasound in only 13 of these 20 presumably normal hearts. The 60 patients studied 1 year or more after transplantation all had at least minimal intimal thickening. Twenty-one patients (35%) showed minimal or mild, 17 (28%) moderate, and 21 (35%) severe thickening. Forty-two of these 60 patients had angiographically normal coronary arteries, 21 (50%) of whom had either moderate or severe thickening. All 18 patients with angiographic evidence of coronary disease had moderate or severe intimal thickening, but there was no statistically significant difference in intimal thickness or index when compared with the patients with moderate or severe proliferation and normal angiograms (thickness, 0.53 +/- 0.35 mm versus 0.64 +/- 0.30 mm, p = NS; index, 0.28 +/- 0.10 versus 0.34 +/- 0.10, p = NS).

Conclusions

The majority of patients 1 or more years after cardiac transplantation have ultrasound evidence of intimal thickening not apparent by angiography. Intracoronary ultrasound offers early detection and quantitation of transplant coronary disease and provides characterization of vessel wall morphology, which may prove to be a prognostic marker of disease.