

# Safety and Efficacy of Sequential Left Internal Thoracic Artery Grafting to Left Circumflex Area

Suguru Ohira, MD, Kiyoshi Doi, MD, PhD, Kazunari Okawa, MD, Masahiro Dohi, MD, Tsunehisa Yamamoto, MD, Hidetake Kawajiri, MD, and Hitoshi Yaku, MD, PhD

Department of Cardiovascular Surgery, Kyoto Prefectural University of Medicine, Kyoto, Japan

**Background.** This study investigated short-term and long-term results of coronary artery bypass grafting (CABG) with in situ sequential left internal thoracic artery (LITA) grafting to the left circumflex area.

**Methods.** The study divided 452 patients who underwent CABG with bilateral ITA grafting to the left coronary artery into two groups: 191 in the sequential group and 261 in the individual group. The 147 pairs were matched by the propensity score.

**Results.** In the matched pairs, the rates of off-pump, complete revascularization, and hospital death were comparable between the two groups. Early graft evaluation was performed in 78.6%. There was no occlusion of the sequential LITA graft itself, but 5 complications occurred involving the distal segment of the LITA graft (occlusion, 2; string, 2; and competition, 1), and 3 complications (occlusion, 2; and string, 1) developed in the individual group. Event-free anastomosis rates were

97.8% in the sequential group and 97.4% in the individual group ( $p = 0.847$ ). Diamond anastomosis of proximal sequential grafting showed a better patency of the distal part of sequential anastomosis compared with a parallel anastomosis of proximal sequential grafting (98.4% vs 90.7%, respectively). The freedom from target lesion revascularization and overall survival at 8 years was 94.6% and 96.3% in the sequential and individual groups, respectively (log-rank  $p = 0.645$ ) and 80.7% and 77.4% ( $p = 0.300$ ), respectively.

**Conclusions.** In situ sequential LITA grafting provides acceptable early graft patency and freedom from repeat revascularization, resulting in excellent survival. This technique is a useful strategy for multivessel revascularization including the left circumflex area.

(Ann Thorac Surg 2016;■:■-■)

© 2016 by The Society of Thoracic Surgeons

**B**ilateral internal thoracic artery (BITA) grafting has been demonstrated to improve survival after coronary artery bypass grafting (CABG) [1–6]. BITA grafting is more beneficial for patients with diabetes or chronic kidney disease [3, 5]. At present, we often need to revascularize multiple targets in patients with an increasing severity of disease [3–5]. Sequential arterial grafting in a skeletonized fashion is a useful procedure to achieve effective revascularization in these patients with a limited number of grafts [7–18]. In the presence of more than 2 targets in the left coronary arteries (LCAs) besides the left anterior descending artery (LAD), we have used sequential left ITA (LITA) grafting to the left circumflex artery (LCx) area to apply in situ BITA grafting. Although the benefits of BITA grafting have been recognized, there have been few reports of the results of in situ sequential ITA grafting in the context of BITA grafting [9, 11, 19]. The aim of this study was to examine the short-term and long-term clinical results of in situ sequential LITA grafting for multivessel revascularization including the LCx area.

## Material and Methods

The Kyoto Prefectural University of Medicine Institutional Review Board approved this study. Individual consent was obtained from each patient. Between 2001 and 2012, 943 consecutive patients underwent isolated CABG performed by two surgeons (H.Y. and K.D.). BITA grafting was performed in 676 patients. Of these, data of 452 patients undergoing BITA grafting to the LCA were retrospectively analyzed: 191 patients underwent sequential LITA grafting (sequential group), and 261 patients underwent individual LITA grafting to the LCx area (individual group). Excluded were the remaining 224 BITA grafting cases: LITA to LAD and right ITA (RITA) to LCx ( $n = 93$ ), RITA to LAD and composite LITA grafting to LCx ( $n = 52$ ), RITA or LITA to right coronary artery ( $n = 50$ ), sequential RITA grafting ( $n = 24$ , eg, RITA to LAD to diagonal), and free ITA grafting ( $n = 5$ ).

## Revascularization Strategy

We adopted an off-pump technique whenever possible for isolated CABG. At least one branch of the LCx was

Accepted for publication Feb 22, 2016.

Address correspondence to Dr Ohira, Department of Cardiovascular Surgery, Kyoto Prefectural University of Medicine, 465 Kajii-cho, Kawaramachi-Hirokoji, Kamigyo-ku, Kyoto 602-8566, Japan; email: s-ohira@koto.kpu-m.ac.jp.

The [Appendices](#) can be viewed in the online version of this article [<http://dx.doi.org/10.1016/j.athoracsur.2016.02.075>] on <http://www.annalsthoracicsurgery.org>.

