Conduit Choice for Composite Arterial Grafting in Off Pump Coronary Artery Bypass Graft - Free Internal Thoracic Artery or Radial Artery -

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Abbrebiations

OPCAB, off-pump coronary artery bypass graft; RA, Radial Artery; ITA, Internal Thoracic Artery; CT, computed tomography; HT, hypertension; HL, hyperlipidemia; DM, Diabetes Mellitus; HD, hemodialysis; MI, myocardial infarction; PCI, percutaneous coronary artery intervention; COPD, chronic obstructive pulmonary disease

Backgrounds

"Arterial" grafts would be advantage for small coronary target vessels.
Composite grafting is useful to achieve more "arterial" revascularization without aortic manipulations.

Objectives

In present study, we retrospectively examined graft flow and patency to delineate efficacy of composite grafting with the free ITA or RA.

Methods

We reviewed clinical records of 97 patients(155 anastomoses) who OPCAB with a composite graft between May 2007 and May 2021. Of these, 28 patients (group R;63 anastomoses) had a composite graft with RA to diagonal in 2 anastomoses(3.3%), circumflex in 41(67.2%), and right coronary artery (RCA) in 20(29.5%), while 69 patients (group I; 92 anastomoses) had a composite graft with free ITA to diagonal in 26 anastomoses(24.1%), circumflex in 59(67.8%), and RCA in 7(8.1%)(Table 2). Graft flow was measured at the proximal portion of the in-situ ITA by transit-time flowmetry (TTFM), intraoperatively. Postoperative catheter or computed tomography angiography was performed in 51 patients for clinical reasons.

Conduit choice of composite graft :

<Composite free ITA>

- Usually anastomosed with left coronary system.
- Adjusted the angle and length to avoid kinking if used as sequential fashion.
- Large branch (ex. Diagonal branch) with 90% stenosis of proximal portion of LAD.

<Composite RA>

- Achieve complete revascularization of arterial graft.
- Aorta no touch.

Table.1: Baseline Characteristic of Patient

	Group I (69)	Group R (28)	p value
Age	66.8±8.7	63.3±9.7	0.06
Male	51 (79.7%)	22 (84.6%)	0.81
DM	39 (60.9%)	15 (57.7%)	0.78
HT	54 (84.4%)	19 (73.1%)	0.21
HL	41(64.1%)	17 (65.4%)	0.91
History of MI	21 (32.8%)	8 (30.8%)	0.85
History of PCI	17 (26.6%)	5 (23.8%)	0.46
History of stroke	13 (20.3%)	7 (26.9%)	0.49
COPD	8 (12.5%)	9 (34.6%)	0.02
Calcified Ascending Aorta	19 (29.7%)	7 (26.9%)	0.79

Results

At the baseline, there was no significant difference between the two groups, but in COPD(Group R: 34.6% vs. Group I: 12.5%, p=0.02)(Table1). The number of distal anastomoses in Group R was significantly greater than that in Group I (4.5 vs 3.5, p<0.001), and the rate of sequential fashion in Group R was significantly higher than that in group I (80.8% vs. 29.7%, p<0.001). Otherwise, to avoid kinking or sequential fashion in group I was significantly more than that in group R(62.5% vs. 26.9%, p<0.01)(Table3).

In the results, the mean graft flow (MGF; ml/min) in the group R was significantly larger than that in the group I (79.5 vs 61.5, p=0.01). The rates of low graft flow (MGF < 20) in the group R were comparable (3.1% vs. 3.8%, p=0.86). In the postoperative angiography, the rates of completely patent composite graft were 96.2% in the group R and 100% in group I (p=0.90)(Table.4)

Conclusions

Composite grafting is less invasive and useful to achieve more arterial revascularization with minimal graft materials. Low graft flow can be avoided by appropriate target selection. To our experience, MGF was increased along with flow demand. RA may be the first choice for the target distant or two or more targets. A short segment of free ITA is useful, when the targets are close each other.

Table.2: Revascularized Native Coronary Vessels

	Group I (92)	Group R (63)	p value
Target territory			
Diagonal branch	26 (24.1%)	2 (3.3%)	<0.001
Left Circumflex	59 (67.8%)	41 (67.2%)	0.94
Right coronary artery	7 (8.0%)	20 (29.5%)	<0.001
Native coronary stenosis	Group I (69)	Group R (28)	
50-75%	8	3	0.82
76-90%	25	15	0.34
91-100%	36	10	0.39

Table.3: Operative Data in two groups

	Group I (69)	Group R (28)	p value
EF(%)	49.8±16.7	57.0±14.1	0.06
LV Mass(g)	362.8±119.8	323.2±121.0	0.16
Mean Graft Flow (ml/min)	61.5±35.7	79.5±27.0	0.01
Insufficient Flow (≦20ml/min)	2 (3.1%)	1 (3.8%)	0.86
Sequential Fashion	19 (29.7%)	21 (80.8%)	<0.001
Number of Distal Anastomosis	3.5±0.8	4.5±1.6	<0.001
Avoid kinking or sequential fashion	40 (62.5%)	7 (26.9%)	<0.01

Table.4: Early graft patency

	Group I	Group R	p value
Early graft patency (≦1 year) - Overall -	54/55 (98.2%)		-
Early graft patency	36/36 (100%)	18/19 (94.7%)	ns

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