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ORIGINAL ARTICLE

Comparison Between Saphenous Vein Graft and Radial Artery Graft in Coronary Artery Bypass Grafting

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ABSTRACT

Background: To bypass the obstruction in native coronary arteries both arterial and venous grafts are used. Inspite of having radial artery graft as a favored second conduit for bypass, venous grafts are more frequently used.

Objective: To compare the CT angiography patency findings of radial artery graft vs. saphenous vein graft 3 months postoperatively.

Study Design: Randomized controlled trial. Settings: The study was conductedat the Department of Cardiac Surgery, Mayo Hospital, Lahore.

Data Collection: All patients fulfilling theinclusioncriteria were recruited. A written informed consentwastaken. The non-dominant arm was used almostexclusively forharvesting the radial artery in those patients who have positive modified Allen`s test as a pedicle by atraumatic "no-touch" technique. After heparanization, it was immersed in diluted solution (Inj. verapamil hydrochloride 5mg + Inj. nitroglycerin 2.5mg + Inj. heparin 500 IU + Inj. ringer lactate 300 ml with Inj. 8.4% NaHCO3 0.9 m1). All the patients in the study received LIMA to LAD and were done on pump. After that the patients were dividedinto2 groups namely Group I and Group II by computer generated method. In Group I, the patient received the radial artery as a second graft to a coronary having more than 90% stenosis. The third or fourth graft if required is saphenous vein graft. The group II had SVG as second, third or fourth grafts, one of the venous grafts were to a coronary having more than 90% stenosis.

Results: Average age of all (n=62) patients was 38.82±9.93 years. Average age in Group-I & II patients was 39.09±9.49 & 38.54±10.50 years respectively. Among patients 47% were male and 53% were female patients. In Group-I, 12 (38.7%) of the patients were male, and 19 (67.3%) were female, whereas in Group-II, 17 (54.8%) of the patients were male, and 14 (45.8%) were female. In Group-I 1(3.2%) patient and in Group-II 3(9.7%) patients died (p=0.301). Insignificant difference was seen for cardiac arrhythmias i.e. Group-I:16.1% vs. Group-II: 19.4%, p=0.740. Myocardial infarction in Group-A 5(16.1%) patients and in Group-B 7(22.6%) (p=0.520). In Group-A, 30(96.8%) patients and in Group-B, 28(90.3%) patients showed patency of artery after coronary artery bypass grafting(P>0.05).

Conclusion: We discovered no significant difference in the patency of both radial artery and saphenous vein grafts on 3 months postoperative CT angiography and clinical outcomes in terms of perioperative mortality, MI, and cardiac arrhythmias in patients who underwent CABG in this study.

Keywords: radial artery graft, saphenous vein graft, coronary artery bypass grafting, Myocardial Infarction, Mortality, Cardiac arrhythmias

INTRODUCTION

According to the World Health Organization (WHO), disability adjusted life expectancy is the proportion of years and years of potential life lost owing to coronary heart disease, which is 10% and 14%, correspondingly(1). The most prevalent cause of cardiovascular illness is ischemic heart disease (IHD). There are three therapy options for ischemic heart disease: medical treatment, PCI, and coronary artery bypass grafting (CABG). When necessary, CABG surgery is an effective method of treating ischemic heart disease.

Veins and arteries are the conduits available for CABG. The left internal mammary artery (LIMA), right internal mammary artery (RIMA), right and left radial artery (RA), and gastroepiploicartery(2) are the arterial conduits. The use of the ulnar artery, left gastric artery, thoracodorsal artery, lateral femoral artery, and inferior epigastric artery has also been documented in the literature. The great saphenous vein (GSV), small saphenous vein (SSV), cephalic or basilic veins are examples of venous conduits. LIMA is traditionally used to bypass LAD artery and the GSV in order to reach other coronary artery. However, after 5 years, the patency percentage of the venous graft and the LIMA is 80% and 96%, correspondingly. At 10 years, the patency percentage for venous grafts and the LIMA is 60% and 90%, accordingly, indicating that venous grafts have worse results than arterial grafts(3). The superior clinical results and unmatched long-term patency rates of the LIMA make it the artery of choice for almost all patients having CABG surgery.

The better long-term survival benefit of LIMA over LAD had effectively shown, however the ideal secondary artery choice in CABG operation remained a subject of controversy. This has also been done with the GSV, right internal mammary artery (RIMA), and RA. (4)

MATERIAL AND METHODS

It was Randomized controlled trial which was doneat the Department of Cardiac Surgery, Mayo Hospital, Lahore Study was completed in 1 year after the synopsis approval.

Conclusion Criteria: Patients 18- 60 years of age either gender. Undergoing primary, elective coronary bypass surgery as advised by Heart Team. They should have graftable double or triple-vessel disease and having at least 90% stenosis is in a coronary artery other than LAD according to angiographic report. Patient with moderate to good Left Ventricular Function.(EF > 30 Percent) according to echocardiography.

Exclusion Criteria: Negative modified Allen's test. Patient having impending renal failure (abrupt decline in renal function confirmed on creatinine clearance or Raynaud`s disease). History of vasculitis or Raynaud's disease. Poor L.V function (EF less than 30%) according to echocardiography. CABG with valve replacement surgery
Redo CABG.

