



EARLY OUTCOMES AND QUALITY OF LIFE AFTER RADIAL ARTERY USE IN CORONARY ARTERY BYPASS GRAFTING

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ABSTRACT

BACKGROUND: Radial artery is used in addition to internal mammary arteries and vein grafts in coronary artery bypass grafting. This study was conducted to see the early and midterm outcomes of radial artery (RA) grafting in terms of quality of life.

MATERIAL AND METHODS: A retrospective descriptive study was conducted at the department of cardiac surgery, Jinnah Post Graduate Medical Institute, Lahore from January 2012 to February 2016. All the patients who underwent elective coronary artery bypass grafting during period were included in the study. Perioperative variables were recorded and then the quality of life was assessed using EuroQol 5D questionnaire at follow up.

RESULTS: A total of 429 patients were operated on during the above mentioned period. Radial artery was used in 185 patients, out of which 157 (84%) were males and 28 (16%) were females. We performed off pump coronary artery bypass in 155 (84%) patients and on pump coronary artery bypass in 30 (16%) patients. Among selected patients, 84 (45%) were smokers, 81 (43%) were diabetics and 104 (56%) had hypertension. Renal failure occurred in 4 (2.1%) off pump patients while no on pump patient reported renal failure. Wound infection affected 5 (3.22%) off pump patients and 1 (3.3%) on pump patient. Thirty day mortality occurred in only one on pump patient (0.05%). At midterm, patients gave their feedback on EuroQol questionnaire. No patient was bed ridden. Eighty two percent were following a thirty minute walk plan with least distance of 1 km. Patients were highly aware about the concept of self-care as 99% were taking medicines regularly. Also 83% patients were free of any pain.

CONCLUSION: Radial artery gives acceptable immediate postoperative results and improves quality of life at midterm. Further studies regarding patency are needed to evaluate the graft in coronary artery bypass grafting.

KEY WORDS: Radial artery, coronary artery bypass grafting, outcomes.

INTRODUCTION

Coronary artery bypass grafting (CABG) is the recommended treatment modality for multi vessel disease, poor ejection fraction and left main stem coronary artery disease among many other indications. Vein graft failure has been the Achilles heel of (CABG)¹. This failure urged surgeons to switch to total arterial revascularization using internal mammary artery, radial artery or gastroepiploic artery. Arterial grafts possess durability and also offer protection by decreasing the progression of native CAD in grafted vessel. RA has proven enhanced long term survival. RA can withstand high arterial pressures and have no internal valves². RA and RITA have same perioperative or intermediate term cardiac morbidity and mortality

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rates³. The most common complications that occur after RA harvest are cutaneous paraesthesia and higher degree of atherosclerosis. Severe calcification or chronic dissection from prior cannulation can make RA unavailable for use⁴. Spasm of RA is more intense and difficult to return as compared to IMA.

Although TACR (Total Arterial Coronary Revascularization) is suitable procedure for three vessel disease but the major complaints are about sternal complications. These complications are mostly reported in patients with diabetes, obesity and pulmonary complications.

Total arterial revascularization is yet to gain popularity in Pakistan. We report the mid-term outcome of radial artery utilization in CABG in terms of morbidity and quality of life. This is the largest report of its kind reported in Pakistan so far to the best of our knowledge. This study will put light on the feasibility of radial artery harvesting in

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Pakistani population and pave way for total arterial revascularization in Pakistan in future.

MATERIALS AND METHODS:

A retrospective descriptive study was conducted at the Department of Cardiac Surgery, Jinnah Post Graduate Medical Institute, Lahore from January 2012 to February 2016. A total of 429 patients underwent CABG for two or three vessel disease. Average follow up duration was 23.1 months. Average number of radial grafts was 1.14 for each patient. Patient data was studied for in hospital outcomes and then quality of life at follow up. Health related quality of life was assessed by using Euro-Qol 5D questionnaire. Patients were investigated by conducting a detailed telephonic survey. The questionnaire measures overall health of patient by taking into account 5 dimensions namely mobility, self-care, usual activity, pain and anxiety. As there are three levels under each dimension, moderate, median or severe, we have taken average of each group to compile our results. A visual analogue scale marked 0 to 100 is also included in this questionnaire where zero represents worse health and 100 represents excellent health.

