ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 05, 2021

Comparative Study between Radial Artery Versus Saphenous Vein Grafts Patency After 5 Years

OusmaneToure*, Mohamed Hagras,FouadRasekh, Ahmed Elsharkawy.

Cardiothoracic Surgery Department, Kasr Al Ainy Faculty of Medicine, Cairo University, Egypt
E-mail: othmantoure811@gmail.com.

Abstract:Background:Graft patency is a fundamental predictor of long-term survival aftercoronary artery bypass surgery. Left and right internal thoracic artery (arterial) graft patency has been shown to be superior to that of saphenous vein grafts. More recently, the radial artery has been used as an aortocoronary graft, but little is known about the midterm and long-term patency of this conduit. The ultimate goal of this operation is to achieve complete revascularization of the patient with conduits that will remain patent for the duration of the patient's lifetime. The excellent patency rates achieved with the pedicled left internal mammary artery are well described. Over the past decade, there has been considerable interest in whether the left internal mammary radial artery may provide results comparable to the arterial conduit. However, other studies have described that mild proximal stenosis of target vessels correlated with graft occlusion when an RA graft was used. Thus, we compared the short- and long-term results of patients who received an RA graft to the OM with those of patients who received an SVG.**Methods:**Following approval by the ethics and research committee of Kasr el Ainy faculty of Medicine Cairo University, and obtaining an informed consent, a prospective randomized clinical study was conducted on **FIFTY** who were operated upon with CABG.Requiring in addition to LIMA to LAD, revascularization of an obtuse marginal. These patients included 25 patients who received radial artery as the conduit. The selected patients for this study were evaluated postoperatively by MSCT angiography to comparative study between radial artery versus saphenous vein grafts patency after 5 years.**Results:** In our study according to graft patency by MSCT postoperative after 5 years of both groups showed statistically significant difference in group A which is p value 0.047 in group A 22 patients (88.0%) with radial to OM graft were patent while 3 patients (12.0%) with radial to OM were occluded. But in group B 16 patients (64.0%) with saphenous to OM graft were patent while 9 patients (36%) with saphenous to OM were occluded**. Conclusion:**In the long-term study, there was significant difference between total arterial revascularization and conventional CABG.
Total arterial revascularization having low operative mortality and morbidity

Keywords: Radial Artery, Saphenous Vein,Obtuse Marginal Brunch, MSCT Coronary Angiography.

Introduction

The first used of the radial artery (RA) in the clinical practice by **Carpentier** and associates in 1973. But, after 2 years **Carpentier et al.** deserted its use because of diffuse narrowing that occurred in 35% of the grafts, **(Carpentier et al., 1975)**.

Curtis and his group reported the failure rate of RA grafts was 64.7% in 79 patients at 1year after surgery. This was higher than failure rate for saphenous vein and IMA grafts used in the same patients **(Curtis et al., 1975)**.

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 05, 2021

The mechanism of radial artery occlusion was not clearly demonstrated at that time. The radial artery graft removed at re-operation showed asignificant degree of intimal hyperplasia. But, Carpentiersuggested that "the narrowing of the RA was due to spasm of the artery" Acarand his group used thr radial artery in CABG. Showed high patency rate.Several centers in America and Europe confirmed these results. The improved results of RA was related to the use of Ca^{++}-channel blocker and other vasodilator agent used that prevent spasm of the RA(**Acar et al., 1992**).

From the surgical point of view, the radial artery is an attractive conduit. Its preparation is straight-forward, can be harvested simultaneously with the LIMA, its morphological features in terms of length, diameter and wall thickness facilitates performance of coronary anastomosis and multiple distal anastomosis can be done, to performed two separate grafts by dividing one radial artery of adequate length. It has been also shown that it is possible to do composite arterial grafts by proximally anastomosing radial artery to IMA as a T- or Y-graft.(**Borger et al., 1998**).

Methods:

Following approval by the ethics and research committee of Kasr el Ainy faculty of Medicine Cairo University, and obtaining an informed consent, a prospective randomized clinical study was conducted on **FIFTY** who were operated upon with CABG.Requiring in addition to LIMA to LAD, revascularization of an obtuse marginal. These patients included 25 patients who received radial artery as the conduit. The selected patients for this study were evaluated postoperatively by MSCT angiography to comparative study between radial artery versus saphenous vein grafts patency after 5 years.

