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Outcome of Percoutaneous Coronary Intervention in Patients With Prior Coronary Artery Bypass Surgery

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Background: Advance progression in percutaneous coronary intervention (PCI) technique, particularly with new advanced drug eluted stents (DES) has made it an effective treatment for many cardiac diseases.

Objectives: Redo coronary artery bypass surgery (CABG) has higher risk of mortality rather than first operation. Although the positive impression of percoutaneous coronary intervention (PCI) in such symptomatic patents has not proven yet, but different studies have evaluated the outcome of the symptomatic post CABG patients after performing PCI. In this study we aim to find out if PCI could be helpful in such patients.

Patients and Methods: In this study, 111 symptomatic patients with pervious history of single coronary artery bypass graft (without concomitant vale surgery) underwent PCI by a single operator between March 2008 and March 2012. Then, they were followed during the following year after PCI and the incidence of death redo CABG, persistent cardiac symptom and rate of hospitalization were recorded

Results: The successful rate of PCI in this study was estimated to be 94.5% (104 of 111). In hospital MACE was 9.6% (three deaths and one myocardial infarction). 67% (73) of patients were male and 33% (33) were female. 79.6% (86) of PCI procedures were done on native coronary arteries and 20.4% (22) on SVG grafts. During one year follow up, we had 7 death in patients with PCI on native vessels (group A) and 1 death in the patients whose PCI was performed on SVG grafts (group B), ($P \geq 0.999$). In group A, 27.9% (24) patients were remained symptomatic; while in group B, 18.4% (4) patients were still symptomatic ($P = 0.353$). Hospitalization because of cardiac syndrome was recorded for 10.5% (9) patients in group A and 9.1% (2) patients of group B ($P > 0.955$). None of the patients of group B went under redo-CABG during the follow up but 2.3% (2) patients of group A did ($P > 0.289$). No case of stent restenosis or target vessel revascularization was recorded in either group. The overall rate of death was 7.6% (8 0f 104), persistent cardiac symptoms 27% (28 0f 104), hospitalization for cardiac symptoms 10.5% (11 f 14) and redo CABG 2% (2 of 104).

Conclusions: This study shows that PCI in symptomatic post CABG patients follows by high successful and low complication rate and positive impression on their cardiac symptoms and could reduce the need for redo CABG. It seems that there is no difference that PCI is performing on SVG or native vessel, the intervention itself improves the patients' quality of life.

Keywords: Percutaneous Coronary Intervention; Mace; Coronary Artery Bypass Surgery

1. Background

Advance progression in percutaneous coronary intervention (PCI) technique, particularly with new advanced drug eluted stents (DES) has made it an effective treatment for many cardiac diseases. The role of PCI as an alternative for coronary bypass surgery (CABG) in multivessel coronary disease is a matter of question. There are documents supporting this hypothesis (1, 2) and other that believe CABG is preferable (3, 4). However the effectiveness of DES in decreasing restenosis has been proven but because of their high cost they are not usually the first choice (5, 6).

The process of atherosclerosis does not stop after CABG and could lead to graft stenosis or worsening the atherosclerotic process in native vessels. The result is symptomatic post CABG patients which is usually difficult to manage. In such patients who do not answer to medical therapy, the best intervention is a matter of question. Redo CABG has higher risk of mortality rather than first operation and patients usually are not emotionally and physically compliant for that (7, 8), in such situations PCI could be a valuable alternative in these patients. Previous studies show that PCI in symptomatic post CABG patients accompanies with less procedural mortality and morbidity but more revascularization interventions (9-11). It seems that DES has more long-term effectiveness in post CABG patient and MACE is greater by using BMS particularly in hypertensive patients (12, 13).

2. Objectives

Razavi Hospital is one of the most equipped therapeutic centers in the region and provides the best therapeutic facilities for its patients. Today Razavi hospital is a referral center for cardiac intervention both CABG and PCI. The

aim of this study was to determine the successful rate, complications and long term mortality and morbidity of performing PCI for symptomatic patients with prior CABG and answering the question that which treatment is superior; PCI or Redo-CABG.

