Journal of the Egyptian Society of Cardio-Thoracic Surgery 25 (2017) 331–336

HOSTED BY

Contents lists available at ScienceDirect

Journal of the Egyptian Society of Cardio-Thoracic Surgery

journal homepage: http://www.journals.elsevier.com/journal-of-the-egyptian-society-of-cardio-thoracic-surgery/

Total arterial complete revascularization versus combined complete revascularization in patients undergoing coronary artery bypass grafting: Early outcomes

Ayman Sallam [a, b], Elatafy E. Elatafy [a], Mohab Sabry [a, *]

[a] Cardio-thoracic Surgery Department, Tanta University, Egypt
[b] Fellow of Pediatric Cardiac Surgery NH Health City, Bangalore, India

ARTICLE INFO

Article history:
Received 30 September 2017
Received in revised form 16 November 2017
Accepted 25 November 2017
Available online 28 November 2017

Keywords:
Coronary artery bypasses graft
Early outcome
Total arterial re-vascularization
Combined complete re-vascularization

ABSTRACT

Background: Total arterial revascularization is a target to achieve in patients with coronary artery disease (CAD) especially in younger patients. This study sought to assess early outcomes after total arterial complete re-vascularization versus combined complete re-vascularization in patients undergoing coronary artery bypass surgery (CABG).

Methods: In a period of 12 months, a number of 104 successive patients subjected to on-pump isolated CABG (no other concomitant procedures) were included in our study. Those patients were divided into two main groups based on grafting strategy: Total arterial grafts "G1" (all arterial grafts no saphenous veins) and Left internal mammary artery (LIMA) in addition to saphenous vein grafts (SVG) "G2".

Results: Complete arterial re-vascularization patients "G1"were younger, more often of male gender, better New York Heart Association (NYHA), less often operated upon urgently and more comorbid diseases without any significant difference. On the other hand, composite complete re-vascularization "G2" received more distal anastomosis than complete arterial re-vascularization patients "G1" without any significant difference.

Conclusions: Looking for the early results it may be difficult to get a significant difference between total arterial revascularization and composite arterial and venous grafting.

1. Introduction

The concept of complete revascularization is usually our concern in patients having stable coronary artery disease (CAD) whenever their coronary angiographies revealed diffuse lesions affecting the majority of vessels. Surgeons always favor complete over incomplete revascularization and always do more efforts to achieve it in coronary artery bypass graft (CABG) surgeries, in particular patients less than 60 years but not more than 60 years [1,2]. The other way round, arterial conduits have proved the benefits of arterial conduits on both short and long-term outcome [3,4], but others were fully satisfied by the saphenous vein grafts (SVG) as the conduits of choice for CABG in the elderly patients and they explain their opinion by the

* Corresponding author.
E-mail addresses: ayman_sal@hotmail.com (A. Sallam), mohab_sabry@hotmail.com (M. Sabry).
Peer review under responsibility of The Egyptian Society of Cardio-thoracic Surgery.

https://doi.org/10.1016/j.jescts.2017.11.008

lower life expectancy of those patients and to minimize massive surgical maneuvers with employing arterial conduits [5]. As shown in some studies, total arterial revascularization ameliorated the clinical outcome in patients subjected to CABG compared with the conventional technique by grafting LAD using internal mammary artery and grafting other diseased vessels using great saphenous vein [6,7].

2. Patients and methods

From Jan. 2014 to Jan. 2015, a number of 104 successive patients subjected to on-pump isolated CABG in Cardio-thoracic Surgery Department, Tanta University, Egypt were our study cohort. Those patients were divided into two main groups based on grafting strategy: Total arterial grafts "G1" (all arterial grafts no saphenous veins) and Left internal mammary plus saphenous vein grafts (SVG) "G2". All surgeries were performed by a group of 4 surgeons contributing to both composite and control groups. Patients with preoperative intra-aortic balloon (IABP), grossly obese patients (BMI>40), insulin dependent diabetics, ejection fraction $\leq$ 25%, patients who had an emergent status or underwent fewer than two distal bypasses, or those with severe COPD (defined as the percentage of FEV1from the predicted less than 49%) and off-pump coronary artery bypass surgery all were excluded from this study.