SURGICAL TECHNIQUE:

Pre-operative Allen’s test was performed before harvesting radial artery in every patient. Doppler test was performed when needed. Radial artery was used only when there was more than 90% stenosis on the right sided coronary targets and more than 70% on the left sided coronary targets. Harvesting was done by no touch technique. RA was harvested along with accompanying veins. Recurrent RA was spared and considered the proximal landmark. Wound was closed with an interrupted technique. Postoperative nitrates were given to all patients immediately after surgery and for 6 months after discharge.

RESULTS:

A total of 429 patients underwent CABG for double or triple vessel disease.. Among these, we used radial artery in 185 patients. Out of the cohort, 157 (84%) were male and 28(16%) were female patients We performed off pump coronary artery bypass in 155 (84%) patients and on pump coronary artery bypass in 30 (16%) patients. Average follow up duration was 23.1 months. Average number of radial grafts was 1.14 for each patient (table 1).

Among the patients included in the study, 84(45%) were smokers, 81(43%) were diabetics and 104 (56%) had hypertension. Renal failure occurred in 4 (2.1%) off pump patients while no

on pump patient reported renal failure. Wound infection affected 5 (3.22%) off pump patients and 1 (3.3%) on pump patient. Re-exploration for bleeding was needed in 4 (2.1%) off pump patients and no on pump patient required re operation. Prolonged ventilation was reported in 1 (0.6%) off

Table: 1 Demographic data of the patients

Total number of patient (n)	429
Radial artery as graft	185 (43%)
Male	157 (84%)
Female	28 (16%)
Average follow up months	23.1
Hypertension	104 (56%)
Diabetes	81 (43%)
Smoking	84 (45%)

Table: 2 Early outcomes in off-pump and on-pump patients

N= 185	Off pump 155 (84%)	On pump 30 (16%)
Renal failure	4 (2.1%)	0
Deep sternal wound infection	5 (3.22%)	1 (3.3%)
Reoperation (for excessive bleeding)	4 (2.1%)	0
Prolonged ventilation	1 (0.6%)	2 (6.6%)
Mortality		1 (3.3%)

Table 3: EuroQol 5D results

Parameter	Results	Percentages
Mobility	155	81%
Self-care	183	99%
Usual activity	54	82%
Pain	31	17%
Anxiety	33	21%

Fig. 1. Post-operative complications in off pump patients

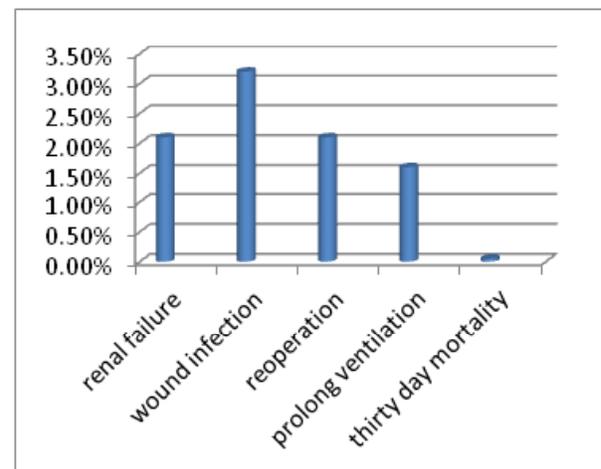
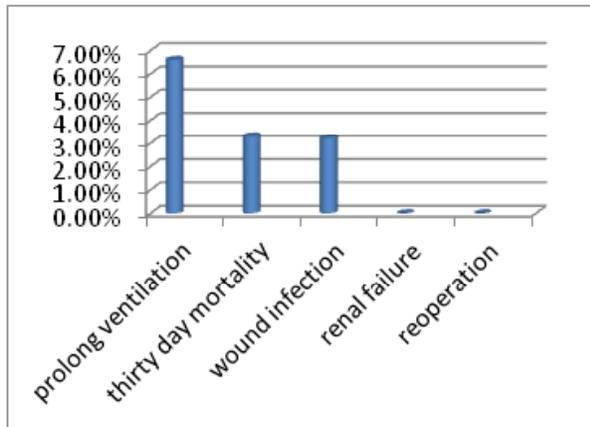


