

Nitroglycerin-induced coronary vasodilation in cardiac transplant recipients. Evaluation with in vivo intracoronary ultrasound.

Circulation. 1992;85:69–77

Authors

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Abstract

Background

Coronary artery vasomotion is altered after cardiac transplantation. The impact of accelerated transplant coronary atherosclerosis and myocardial rejection on vasomotion is not well understood. Intravascular ultrasound is a new imaging method with the ability to study real-time changes in coronary artery dimensions.

Methods and results

Epicardial coronary artery response to nitroglycerin was studied in 32 cardiac transplant recipients (age, 47 +/- 11 years) 3 weeks to 10 years after transplantation with intracoronary ultrasound. Cross-sectional luminal area and diameter were measured at a fixed position in the left anterior descending artery immediately before and every 30 seconds for 5 minutes after 0.4 mg of sublingual nitroglycerin. Cross-sectional area increased from a baseline of 13.1 +/- 3.9 mm² to 15.8 +/- 3.9 mm² at maximal vasodilation; luminal diameter increased from 4.0 +/- 0.6 mm to 4.5 +/- 0.6 mm. This increase reached statistical significance (p less than 0.001) at 1.5 minutes after administration of nitroglycerin; mean maximum increase occurred at 4.5 minutes (24% for cross-sectional area and 11% for luminal diameter). Patients with biopsy-proven mild or moderate concurrent rejection had a significantly blunted vasodilatory response versus the nonrejection group (9% versus 27% for cross-sectional area, p less than 0.04), although a vasodilatory effect was still present. Nitroglycerin response was well preserved in patients up to 10 years after transplantation; however, there was a trend toward a decreased response in patients studied immediately after transplantation (21% versus 29%, p = 0.37). Coronary intimal thickness, as measured by ultrasound, had no impact on the vasodilatory response (R = 0.23, p = 0.34).

Conclusions

Vasodilatory response to nitroglycerin in cardiac transplant recipients is attenuated during episodes of cardiac rejection. This response is preserved in long-term survivors and is independent of the degree of intimal thickening. Intravascular ultrasound provides a new method to document real-time epicardial coronary vasomotion.