RESULTS

The mean age of patients in both treatment groups was 39.09±9.49 and 38.54±10.50 years. Minimum and maximum patient's age was 27 and 57 in Group-A and 27 and 60 years in Group-B.

Among patients 47% were male and 53% were female patients.

In Group-A 12(38.7%) patients were men and 19(67.3%) were women while in Group-B 17(54.8%) patients were menand 14(45.8%) were women.

No significant difference was seen for cardiac arrhythmias in both treatment groups. i.e. Group-A:16.1% vs. Group-B: 19.4%, p-value=0.740

In Group-A 5(16.1%) patients and in Group-B 7(22.6%) patients suffered myocardial infarction. Although in Group-B frequency of MI was higher as that of Group-A patients but it was not statistically significant i.e. Group-A: 16.1% & Group-B: 22.6%, p-value=0.520.

In Group-A, 30(96.8%) patients and in Group-B, 28(90.3%) patients showed patency of artery after CT angiography. Although in Group-A frequency of patency of artery was higher as that of Group-B patients but it was not statistically significant i.e. Group-A: 96.8% & Group-B: 90.3%, p-value=0.3029.

Table 1: Demographic and Clinical Outcomes

Characteristics		Radial Artery(Group A) n-31	Saphenous-vein Grafts(Group B) n-31	P-Value
Age		39.09±9.49 (range 27-57)	38.54± 7.40 (range 27-60)	0.830
Gender	Male(29)	12(38.7%)	17(54.8%)	0.203
	Female(33)	19(67.3%)	14(45.8%)	
Arrhythmias	Yes(11))	5(16.1%)	6(19.4%)	0.740
	No(51)	26(83.9%)	25(80.6%)	
Myocardial Infarction	Yes(12))	5(16.1%)	7(22.6%)	0.520
	No(50)	26(83.9%)	24(77.4%)	
Patency of Artery	Yes(58))	30(96.8%)	28(90.3%)	0.303
	No(4)	1(3.2%)	3(9.7%)	

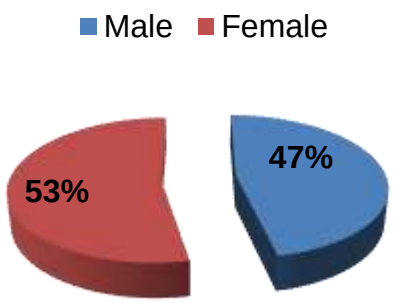

Figure - 1: Gender of patients

DISCUSSION

Petrovic et al performed a research on 200 patients who had isolated, primary CABG utilizing left internal thoracic artery grafting & SVG method in Ist group, and radial artery grafting procedure in the second group. According to the results of their research there was no great disparity in the clinical results (long term) among the patients in whom SVG or RAG was utilized as a second conduit, beside LIMA, for surgical myocardial revascularization. [5]

These findings are similar to the results of our research as in our study there was no strong relation observed between the patients suffering from MI and the study groups. Additionally, their results indicated that the graft patency among the patients who had had coronary angiography was comparable across groups. According to the outcomes of 2 randomized control trials the event free survival was greater among individuals getting RA[6] According to one additional study by Nasso et al, there was resemblance between events free survival in patients who got RA as contrasted with the people treated a second IMA graft. [7] Together delayed and earlier survival and event-free survival was elevated by utilizing RA as contrast with a SVG. [8]

A research conducted in 2010 indicated no significant difference in rate of patency with laboratory findings. [9] Another research by Zacharias investigated six year results of patients received LIMA-LAD grafting. Among 925 patients, they observed better survival with the RA transplants. Data from different studies demonstrated increased RA graft patency. The results of Desai et al [10] indicated radial artery patency in study of 440 RA vs 440 SVG grafts in CABG and demonstrated RA was protected alongside blockage, especially among females upto 12 months. [11] These results differ from the outcomes of our investigation since in our study both the classes were equally successful.

According to another research there was relationship between history of peripheral vascular disease and increased incidence of RA blockage, while grafting to an artery with proximal occlusion promoted RA stability. [12] The RAPS research is the 1st study undertaken at diverse sites RAG patency over 5 years. In a research [13], RA or SVG was given to the second best target; they found that after 1 year, full graft blockage was comparable in RA and SVGs (11%). At five years and five months, RSVP research found that entire graft blockage was considerably less common in RAG as compared with SVGs administered to the circumflex area. [14]

Another research planned angiographic check-up within five years in some patients and between 5 - 10 years postoperatively in the rest; they have reported intermediate statistics. [15]

RA vs SV Grafting explaining the research evidence of validity to support RA over SVGwhile CABG using the LIMA to LAD. The RA ($p < 0.001$) is probably related to the greater patency of the RA over SVG. [16] These findings were distinct from the results of our research as in our study both the RA and SV grafting had same findings. In other trials, the evidence for improved survival with RA grafting over SVG is also compelling. [17] [18] However, in a recent trial that differed from previous studies, Kelly et al [19] discovered that RA grafts did not improve survival when compared to LIMA and only SV grafts in a secondary source.

CONCLUSION

According to the findings of this study, there was no significant difference in RA and SVG patency on 3 months postoperative CT angiography and interventional impacts in terms of perioperative mortality, myocardial infarction, and cardiac arrhythmias in CABG patients. The patency proportion of the SVG graft was 90.3 %, while the patency proportion of the RA graft was 96.8 %.

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