Case Report

Sextuple Coronary Artery Bypass Grafting Using Only *in situ* Arterial Conduits

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Sequential bypass in coronary artery bypass grafting (CABG) with in situ arterial conduits, the bilateral internal thoracic arteries and the right gastroepiploic artery, is one of the most important procedures using a limited number of in situ arterial conduits to revascularize a wide area, although it demands rather difficult techniques. We report a case of a 50-year-old man who underwent sextuple bypass using only in situ arterial grafts with three sequential anastomoses. (Ann Thorac Cardiovasc Surg 2001; 7: 183–5)

Key words: sextuple CABG, sequential bypass, in situ arterial conduit

Introduction

The left and right internal thoracic arteries (LITA and RITA) and right gastroepiploic artery (GEA) are the most frequently used and available conduits as in situ arterial grafts for coronary artery bypass grafting (CABG). Sequential grafting is one of the most important procedures to take advantage of a limited number of in situ arterial conduits, live conduits, to revascularize a wide area. We report a case in which we performed sextuple CABG with three in situ arterial conduits with two distal anastomoses per graft.

Case Report

A 50-year-old man with a diagnosis of effort angina pectoris and hyperlipidemia was referred to our outpatient clinic for consideration for surgical revascularization. Preoperative coronary angiography demonstrated 75% stenosis in the proximal portion of the right coronary artery, posterior descending branch and left anterior descending artery, and 90% stenosis in the diagonal branch, obtuse marginal branch and left posterolateral branch of the left circumflex artery. Left ventricular ejection fraction was 54%. The LITA and GEA were confirmed by catheter angiography to be suitable in length, luminal diameter and quality for CABG. Because the patient was relatively young and there were multiple coronary artery stenoses in distal branches, we decided to perform complete revascularization using only arterial in situ conduits. Under hypothermic cardiopulmonary bypass, the LITA was anastomosed to the obtuse marginal branch with side-to-side anastomosis, then to the left posterolateral branch with end-to-side anastomosis. The RITA and the GEA were anastomosed in the same fashion, with distal anastomosis following proximal anastomosis. Thus, the RITA was bypassed sequentially to the left anterior descending artery and the diagonal branch, and the GEA was bypassed sequentially to the right posterior descending and atrioventricular branches. All the anastomoses were constructed using one stay suture at the heel and a running suture with 8-0 polypropylene suture. Postoperatively, the patient showed an uneventful recovery and was free of symptoms. All three sequential grafts were revealed to be patent by angiography 2 weeks after the operation (Fig. 1). Left ventricular ejection fraction was improved to 64%.

Discussion

The good patency rate and excellent results of arterial conduits in CABG are generally accepted, and encour-

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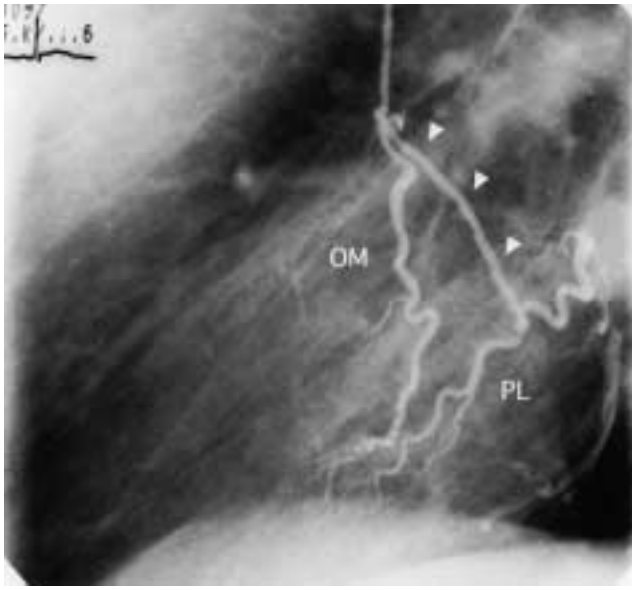

