The Fate of a Composite Arterial Graft in a 58-Year-Old Man with Strong Comorbidities and Atherosclerotic Burden

Giuseppe Gatti, Luigi Priolo, Bernardo Benussi, Giancarlo Vitrella, Gianfranco Sinagra, and Aniello Pappalardo

Introduction: For some difficult subsets of coronary patients having specific co-morbidities, such as insulin-dependent diabetes and chronic renal failure arterial myocardial revascularization could be a satisfactory option. The key question is which arteries should be used.

Case Presentation: A 58-year-old insulin-dependent diabetic patient with severe renal failure, despite previous kidney transplantation, underwent treatment of his severe and diffuse coronary disease using a composite arterial Y-graft and saphenous vein. Both internal thoracic arteries were harvested as skeletonized conduits. The patient’s hospital course was totally uneventful. Fifty-six months later, the patient underwent hospital readmission due to a new (inferior) myocardial infarction. Coronary angiography showed both the progression of disease into native vessels and occlusion of the venous graft. The Y-graft was patent and well-functioning despite the presence of a preoperative left upper limb dialysis fistula.

Conclusions: This case report emphasizes the concept that both internal thoracic arteries seem to be refractory to most aggressive forms of atherosclerosis, and that a more liberal use even for high-risk candidates could be a rational practice. However, many surgeons consider the use of both internal thoracic arteries for myocardial revascularization as a too risky strategy that has to be adopted only for young and low-risk patients.

Keywords: Arterial Grafts, Atherosclerosis, Chronic Renal Failure, Coronary Bypass Surgery, Diabetes, Insulin, Outcome, Kidney Transplantation

1. Introduction

The use of in situ left internal thoracic artery (ITA) to the left anterior descending coronary artery, and saphenous vein grafts for the remaining stenotic coronary vessels, is the standard for surgical myocardial revascularization. However, there are some difficult subsets of coronary patients with specific co-morbidities, such as insulin-dependent diabetes and chronic renal failure, who do not benefit greatly from this model of revascularization, primarily because of early failure of the venous grafts (1). For these challenging patients, arterial myocardial revascularization could be a more satisfactory option. Therefore, the key question is which arteries should be used.

2. Case Presentation

During January 2012, a 58-year-old man with unstable angina and multiple risk factors for cardiovascular disease (tabagism, hypertension, and diabetes on insulin) and strong concomitant diseases, meaning severe renal impairment despite previous kidney transplantation (creatinine clearance, 41 mL/min), chronic lung disease, bilateral internal carotid artery and peripheral vascular disease, and a squamous cell carcinoma of the scalp spreading to lymph nodes that had been treated surgically and with radiotherapy, was admitted to the present authors’ surgical unit for the treatment of a diffusely stenotic coronary tree (combined left main and three-vessel coronary artery disease; Figure 1A-C). In addition to angina, there were symptoms of congestive heart failure (New York Heart Association class III) and electrocardiographic signs of a recent inferolateral myocardial infarction without left ventricular dysfunction (ejection fraction, 0.61), or significant mitral regurgitation. The expected operative risk, calculated according to the European system for cardiac operative risk evaluation II (EuroSCORE II), was of 12.5% (2). To perform a left-sided myocardial revascularization, the right ITA was dissected and used as a free graft from the in situ left ITA. Both ITAs were harvested as skeletonized conduits using low-intensity bipolar coagulation forceps (3, 4). Fi-
nally, a saphenous vein graft with the proximal end from the ascending aorta, was adopted to bypass the right posterior descending coronary artery. The lengths of cardiopulmonary bypass and aortic cross-clamping were 81 and 64 minutes, respectively. The patient's hospital course was totally uneventful. He was moved to the ward during postoperative day two and discharged home after 10 days from the operation. Neither blood transfusion nor renal replacement therapy was required. No sternal complications occurred.

Figure 1. (A-C) Preoperative and (D) Follow-Up Coronary Angiography

The Y-graft was used to bypass the left anterior descending coronary artery (right branch and end-to-side anastomosis), the diagonal branch (right branch and side-to-side anastomosis), and the obtuse marginal branch (left branch and end-to-side anastomosis). The venous graft to the right posterior descending coronary artery could not be seen.

Fifty-six months later, the patient underwent hospital readmission due to a new (inferior) myocardial infarction. Coronary angiography showed both the progression of disease into native vessels and occlusion of the venous graft, and in the meantime the Y-graft was patent and well-functioning despite the presence of a preoperative left upper limb dialysis fistula (Figure 1D).

3. Discussion

The case presented here was a patient with strong comorbidities and atherosclerotic burden, who underwent successful treatment of his severe and diffuse coronary disease using both a composite arterial Y-graft and saphenous vein. After about four and a half years, the Y-graft was working well, whilst the venous one was occluded. In addition, there was a clear progression of atherosclerosis into the entire native coronary tree, except for the coronary vessels that had been revascularized by the Y-graft.

In the authors’ opinion, this case emphasizes the concept that both ITAs seem to be refractory to most aggressive forms of atherosclerosis (5), even in the presence of insulin-requiring status, renal failure, or long-standing immunomodulatory therapy (1, 3, 5, 6). Besides, no sternal complications occurred after surgery and there were no symptoms of coronary steal despite the presence of a dialysis fistula ipsilateral to the composite in situ ITA graft (albeit it would always be preferable to avoid the use of an in situ ITA graft in the case of an ipsilateral arteriovenous fistula due to the risk of myocardial ischemia during hemodialysis) (7). Nevertheless, although there is increasing evidence of long-term survival benefits (1, 3-6), many surgeons consider the use of both ITAs for myocardial revascularization as a too risky strategy that has to be adopted only for young and low-risk patients (8). Obviously, there are many factors that may affect the graft patency (primarily the coronary run-off), it is not a single (maybe) fortunate clinical case that may change the surgical practice, and the approach that is tailored to the baseline characteristics of each individual patient should always be preferred. However, a more liberal use of both ITAs, even for high-risk candidates, could not be a less rational practice. The present authors are currently performing left-sided myocardial revascularization using both ITAs in 100% of patients (n = 3440; mean EuroSCORE II, 3.8 ± 5.6%; 30-day mortality, 1.5%) (2, 3).

Footnote

Conflict of Interest: None declared.

References