Indications for CABG surgery were based on a weekly group meeting and consensus, involving cardiologist and cardiac surgeons. According to the urgency of the patient condition, patients were designed on a waiting list. Standard cardiopulmonary bypass allowing body temperature to drift to roughly 32 °C.

Cardiopulmonary bypass allowing body temperature to drift to roughly 32 °C. Cold crystalloid (St. Thomas Solution) cardioplegic solution was delivered intermittently antegrade at 20 ml/kg via the aortic root unless otherwise indicated according to each single case. Due to lack of universal agreement, there is a dilemma between complete/incomplete anatomic and functional/physiological revascularization. Recently, some centers [8] determined a new definition of various types of revascularization as the following: (I) Targeting of all affected coronary segments >1.5 mm in diameter and $\geq$50% diameter stenosis, defined as perfect anatomic; (II) Incomplete anatomic but functionally adequate revascularization (ie, reasonable IR or functionally CR) [9], explained as treatment of all coronary segments with $\geq$50% diameter stenosis furnishing viable myocardium; and lastly (III) Incomplete functional revascularization consequentially, known as failure to treat all coronary segments that contribute viable myocardium and have a >50% diameter stenosis [8]. The liberty of conduits and/or fashion of composite grafts were established on surgeon predilection instead of constant norm such as graft region, target vessel stenosis grade, vessel caliber or flow. Minimal trauma technique of arterial conduits harvestation (skeletonized) and all exposed to a papaverine or nitroglycerine/verapamil (calcium channel blockers) solution prior to use. In the plurality of patients composite anastomosis were done after completion of all distal anastomoses and under cardioplegic arrest.

Our protocol to achieve this via right and left internal mammary arteries and radial artery grafting. We preferred to use the two IMA grafts on the two best coronary vessels according to size, and ischemic myocardium combined (usually LAD and Cx territories) and the redial artery to the distal RCA territory, and ease of reach of the RA, being significantly longer than the free RIMA. Composite complete revascularization was realized as any case where LIMA was utilized for single LAD bypass and the rest of bypasses were performed using great saphenous vein grafts. In such condition, great saphenous vein grafts were fashioned as either serial sequential anastomosis or solo bypass and proximally were anastomosed to the aorta. T- or Y-fashion, proximal aorto-coronary anastomosis. The radial artery was harvested keeping its satellite veins and the surrounding connective tissue to reduce wall damage and risk of future spasm. Before radial artery harvestation and to detect abnormal unlar artery collaterals, Allen's test [10] was performed routinely for all patients undergoing total arterial conduits (reperfusion of the ischemic hand in more than 10 s after unlar pulse releasing).

2.1. Data collection and analysis

Demographic data, pre-operative, intra-operative and post-operative variables especially post-operative adverse outcomes and in-hospital mortality were collected retrospectively for all the patients.

Data collection was approved by ethical committee of Tanta University – Egypt. Waiting patients at home prior to the procedure were defined as elective cases. Hospitalized patient who requires surgery was known as in house case; on the other hand cases demanding surgery within 24 h to prohibit further complication were addressed as urgent. Analysis was performed with software package (SAS, Cary, NC, Release 8.2). Discrete and continuous variables were analyzed with an unpaired *t*-test, Wilcoxon rank sum test, Fisher exact test and chi-square test. Clinically relevant variables were analyzed by multivariable logistic regression model in addition to analyze combined adverse outcomes. $P < 0.05$ was considered significant for all statistical calculations.

3. Results

A total of 104 consecutive patients underwent on-pump isolated coronary re-vascularization and who met our graft composition criteria were included in this study. Of these, 44 (42.3%) were complete arterial re-vascularization "G1" (no saphenous vein conduits) and the remaining 60 (57.7%) were identified as composite complete re-vascularization "G2" (arterial conduits + saphenous vein graft). The patients in the two groups were rated to all variables and characteristics as shown in Table 1.