Inclusion criteria:

The lesion in oblique marginal is proximal and tight(more than 80%).
EF more than 40%
ALL ages
Both genders

Preoperative investigation and assessment:

History tacking and Clinical examination
Routine lab investigations (CBC, ESR, liver functions, kidney functions, bleeding profile ,blood chemistry, lipid profile and fasting blood sugar and glycated hemoglobin).
Chest X-ray (P-A and Lateral Views erect) and CT chest in patient older than 60 years.
Carotid duplex
Echo to asses EF and other valvular lesions and RWMA.
Coronary angiography
Non-invasive: Heart rate (beat/min), Invasive blood pressure values (systolic, diastolic & mean in mmHg) were obtained immediately before anesthesia induction for the 2 groups.

Statistical analysis used in our patients:

Results are expressed as mean ± standard deviation or number (%). Comparison between categorical data [number (%)] was performed using Chi square test or Fisher exact test if cell count was less than 5. Comparison between variables in the two groups was performed using unpaired t test. Statistical Package for Social Sciences (SPSS) computer program (version 20 windows) was used for data analysis. P value ≤ 0.05 was considered significant.

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 05, 2021

Result:

Analysis of preoperative data
Number of graft
In our study according to the number of graft in both group which showed statistically significant different in group B **Table(1)**

Table (1): number of graft

	Group A	Group B	P value
Number of grafts	2.80 ± 0.50	3.16 ± 0.47	0.012

Angiography
According the coronary angiography both groups had significant lesion in the obtuse marginal of left circumflex artery **(table 6)**

Table (2): Angiography in the two studied groups.

	Group A	Group B
LCX	25 (100.0%)	25 (100.0%)

Technique of grafting
Regarding to graft anastomosis in group A was composite (T or Y graft to LIMA)while in group B the type of graft anastomosis was separate(aorto-coronary bypass) **(Table 3)**

Table(3): Technique of grafting in the two studied groups.

	Group A	Group B
Composite	25 (100.0%)	0 (0.0%)
Separate	0 (0.0%)	25 (100.0%)

MSCT postoperative after 5 years
According to graft patency by MSCT postoperative after 5 years of both groups showed statistically significant difference in group A which is p value 0.047 (**Table 4**)

Table (4):MSCT postoperative after 5 years in the two studied groups.

	Group A	Group B	p value
Occluded	3 (12.0%)	9 (36.0%)	0.047
Patent	22 (88.0%)	16 (64.0%)	

In group A 22 patients (88.0%) with radial to OM graft were patent while 3 patients (12.0%) with radial to OM were occluded. But in group B 16 patients (64.0%) with saphenous vein to OM graft were patent while 9 patients (36%) with saphenous to OM were occluded (**Fig.1,2,3**)

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 05, 2021

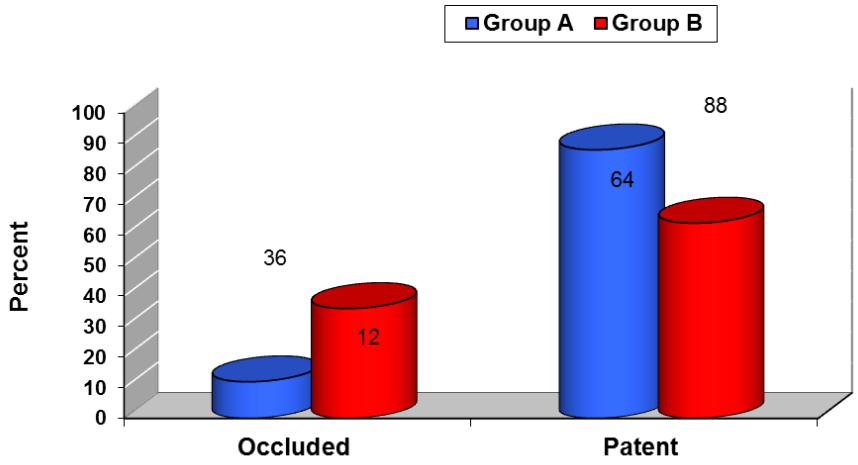

Fig. (1): MSCT postoperative after 5 years in the two studied groups.

Calcium channel blockers

According to the used of calcium channel blocker: all patients in group A were received CCB (Table 5)

Table (5): Calcium channel blockers in the two studied groups.

