Detection of coronary atherosclerosis in young adult hearts using intravascular ultrasound

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Abstract

Background

Coronary atherosclerosis has been demonstrated in young adults by postmortem pathology. Angiographic evaluation of coronary disease in young adults is limited by ethical issues and the insensitivity of angiography for detecting early pathology. Catheter-based intracoronary ultrasound has proven useful both in detecting and quantitating coronary disease, but the ultrasound appearance of young, angiographically normal, coronary arteries has not been well defined.

Methods and results

Twenty-five subjects were examined with intracoronary ultrasound within 1 month of cardiac transplantation. Mean age of the donor hearts was 28 years (range, 14-43 years). Measurements of an index of intimal thickening were obtained at four left anterior descending coronary artery sites in each patient. All study patients had angiographically normal coronary arteries. Ultrasound in 14 subjects demonstrated a three-layered appearance of the coronary vessel wall with a mean intimal index of 0.16 +/- 0.07. The other 10 subjects, including all donors under the age of 25 years, had coronary vessel wall layers too thin to be imaged separately at the 30-MHz sound frequency. Five subjects had ultrasound evidence of focal intimal thickening greater than 500 microns. The donors of these hearts each had risk factors for coronary artery disease. Two subjects died within 5 weeks of their ultrasound study. Histological measurements of the vessel wall layers were similar to the corresponding ultrasound values.

Conclusions

This study provides a reference for the intravascular ultrasound appearance of young adult coronary arteries and confirms pathology findings that young subjects with angiographically normal vessels have a range of coronary intimal thickening, which includes occasional evidence of focal, early atheromatous lesions.