

# Bilateral versus Unilateral Internal Thoracic Artery Revascularization in Patients with Multivessel Coronary Artery Disease

Abdusalom Abdurakhmanov, Mustapha Obeid, Ilkhom Abdulkhalimov

## Background and Objective

since its introduction into the recommendations, left internal mammary artery use became a quality control measure for CABG surgery [1,2]. LIMA to left anterior descending artery grafting can improve patients survival compared with use of an SVG. Initially patients with double IMA grafts can be at greater risk group before operation, but on 10-year follow-up period their survival rate was similar to that of patients with a single IMA graft [3]. Arterial grafting of the non-left anterior descending vessels, in patients undergoing isolated coronary artery bypass graft surgery with LIMA to left anterior descending artery, can improve a 15 years survival rate compared with SV grafting [4]. Regarding to conclusion of Iribarn A., et al., BIMA grafting reduces a risk of repeat revascularization and improves long-term survival and should be considered more frequently during coronary artery bypass grafting [5]. BIMA grafting to non-LAD coronary arteries received a class IIa recommendation (level of evidence grade B) by the American College of Cardiology Foundation/American Heart Association guidelines for CABG, to improve survival and decrease reintervention rates [6]. Endo M., et al., suggest that the use of BIMA grafts in patients with in situ coronary artery anastomoses conferred to a significantly higher rate of freedom from repeated CABG in all patients compared with the use of SIMA [7]. Ravoux JM et al., in his study underlined that obesity, age, and diabetes treated by insulin (or not) does not influence of developing sternal wound infection or reintervention for postoperative bleeding (RIB), although, mortality was higher in RIB group [8]. The advantage of BIMA grafts versus SIMA grafts has been a controversial topic, although the use of skeletonized BIMA grafts in coronary revascularization has recently been shown to produce better outcomes than use of SIMA grafts [9].

We aimed to compare incidence of bleeding, wound complications and major cardiac events among patients underwent coronary artery bypass grafting procedure using BITA vs LITA harvesting.

## Materials and methods

The study included 43 patients who underwent surgery in the department of cardiac surgery from October 2016 to December 2018 at the Republican Research Centre for Emergency Medicine.

All patients were divided into 2 groups: the first group consisted of 25 patients who underwent coronary bypass with the use of the left internal thoracic artery and venous grafts (LITA+SVG), the second group - 18 patients underwent CABG using both internal thoracic arteries for myocardial revascularization (BITA+SVG). The age of the heart patients ranged from 47 to 66 years (the average - 55 years). In both groups, all heart patients were male and not female.

## Results

In the first group, 14 patients had stable angina, the remaining 11 patients had inconstant angina. In the BITA+SVG group, all heart patients had unstable angina. All patients had also history of previous or earlier myocardial infarction. (initial patients characteristics are shown in the table 1).

Variable	SIMA SVG n=25	BIMA SVG n=18	p Value
Age (y)	56 ± 8	53 ± 8	0.005
Male	25 (100%)	18(100%)	0.8
Diabetes	4(16%)	3 (17%)	0.013
HBP	8 (32%)	6 (33%)	0.8
COPD	2(8%)	1 (6%)	0.5
Stable angina	14(56%)		0.005
Unstable angina	11(44%)	18(100%)	0.005
LVEF	60 ± 10	57 ± 12	0.015

Table 1: Initial patients' characteristics

On coronary angio - 18 patients had - 3x vascular lesion, and 7 had - stenosis of the left main and the right coronary artery (LITA+SVG). Among BITA+SVG patients 15 patients had - 3 vessel disease and 3 patients had a left and right main stem stenosis (Characteristics of vascular pathology are shown in the Table 2).

Variable	SIMA SVG n=25	BIMA SVG n=18	p Value
Left main stenosis	5 (20%)	3 (16,7%)	0.007
One-vessel disease	1 (4%)	1(6%)	0.0001
Two-vessel disease	1 (4%)	4(22,2%)	0.0001
Three-vessel disease	18 (72%)	10 (55,6%)	0.0001
Aorta calcification	0	8(44,4%)	0.0001

Table 2: Characteristics of vascular pathology

Name: Abdusalom Abdurakhmanov, Mustapha Obeid, Ilkhom Abdulkhalimov

Affiliation: Republican Research Centre of Emergency Medicine, Tashkent, Uzbekistan Email:

The revascularization index was 3.1 for the patients of LITA+SVG group and 3.1 for the BITA+SVG group (the results are unified in the table 3).

Variable	SIMA SVG n=25	BIMA SVG n=18	p Value
Mortality	-	-	-
Stroke	-	-	-
Wound complications	-	-	-
Blood loss	280 ± 15 ml	305 ± 23 ml	0.1
Grafted vessels mean	3.1	3.1	0.1

Table 3: Early postoperative results

In the early postoperative period any case of acute myocardial infarction, stroke and mortality were not observed in both groups. The average blood-loss in drainage tube during first postoperative day was 280 ± 15 ml and 305 ± 23 ml for the LITA+SVG and BITA+SVG groups, respectively. It should be noted that in the first and second groups, were not observed any wound related complications in heart patients.

**Conclusion**

This relative study showed that BITA and LITA harvesting doesn't impact early postoperative period. Both methods companion by satisfactory results regarding to bleeding, wound healing and major cardio-cerebral events in patients with multivessel coronary artery disease.

**References**

1. Karthik S, Fabri BM. Left internal mammary artery usage in coronary artery bypass grafting: a measure of quality control. *Ann R Coll Surg Engl.* 2006;88(4):367-369. doi:10.1308/003588406X98667;

2. Hillis LD, Smith PK, Anderson JL, Bittl JA, Bridges CR, et al. (2011) 2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation* 124: e652-735.

3. Farinas JM, Carrier M, Hébert Y, et al. Comparison of long-term clinical results of double versus single internal mammary artery bypass grafting. *Ann Thorac Surg.* 1999;67(2):466-470. doi:10.1016/s0003-4975(98)01196-5;

4. Locker C, Schaff HV, Dearani JA, et al. Multiple arterial grafts improve late survival of patients undergoing coronary artery bypass graft surgery: analysis of 8622 patients with multivessel disease. *Circulation.* 2012; 126 (9): 1023-1030. doi: 10.1161/CIRCULATIONAHA.111.084624;

5. Iribarne A, Schmoker JD, Malenka DJ, et al. Does Use of Bilateral Internal Mammary Artery Grafting Reduce Long-Term Risk of Repeat Coronary Revascularization? A Multicenter Analysis. *Circulation.* 2017;136(18):1676-1685. doi:10.1161/CIRCULATIONAHA.117.027405

6. Dalén M, Ivert T, Holzmann MJ, Sartipy U. Bilateral versus single internal mammary coronary artery bypass grafting in Sweden from 1997-2008. *PLoS One.* 2014;9(1):e86929. Published 2014 Jan 21. doi:10.1371/journal.pone.0086929

7. Endo M, Nishida H, Tomizawa Y, et al. Benefit of bilateral over single internal mammary artery grafts for multiple coronary artery bypass grafting. *Circulation.* 2001;104:2164-2170.

8. Ravaux JM, Guennaoui T, Mélot C, Schraeverus P. Bilateral Internal Mammary Artery Bypass Grafting: Sternal Wound Infection in High-Risk Population. Should Sternal Infection Scare Us?. *Open J Cardiovasc Surg.* 2018;10:1179065218789375. Published 2018 Jul 23. doi:10.1177/1179065218789375

9. Taggart DP. Bilateral internal mammary artery grafting: are BIMA better?. *Heart.* 2002;88(1):7-9. doi:10.1136/heart.88.1.7