

Off Pump Long-Onlay–Patch Angioplasty to the LAD Using the Left Internal Mammary Artery

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ABSTRACT

Surgical treatment for diffusely diseased coronary arteries has been considered to be a relative contraindication for off pump coronary artery bypass (OPCAB) grafting. We report a case of off pump long-onlay–bypass grafting using the left internal mammary artery. To our knowledge, the long-onlay–patch grafting with OPCAB technique has not been previously described. Two sets of Octopus-3 tissue stabilizers were placed longitudinally along the target coronary artery (Double-Octopus technique). This technique allowed us to perform surgical angioplasty and bypass grafting without cardiopulmonary bypass support. Patients with severe diffuse coronary lesions who are at high risk for cardiopulmonary bypass will benefit from this technique.

INTRODUCTION

Surgical treatment for diffusely diseased coronary arteries has been considered to be a relative contraindication for OPCAB. We report our experience of off pump long-onlay–bypass grafting using double Octopus tissue stabilizers in a case of diffusely diseased coronary artery.

CASE REPORT

This patient was a 77-year-old gentleman with triple-vessel disease. His proximal right coronary had 50% stenosis and significant left main disease. Moreover, his circumflex system had significant stenosis. Most importantly, he had diffuse and long segmental stenosis on the left anterior descending (LAD) artery. His left ventricular function was preserved without infarction, and his ejection fraction was 59%.

To visualize the LAD clearly, sponge pads were placed behind the heart. Atheromatous plaques of the artery were observed carefully through the adventitia or palpated by a

surgeon's finger. Thus the range of arteriotomy was ascertained. The first Octopus-3 tissue stabilizer (Medtronic, Minneapolis, MN, USA) was placed proximally on the target coronary artery and another stabilizer was applied on the distal part of the artery. Thus, the whole length of the coronary lesion was immobilized. A silastic snare suture was placed proximally and tightened to achieve hemostasis of the operative field. A carbon-dioxide gas blower was used to facilitate anastomosis by providing a bloodless operating field. A longitudinal arteriotomy, 5.5 cm, was made on the target coronary artery. Distal arteriotomy was extended as far as nondiseased intima while the most proximal significant stenotic lesion was left as it was, to avoid competitive flow.

A 1.5-mm intraluminal shunt was placed between the side of the antegrade cardioplegic line and distal end of the opening of the LAD to maintain the blood flow of the distal LAD during anastomosis. A longitudinal incision was also made in the left internal mammary artery to match the length of the arteriotomy made on the LAD. The anastomosis was carried out in an onlay fashion using 7-0 or 8-0 polypropylene running sutures. We used at least 3 to 4 different sutures along the proximal, middle, and distal portion of the anastomosis to avoid a purse-string effect on the anastomosis. The sutures were placed to exclude the atheromatous plaque from the lumen of the coronary artery. All coronary branches, such as the septal and diagonal branches, were preserved.

In this case, we did a total of 5 distal anastomoses using the left internal thoracic artery (LITA), right ITA (RITA), and 1 saphenous vein graft. The free RITA was anastomosed sequentially on the obtuse marginal branch as well as 2 posterolateral branches. One vein graft was placed between the aorta and right coronary artery. In situ LITA was anastomosed as a long-onlay patch for diffuse stenosis of the LAD. Postoperative angiography demonstrated that all grafts were patent without any stenosis on anastomotic sites. The patient's ejection fraction was maintained at 54% as it was preoperatively.

DISCUSSION

Diffusely diseased coronary arteries that require long anastomosis [Barra 2000] have been considered not to be suitable for OPCAB [Jansen 1998]. However, using a double-Octopus technique we could safely perform long-onlay graftings without cardiopulmonary bypass. By using this technique, a wider operative field could be well immobilized.

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A proximal snare suture and a CO₂ blower were used effectively to obtain a relatively bloodless field. This technique is somewhat difficult, and thus it is necessary that the surgeon performing the operation be very experienced in OPCAB grafting surgery. We presume that the myocardium can withstand a rather long period of ischemia because of existent collateral circulation that is usually well developed in cases of severe diffusely diseased artery.

The coronary plaques are so fragile that migration of the plaque during plaque immobilization may result in perioperative myocardial infarction. Because our plaque exclusion technique does not require plaque immobilization from the vessel wall, it should be free from risk of distal emboli.

We believe that patients with severe diffuse LAD coronary lesions who are at high risk for cardiopulmonary bypass will certainly benefit from this technique.

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