	Group A	Group B
Yes	25 (100.0%)	0 (0.0%)
No	0 (0.0%)	25 (100.0%)

Data are expressed as number (%).

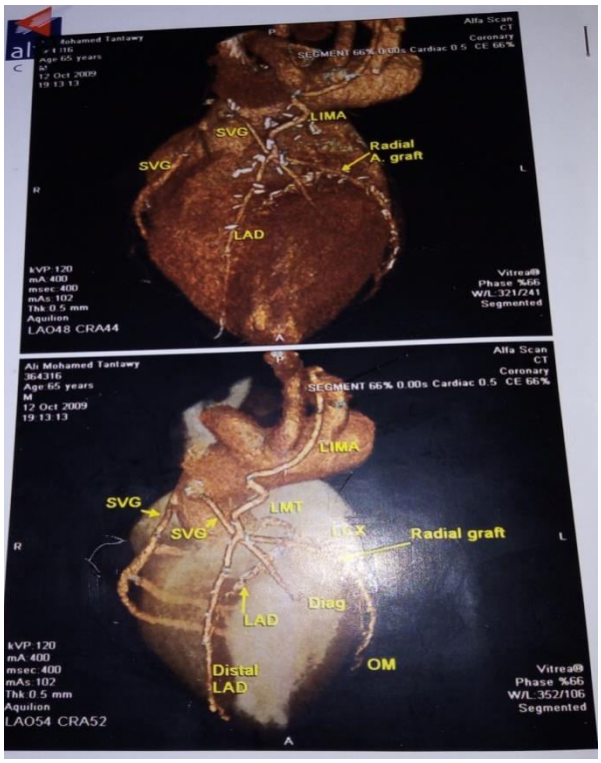

Fig. (2): patent radial graft to OM Y-graft to LIMA

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 05, 2021

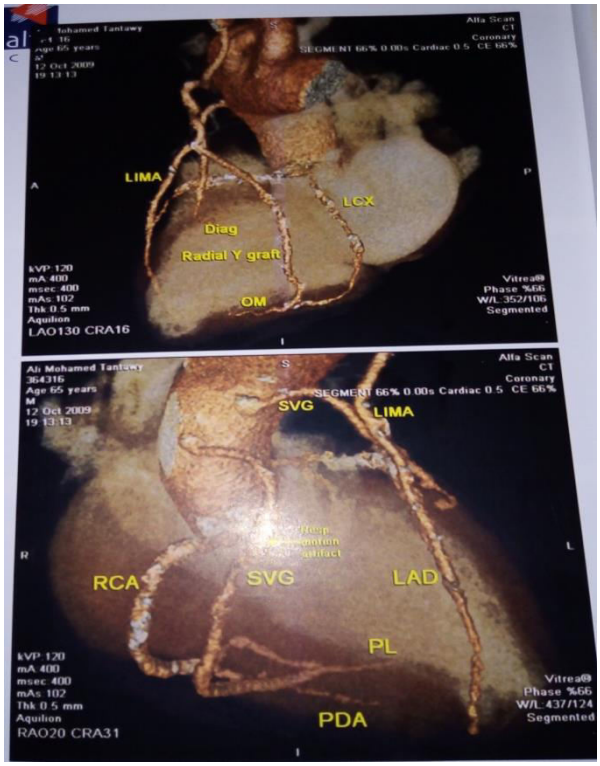

Fig. (3): patent radial graft to OM to LIMA Y-graft

Discussion

According to CABG conduits, the internal mammary artery has the long term patency rate and is associated with long term in survival rate. The issue with the saphenous vein is that the patency rate is lower than the left internal mammary artery.

In 2011, the radial artery shows long term patency. This is due to several factors, good handling of the conduit, the anastomosis, distal runoff and also the degree of lesion. **(Athanasiou et al., 2011).**

In our study in group A the mean age was 56.28 ± 6.49 years while in group B was 66.92 ± 5.84 years which showed an significant statistical difference as P value was 0.001.

In group A there was 20 patients (80.0%) of the patients was male and 5 patients (20.0%) was female but in the group B there was 22 patients (88.0%) of the patients was male and 3 patients (12.0%) was female.

Modine et al. used of radial artery in older patients. 261 patients aged 65–93 from 1998 to 2001. In addition to the saphenous vein and the radial artery.This study showed that the use of RA grafts in patients above 65 years and above is practical, and does not increase mortality or morbidity **(Modine et al., 2002)**.