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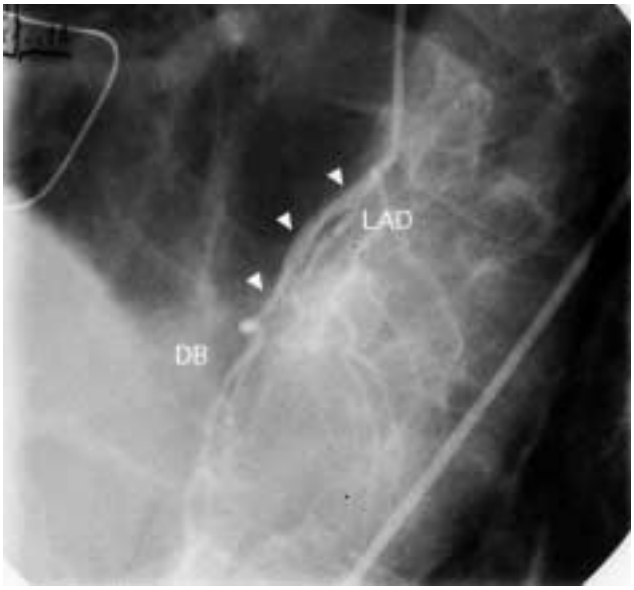

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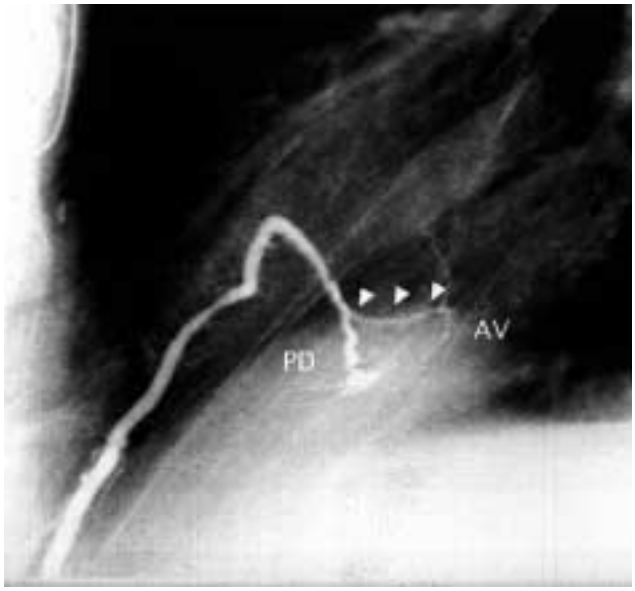

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Fig. 1. Postoperative coronary angiography. LITA sequential bypass to the obtuse marginal (OM) and left posterolateral (PL) branches (a). RITA sequential bypass to the left anterior descending artery (LAD) and diagonal branch (DB) (b). GEA sequential bypass to the right posterior descending (PD) and atrioventricular (AV) branches (c). All three grafts were demonstrated to be patent.

age us to attempt complete revascularization using only arterial grafts. To take advantage of live conduits by using a limited number of in situ arterial conduits to revascularize a wide area, sequential grafting is one of the most important procedures. For this procedure, the length, luminal diameter of grafts and type of anastomosis are the most important factors. Since we routinely harvest the ITAs in a skeletonized fashion, we can harvest grafts with a suitable luminal diameter, long enough to anastomose grafts sequentially.[1)] The ITAs can also be anastomosed parallel to coronary arteries at side-to-side anastomotic sites, because of their sufficient length, to avoid the risk of seagull-wing kinking.[2)] The angle between a conduit and a recipient coronary artery is also important. Right-angle anastomosis should be avoided especially in an end-to-side anastomotic site.[3)] Even in an end-to-side anastomotic site, we can anastomose in a nearly longitudinal manner, because of the skeletonized harvesting of ITAs. The GEA has not yet been widely used as a sequential graft.[4)] The GEA can be harvested with a very long length to reach almost any coronary artery system,[5)] and this makes it also possible to anastomose it parallel to a coronary artery at both a side-to-side and an end-to-side anastomotic site. However, in our study,[6)] when the GEA is used as a sequential graft, the occlusion rate is 21% for a side-to-end anastomotic site

as opposed to 0% for a side-to-side anastomostic site. This finding is explained by variation of luminal diameter in the GEA, especially at distal lesions. In some cases, because of its anatomical character, the luminal diameter of the GEA at a distal portion is quite small despite that at a proximal portion it is quite adequate.[7] In such cases, GEA sequential grafts should be limited to within the right coronary artery system or avoid sequential grafting between the right coronary artery and the left circumflex artery, because there would be flow competition between the GEA and the native coronary artery causing a graft failure. We conclude that this exclusive use of in situ arterial sequential conduits is an important procedure for complete revascularization in CABG. It is necessary to evaluate grafts, not only the ITAs but also the GEA, preoperatively by selective angiography.

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