Fig. 2: Post op complications in on pump patients



pump patient and 2 (6.6%) on pump patients (Fig. 1 and 2). Thirty day mortality occurred in only one on pump patient (3.3%)(Table 2).

According to the EuroQol 5D questionnaire patients were asked about five parameters i.e. mobility, self-care, usual activity, pain and anxiety. No patient was bed ridden. Eighty two percent were following a thirty minute walk plan with least distance of 1 km. Patients were highly aware about the concept of self-care as 99% were taking medicines regularly. They were eating a healthy diet with low salt and low fat. They were good in personal hygiene. Among those questioned, 82% were still working after CABG surgery. Also 83% patients were free of any pain. While 31 patients reported different types of pain. We assessed their pain types. 10 patients were having pains that were not related to cardiovascular system. Whereas, 21 were having post CABG angina. 7 patients were suffering with severe angina so we advised them to visit us as early as possible. Most of the patients were happy and had no complaints of anxiety regarding their health. They have redeemed their psychological integrity. Only 18% had minor anxiety problems. (Table 3)

DISCUSSION:

Graft patency plays a pivotal role in long term success of CABG. Angiographic reports in various studies support the fact that RA has excellent short, midterm or long term patency. Possati and colleagues described the long term angiographic patency of RA grafts in 90 patients⁵. They found 88% patency which was less than LITA (96.3%) but better than SVG (53.4%).

The RAPCO study is two tiered trial in which they compared RA and free RITA or SVG biologi-

cally⁶. In another study from japan, Tanaka and colleagues concluded that arterial conduits have an intrinsic mechanism of control of blood flow. In their study they observed no hospital death and no perioperative myocardial infarctions. They concluded that a skeletonized radial artery gives outstanding results⁷.

Several studies have now reported excellent clinical results using a strategy using one or both internal mammary artery grafts and one or both radial artery grafts in an attempt to provide complete or near-complete arterial revascularization. Similarly major outcomes like death, reoperation, and re-intervention in the form of stenting were more frequent for patients undergoing single rather than bilateral ITA grafting. The results were true even when the population was adjusted for patient selection, sampling, and length of follow-up⁸.

The popularity of RA is increasing immensely. For complete arterial revascularization and preferred off pump surgery to avoid aortic manipulation, the use of RA in combination with LITA is becoming evident⁹. The use of aortic connectors may be extended to RA grafts. Gene therapy and innovative pharmacological agents will further decrease RA spasms hence making them most useful graft after LITA¹⁰.

It is clear from our study that radial artery use as additional graft to left internal mammary artery and venous grafts does not add morbidity in the perioperative period. Similarly the quality of life parameters at midterm were also satisfactory as shown by a valid scoring system. It can also be concluded from this report that RA harvesting is satisfactory in terms of patient satisfaction and scar discomfort. Moreover, it is easier to harvest and its absence in arm does not affect the blood circulation in arm as proven by various studies¹¹. RA grafting is very efficacious surgical coronary revascularization technique that has promising short and long term outcomes¹². Low rates of re-intervention are reported in various reports¹³. Patency of RA is comparable to LITA¹⁴. Our study suggests that RA grafts can be used effectively and successfully in maximum patients with outstanding short and long term results.

CONCLUSION:

Radial artery gives acceptable immediate postoperative results and improves quality of life at midterm. Further studies regarding patency are needed to evaluate the graft in coronary artery bypass grafting.



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