Georghiou et al and colleagues determine the long-term patency of RA in comparison with the saphenous vein. They also stated that surgeons can use RA grafts as second arterial graft, especially in patients having a critical stenosis(**Georghiou et al., 2005)** this agree with our study.

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 05, 2021

Athanasiou et al. Determinethe Radial artery was associated with a long term patency compared with saphenous veins **(Athanasiou et al., 2011).**

Yie et al., (2008), compared the effect of the proximal anastomosis on patency at 32 months postoperatively. They found that (94.1%) of off-aorta grafts remained patent, compared with (87.2%) of off-LIMA grafts. Showed that the site of proximal anastomosis has no effect **(Yie et al., 2008)**

Calcium channel blockers:
In our study all group A were received calcium channel blocker intraoperative and continue 6 month postoperative.

The advantages of calcium blocker is high potency to inhibit the voltage-operated calcium channel which prevents concentration of vascular smooth muscle**(U Borchard et al., 1994).**

Conclusion:
In the long-term study, there was significant difference between total arterialrevascularization and conventional CABG.

Total arterial revascularization is safe, having low operative mortality and morbidity and can be used in a great number of patients requiring CABG.

The use of radial artery in combination with both internal mammary arteries permits total arterial revascularization in a great majority of patients with minimal mortality in long term.
Ischemic complication of the arm and hand are not to be excepted if careful preoperative and intraoperative evolution of sufficient retrograde circulation through the palmer arch is done, modified Allen's test is the most important test in assessment.

The choice of conduits utilized is according to the surgeon's experience and preference.
The patency of arterial conduit is excellent especially for the ITAs and is extremely promising for Radial artery.

References

Acar C, JebaraVA , Portoghese M, Beyssen b, Pagny YJ, Grare P, Chachques JC, Fabiano JN , Deloche A, Guermonprez JL and Carpentier AF: Revival of the radial artery for coronary artery bypass grafting. *Ann Thorac Surg* 1992;54:652-660

Acar C, Ramsheyi A, Pagny J, Jebara V, Deloche A, Carpentier A.The radial artery for cornary artery bypass grafting: Clinical and angiographic results at five years. . *J Thorac Cardiovasc Surg* 1998;116:981-989.

Athanasiou T, Saso S, Rao C, Vecht J, Grapsa J, Dunning J, et al. Radial artery versus saphenous vein conduits for coronary artery bypass surgery: forty years of competition–which conduit offers better patency? A systematic review and meta-analysis.Eur J CardiothoracSurg Jul 2011;40(1):208–20.

Borchard U. (1994) calcium antagonists pharmacologists. J cardiovascpharmacol 24:suppl 2:85-91

Borger MA, Cohen G, Buth KJ, et al. Multiple arterial grafts: radial versus right internal thoracic arteries. Circulation. 1998; *98*

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 05, 2021

Carpentier A, Guermonprez JL, Deloche A, Frechette C and Dubost C: The aorta to coronary radial artery bypass graft : A technique avoiding pathological changes in grafts. *Ann Thorac Surg* 1973;16:111-121

Curtis JJ, Stoney WS, Alford WC, Jr, et al. Intimal hyperplasia.A cause of radial artery aortocoronary bypass graft failure. Ann Thorac Surg 1975;20:628-35

Georghiou G.P., Vidne B.A., Dunning J. Does the radial artery provide better long-term patency than the saphenous vein? Interact Cardiovasc Thorac Surg. 2005 Aug;4(4):304–310.

Modine T., Al-Ruzzeh S., Mazrani W., Azeem F., Bustami M., Ilsley C. Use of radial artery graft reduces the morbidity of coronary artery bypass graft surgery in patients aged 65 years and older. Ann Thorac Surg. 2002 Oct;74(4):1144–1147.

Fisk R, Brooks C, Callaghan J, Dvorkin J. Experience with the radial artery graft for coronary artery bypass. Ann ThoracSurg 1976;21:513-8

Yie,K. C. Y. Na, S.S. Oh, J.-H. Kim, S.-H. Shinn, H.-J. SeoAngiographic results of the radial artery graft patency according to the degree of native coronary stenosisEur J CardiothoracSurg, 33 (2008), pp. 341-348