

# Evaluation of Previously Cannulated Radial Arteries

as Patent Coronary Artery Bypass Conduits

**Timothy Watson, MD, MRCP**  
**Adele Pope, MBChB**  
**Niels van Pelt, MBChB,**  
**FRACP**  
**Peter N. Ruygrok, MD,**  
**FRACP**

*In coronary artery bypass grafting, good-quality conduits are needed to maximize the potential for long-term patency. Revascularization has traditionally been achieved with use of the saphenous vein and the internal thoracic arteries. In recent years, total arterial revascularization with use of the radial arteries has been promoted. Meanwhile, use of the transradial approach for coronary angiography has also increased. The long-term effects of previous cannulation in radial artery bypass grafts are not known. Therefore, we used multidetector computed tomographic angiography to investigate radial-artery graft patency in a small series of patients who had undergone transradial angiography. We found a high patency rate, and we discuss those findings here. (Tex Heart Inst J 2015;42(5):448-9)*

**Key words:** Coronary angiography/methods; coronary artery bypass/methods; radial artery/transplantation; risk factors; treatment outcome; vascular patency

**From:** Green Lane Cardiovascular Service (Drs. Ruygrok and Watson), Auckland City Hospital, Auckland 1142; Department of Cardiology (Drs. Pope, Ruygrok, van Pelt, and Watson), Middlemore Hospital, Auckland 2025; and Faculty of Medical and Health Sciences (Drs. Ruygrok and Watson), University of Auckland, Auckland 1010; New Zealand

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**Address for reprints:**  
Timothy Watson, MD,  
MRCP, Green Lane  
Cardiovascular Service,  
Auckland City Hospital,  
2 Park Rd., Auckland 1142,  
New Zealand

**E-mail:** [tjw123@me.com](mailto:tjw123@me.com)

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**R**evascularization by means of coronary artery bypass grafting (CABG) mandates the use of good-quality conduits. For years, CABG has chiefly involved the use of the saphenous vein and the internal thoracic arteries. Investigators have since promoted the concept of total arterial revascularization with use of the internal thoracic and radial arteries.<sup>1</sup> This change in surgical practice has been accompanied by more frequent use of the radial artery for preoperative angiographic procedures. Concern has arisen that using a previously cannulated radial artery as a conduit might adversely affect graft survival<sup>2</sup>; however, little evidence supports this supposition. We evaluated graft patency in a consecutive series of patients who had undergone grafting of the radial artery after it had been cannulated for preoperative coronary angiography, and we report our findings here.

## Patients and Methods

We identified 16 suitable patients in our cardiac surgical database. However, 1 had died, 2 had emigrated, and 6 declined to participate or could not be contacted. Seven patients (mean age, 65 ± 11.8 yr; 4 men) agreed to participate and provided written informed consent. Three had diabetes mellitus, and 4 were current or recent smokers. The indication for CABG in all cases had been significant coronary artery disease, identified after myocardial infarction. Immediately after CABG, each patient had been given verapamil or diltiazem along with systemic heparinization. None had presented again at the hospital or reported pertinent symptoms postoperatively. Study approval was granted by the Northern A Research Ethics Committee (Ministry of Health, New Zealand).

After giving each patient a maximum 80 mL of 75.5% OMNIPAQUE® 350 solution (Takeda Pharmaceuticals International GmbH; Zurich, Switzerland), we performed multidetector computed tomographic (MDCT) imaging with flash or retrospective gating in accordance with standard protocol.

## Results

Of 24 total grafts (median, 3; range, 3–4 per patient), 8 were of the left internal thoracic artery (including 1 sequential) and 16 of the radial artery (8 right radial including 1 sequential, and 8 left radial). The records inconsistently specified whether the right or left radial artery had been used for any particular graft.

The mean time from CABG to MDCT evaluation was  $3.9 \pm 1$  years. Of the 24 grafts, 3—all radial—were occluded. In one patient thus affected, the radial artery had dissected during preoperative angiography. The records did not specify whether the other 2 occluded radial arteries had been cannulated.

## Discussion

In early reports, attempts to graft radial arteries were hampered by a propensity toward profound spasm and resultant early graft failure. This has now been almost entirely ameliorated by perioperative calcium channel blockade and heparinization, and by improved harvesting, such as with a harmonic scalpel.<sup>3,4</sup> Subsequently, investigators concluded that the radial artery can be a highly effective conduit, with long-term patency exceeding even that of the saphenous vein.<sup>5</sup>

In many institutions, coronary angiography is now almost exclusively performed transradially rather than transfemorally. Radial angiography causes fewer observed bleeding sequelae, facilitates patients' postprocedural ambulation, and typically enables their early discharge from the hospital.<sup>6-8</sup>

Our study data indicate good long-term patency of approximately 4 years among our small cohort of patients with radial artery bypass conduits, in whom the radial arteries had been cannulated during preoperative angiography. These data do not definitively support the routine use of previously cannulated radial arteries as bypass conduits; nevertheless, the graft-failure rates in this context were not excessively high. We are therefore encouraging our surgeons to clearly identify and re-

cord the sites of subsequent radial grafts, to enable future audits of graft performance. We think that results of a randomized controlled trial might establish whether previously cannulated radial arteries can be used with confidence in CABG.

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