**Abbreviations and Acronyms**

ASD	= absolute standardized difference
BITA	= bilateral internal thoracic artery
CABG	= coronary artery bypass grafting
COPD	= chronic obstructive pulmonary disease
CT	= computed tomography
GEA	= gastroepiploic artery
LAD	= left anterior descending artery
LCA	= left coronary artery
LCx	= left circumflex artery
LITA	= left internal thoracic artery
NYHA	= New York Heart Association
PAD	= peripheral artery disease
RCA	= right coronary artery
RITA	= right internal thoracic artery
SVG	= saphenous vein graft
TLR	= target lesion repeat revascularization

grafted by in situ LITA according to the number of distal targets with more than 50% stenosis. The sequential pattern was basically determined to form a natural configuration and shortest way of the LITA graft. In this study, the LAD was revascularized by in situ RITA as an individual fashion. In patients with both diagonal and LCx lesions, the revascularization strategy was:

1. If there were 2 targets, such as diagonal and obtuse marginal branches, sequential LITA grafting was adopted.
2. If there were 2 targets and the LITA was not long enough or relatively narrow to perform sequential grafting, the LITA was anastomosed to the LCx in an individual fashion and the other target was revascularized by a vein graft or the gastroepiploic artery in either a sequential or an individual fashion.
3. If there were 3 targets including the diagonal branch, sequential LITA grafting was performed to revascularize the 2 vessels according to the LITA length, and the other was anastomosed by another graft.

If sequential grafting was not available due to the reasons described in the second strategy, 1 or 2 other grafts were used.

**Surgical Techniques**

Our surgical techniques were described previously [17]. Briefly, skeletonized BITA grafts were harvested using a harmonic scalpel [7]. ITA grafts were anastomosed with 8-0 polypropylene. A proximal anastomosis of sequential LITA grafting was performed in a diamond (cross direction) or parallel fashion to form a natural configuration of the graft (Fig 1). In a diamond fashion, incision of the ITA was placed longitudinally, being careful not to exceed the diameter of the ITA.

**Graft Evaluation**

Postoperative graft evaluation was performed by coronary angiography or computed tomography (CT)

angiography before discharge. The details are described in the [Appendix](#).

**End Points and Definition**

The presence of stenosis causing more than a 50% diameter reduction was defined as a diseased vessel and considered as a target of bypass grafting. The end points were target lesion repeat revascularization (TLR), cardiac events, and overall death. TLR was defined as reintervention for vessels revascularized by CABG. Postoperative cardiac events were defined as cardiac death, coronary reintervention, recurrent ischemia, and congestive heart failure requiring admission. Cardiac death included deaths caused by arrhythmia, myocardial infarction, heart failure, or sudden death. More details are described in the [Appendix](#).

**Statistical Analysis**

We estimated propensity scores using nonparsimonious multiple logistic regression analysis, with sequential LITA grafting as the dependent variable. The following 26 characteristics were entered into the multivariate models: age, male sex, body mass index, creatinine, ejection fraction, number of diseased vessels, New York Heart Association Functional Classification, left main disease, diagonal lesion, priority of operation, off-pump, intra-aortic balloon pump, redo operation, history of hypertension, hyperlipidemia, diabetes, insulin user, acute myocardial infarction, old myocardial infarction, percutaneous coronary intervention, smoking, chronic obstructive pulmonary disease, peripheral artery disease, stroke, atrial fibrillation, and mitral regurgitation of 2 or higher.

The C statistic for this model was 0.754, which indicates acceptable discrimination. The Hosmer-Lemeshow goodness-of-fit test result was 8.08 ( $p = 0.426$ ). One-to-one matching without replacement was performed using a greedy nearest matching within a caliper width equal to 0.2 of the standard deviation of the logit of the propensity scores, and 147 pairs were successfully matched. Absolute standard differences were calculated to compare the balance in baseline characteristics between both groups. A threshold of 0.10 was used to indicate a significant imbalance. All analyses were performed using SPSS 22.0 software (IBM Corp, Armonk, NY). More details are described in the [Appendix](#).

**Results****In-Hospital Outcomes**

Patients in the nonmatched groups who received sequential LITA grafting were significantly younger, with lower ejection fraction, kidney function, and a higher prevalence of diabetes and the number of diseased vessels ([Appendix Table E1](#)). After the propensity-score matching, these basic characteristics were adjusted ([Table 1](#)). The rates of off-pump, complete revascularization, deep sternal wound infection, and hospital death were comparable in the nonmatched ([Appendix Table E2](#))

Download English Version:

<https://daneshyari.com/en/article/2870844>

Download Persian Version:

<https://daneshyari.com/article/2870844>

[Daneshyari.com](https://daneshyari.com)