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ORIGINAL ARTICLE

Coronary endarterectomy in the left anterior descending artery

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Summary
Background: The diffusely diseased coronary artery is a challenge for cardiac surgeons. Although coronary endarterectomy is an option for surgical reconstruction of a diffusely diseased vessel, it has not been widely used. We assessed the early clinical and angiographic outcomes of patients undergoing coronary endarterectomy of the left anterior descending artery (LAD) with a patch plasty method using the left internal thoracic artery (LITA). Furthermore, we assessed the coronary artery velocity flow reserve (CFVR) of the endarterectomized LAD.
Methods: We retrospectively reviewed the records of 148 patients undergoing LAD endarterectomy using the in situ LITA. Direct endarterectomy was performed with a long segmental incision of the LAD that was reconstructed with the longitudinally incised LITA. The mean age at surgery was 65.1 ± 8.6 years. Previous myocardial infarction was observed in 58.1% of the patients. The mean Canadian Cardiovascular Society score was 2.4 ± 0.9. Postoperative angiography was performed in 134 patients (91.2%) during the same hospitalization (mean, 11.2 ± 9.0 postoperative days). CFVR in the LAD was measured early after the operation by transthoracic echocardiography.
Results: The mean number of distal anastomoses per patient was 4.2 ± 1.3. The mean length of reconstructed LAD with endarterectomy was 5.8 ± 1.5 cm. The operative mortality was 2.7%. Low cardiac output occurred in 6.1% of the patients. Perioperative myocardial infarction was observed in 12.2% of the patients, but severe ventricular arrhythmia was not encountered. The patency rate of the LITA to LAD was 94.0% by early angiographic examination. The mean CFVR in the endarterectomized LAD was 2.41 ± 0.66.

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Conclusions: Coronary endarterectomy of the LAD with a patch plasty using the LITA is associated with acceptable mortality, morbidity, and angiographic patency. CVFR measured by transthoracic echocardiography showed a favorable functional status in the endarterectomized LAD. Endarterectomy is considered to be one of the available surgical methods for patients with a diffusely diseased LAD.

Introduction

Recently, the use of percutaneous coronary intervention (PCI) for treatment of coronary artery disease has progressively increased. A large number of simple stenoses in one or two coronary vessels can be treated by PCI. Therefore, the number of high-risk and severely diseased patients referred for coronary artery bypass grafting (CABG) has been relatively increasing. Coronary endarterectomy has been used to treat severely or diffusely diseased coronary arteries since the 1950s [1]. However, early experiences of this method were not associated with satisfactory clinical results [2—4]. More recently, the benefits of endarterectomy for the left anterior descending artery (LAD) have gradually become recognized because surgical techniques and technologies have evolved [5,6]. The greatest advantage of endarterectomy is that the myocardium supplied by the side branches (diagonal branches and septal perforators) of a diffusely diseased LAD can be relieved of ischemia. This advantage cannot be obtained using a conventional graft to the distal LAD alone because this is beyond the diffusely diseased segments. The aim of the present study was to review the clinical efficacy and angiographic features of endarterectomy for a diffusely diseased LAD.

Patients and methods

Study patients

Between April 2001 and March 2008, 148 patients underwent coronary endarterectomy of the LAD with the in situ left internal thoracic artery (LITA) at the Shin-Tokyo Hospital and the Sakakibara Heart Institute. The preoperative characteristics of the patients are shown in Table 1. The mean age at surgery was 65.1 ± 8.6 years. Previous myocardial infarction was observed in 58.1% of the patients. The mean Canadian Cardiovascular Society score was 2.4 ± 0.9. The study protocol was approved by the Institutional Review Committee of the Sakakibara Heart Institute, and informed consent was obtained from each patient with respect to the surgical method, postoperative angiography, and echocardiography.

Operations

The indications and surgical methods were partly described previously [7]. The target artery for performing coronary endarterectomy was the LAD. We carried out endarterectomy with the principle that the diffusely diseased LAD and its side branches (septal perforators and diagonal branches) affected by severe atheromatous plaque should be relieved of ischemia. In addition, we performed endarterectomy when there was no place in the LAD to be anastomosed to the LITA

Table 1 Preoperative characteristics of patients undergoing endarterectomy of the left anterior descending artery.

	Number or mean
Number	148
Age	65.1 ± 8.6
Sex, female	24 (16.2%)
Unstable angina	40 (27.0%)
Old myocardial infarction	86 (58.1%)
Canadian Cardiovascular Society class	2.4 ± 0.9
Ejection fraction (%)	54.5 ± 12.3
Diseased vessel	2.8 ± 0.6
Left main	23 (15.5%)
Creatinine (mg/dl)	1.3 ± 1.5
Congestive heart failure	22 (14.9%)
Hypertension	110 (74.3%)
Diabetes mellitus	88 (59.5%)
Insulin	24 (16.2%)
Hyperlipidemia	95 (64.2%)
Smoking	78 (52.7%)
Previous stroke	23 (15.5%)
Peripheral vascular disease	14 (9.5%)
Chronic obstructive pulmonary disease	4 (2.7%)
Non-elective	11 (7.4%)