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Cardiac Surgery

Radial Artery and Saphenous Vein Patency More Than 5 Years After Coronary Artery Bypass Surgery

Results From RAPS (Radial Artery Patency Study)

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Objectives The purpose of this study was to present radial and saphenous vein graft (SVG) occlusion results more than 5 years following coronary artery bypass surgery.

Background In the RAPS (Radial Artery Patency Study) study, complete graft occlusion was less frequent in radial artery compared with SVG 1 year post-operatively while functional occlusion (Thrombolysis In Myocardial Infarction flow grade 0, 1, 2) was similar.

Methods A total of 510 patients <80 years of age undergoing primary isolated nonemergent coronary artery bypass grafting with 3-vessel disease were initially enrolled in 9 Canadian centers. Target vessels for the radial artery and study SVG were the right and circumflex coronary arteries, which had >70% proximal stenosis. Within-patient randomization was performed; the radial artery was randomized to either the right or circumflex territory and the study SVG was used for the other territory. The primary endpoint was functional graft occlusion by invasive angiography at least 5 years following surgery. Complete graft occlusion by invasive angiography or computed tomography angiography was a secondary endpoint.

Results A total of 269 patients underwent late angiography (234 invasive angiography, 35 computed tomography angiography) at a mean of 7.7 ± 1.5 years after surgery. The frequency of functional graft occlusion was lower in radial arteries compared with SVGs (28 of 234 [12.0%] vs. 46 of 234 [19.7%]; p = 0.03 by McNemar's test). The frequency of complete graft occlusion was also significantly lower in radial compared with SVGs (24 of 269 [8.9%] vs. 50 of 269 [18.6%]; p = 0.002).

Conclusions Radial arteries are associated with reduced rates of functional and complete graft occlusion compared with SVGs more than 5 years following surgery. (Multicentre Radial Artery Patency Study: 5 Year Results; NCT00187356) (J Am Coll Cardiol 2012;60:28–35) © 2012 by the American College of Cardiology Foundation

The RAPS (Radial Artery Patency Study) study is a multicentre randomized clinical trial comparing the longitudinal angiographic patency of the radial artery and saphenous vein (1). We previously reported that 1 year after surgery, the primary endpoint of complete graft occlusion was reduced in the radial artery compared with the study saphenous vein graft (SVG) (8.2% vs. 13.6%, p = 0.009) (2). The treatment effect was similar in multivariable models (3). The purpose of this investigation is to report on the patency rates of the radial artery and saphenous vein more than 5 years following surgery. Although complete graft occlusion is the standard endpoint used in SVG occlusion studies, radial grafts with diffuse narrowing or reduced flow would be considered patent by this definition. The primary endpoint for the late study was defined as functional graft occlusion, a more rigorous outcome than complete graft occlusion, which was used for the 1-year comparison.

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Methods

Study population. Details of the study protocol have been previously published (1–3) (Online Appendix). Patients <80 years of age undergoing nonemergent primary isolated coronary bypass surgery with graftable triple-vessel disease and an estimated left ventricular ejection fraction more than 35% were eligible for the study. The target coronary vessels for the study grafts were the circumflex and the right coronary arteries, which had ≥70% diameter narrowing, were ≥1.5 mm in diameter, and were deemed to be of acceptable quality according to visual assessment of the preoperative angiogram by the operating surgeon. The study was approved by the research ethics committee at each participating center. All patients provided written informed consent.

Randomization. Randomization was carried out in the operating room with the use of sealed opaque envelopes stratified by site with a randomly determined block size of 4 to 6. Specifically, within-patient randomization was performed whereby each patient was randomly allocated to undergo surgery according to 1 of 2 strategies; the radial artery was used for the right coronary territory and the study SVG was used for the circumflex region or the radial artery was used for the circumflex territory and the study SVG was used for the right coronary system. An internal thoracic artery (ITA) was used to bypass the left anterior descending artery (LAD) territory. Additional grafts were constructed as necessary with single rather than sequential grafts.

Abbreviations and acronyms

CTA = computed tomography angiography
ITA = internal thoracic artery
LAD = left anterior descending artery
MACE = major adverse cardiac event(s)
SVG = saphenous vein graft

Follow-up angiography. Patients were approached to undergo invasive angiography at least 5 years post-operatively. Computerized tomographic graft angiography using a 64-multislice detector machine (computed tomography angiography [CTA]) was offered to patients who withdrew consent for late invasive angiography. Patients who declined to undergo 1-year angiography were also approached to undergo late angiography. Clini-

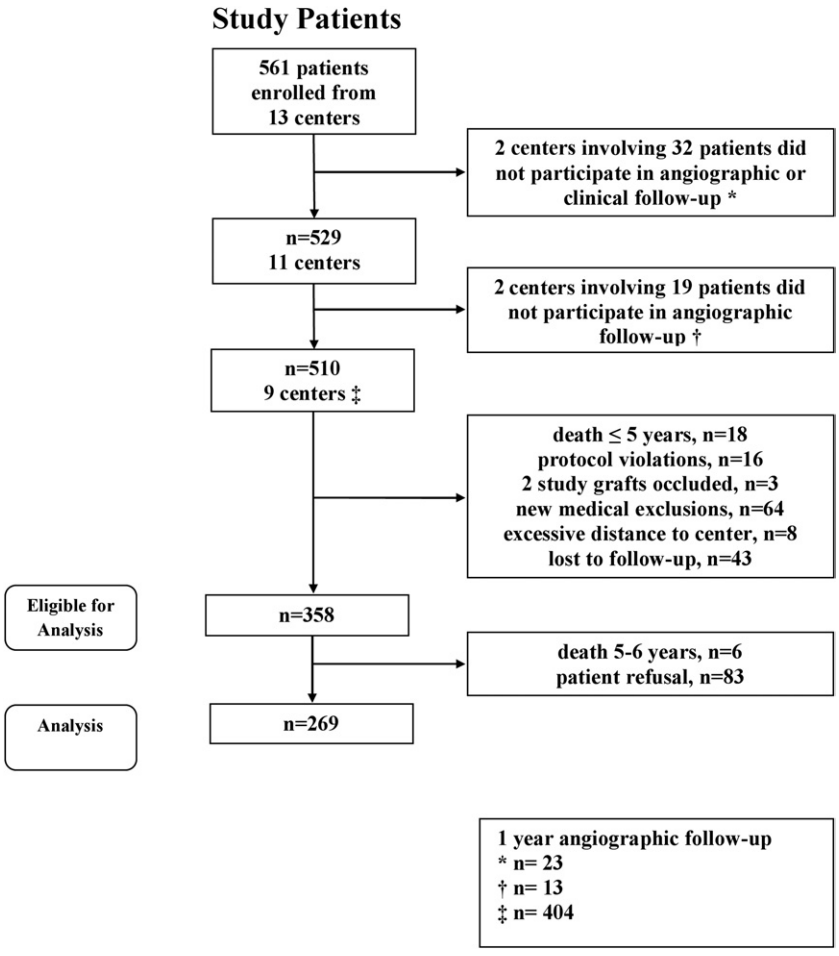

Figure 1 Patient Flow Chart

Flow chart of the 561 patients. Late graft angiography was performed in 269 patients at a mean of 7.7 ± 1.5 years post-operatively.