3. Patients and Methods

In this study, 111 consecutive symptomatic patients with history of prior single CABG (without concomitant vale surgery) underwent PCI by a single operator between March 2008 and March 2012. Our dedicated cardiac ward staff monitored each patient during the first 24 hour and registered every detail about the MANE and MACE occurrence according to our hospital database which is a domestic registry form influenced by ACC and AHA guidelines and confirmed and accepted by the cardiology board of our hospital. All patients were followed up one year after their procedure, by telephone interview or outpatient clinic visit for occurrence of major adverse cardiovascular events specified as cardiovascular death, Redo CABG, persistent cardiac symptom, hospitalization for ischemic symptoms and stent thrombosis or target vessel revascularization. Statistical analysis was conducted using SPSS version 11.5 and the results are expressed as mean ± SD. Chi-square test and fisher's exact test were used to access relation between quantities' variables. Also, in this analysis the P value of less than 0.5 was considered as significant.

4. Results

Of 111 symptomatic patients with history of prior CABG who underwent elective PCI in Razavi Hospital by single high volume operator between March 2008 and March 2012, 73 (77%) were male and 36 (33%) were female. The mean age of patients was 61.95 ± 10.69 years. The prevalence of Diabetes Mellitus was 52.53% (58 of 111), hypertension 57.7% (64 of 111), Dyslipidemia 24.3% (27 of 111) and smoking 48.6% (54 of 111).The mean age of female (63.68 ± 12.11) was higher than males' (61.11 ± 9.92) but was not meaningful.

In this study 79.6% (86) of PCI procedures were done on native coronary arteries and 20.4% (22) on SVG grafts. We used 89 DES and 43 BMS for stenting. The successful result of PCI in post CABG patients was estimated to be 94.5% (104 0f 111). In hospital MACE was 9.6% (three deaths and one myocardial infarction). The result of long term follow up showed that survival rate was 92.6% among these patients and 74.1% of them remained symptom free after one year. The hospitalization rate for ischemic reason was 10.2% among the symptomatic patients. No patient went under target vessel revascularization among the first year after procedure and just 2 patients (1.9%) went under Redo-CABG.

Considering the type of target vessels, native or SVG, we divided our cases in to two groups. Native vessels (group A) and SVG grafts (group B). The comparison of one-year follow up after performing PCI in group A and group B, has been indicated in Table 1. It seems that persistent cardiac symptoms' rate is more in patients who went under native vessels' revascularization.

Table 1. One Year Follow up in Post CABG Patients [a, b]

Type of Vessel, One Year Follow up	Native (n = 86)	SVG (n = 22)	P Value
Death	7 (8.1)	1 (4.5)	≥ 0.999
Persistent cardiac syndrome	24 (27.9)	4 (18.2)	0.353 [c]
Hospitalization	9 (10.5)	2 (9.1)	> 0.955
TVR	-	-	-
Redo CABG	2 (2.3)	-	> 0.289

[a] Abbreviations: CABG, coronary artery bypass surgery.
[b] Data are presented as No. (%).
[c] χ 863/0 = 2.

5. Discussion

During the last decade, rapid and advance progression in cardiac percutaneous interventions both technically and instrumentally, made it a serious rival for open surgery in many cardiac diseases. There are different articles discuss the benefits of CABG and PCI over each other. Despite of brilliant PCI results in multi vessels and left main vessel, there is still more interest in CABG over PCI in this field. But symptomatic patients with a history of prior CABG are challenging cases. On one hand, we have sever multi vessels disease and the benefits of CABG in such cases, and on the other, we face to high complication rate and low compliance for redo-CABG in this patients.

In this study we managed PCI in 111 symptomatic patients with prior history of CABG and followed them for one year. As well as most similar published articles in this study, most PCIs were performed in native artery lesions. In some studies SVG PCI were accompanied with higher in-hospital mortality rate (14), but as luckily in our study in-hospital mortality was very scarce, we did not reach to such result but in our study, cardiac symptoms remaining after native PCIs were higher than SVG PCIs. This study shows that PCI in symptomatic post CABG patients follows by high successful (94.5%) and low complication rate (9.6%) and positive impression on their cardiac symptoms, and could reduce the need for redo CABG. In a similar study done in Iran, successful rate and MACE were estimated to be 93% and 5.6% 13.

Despite of high successful rate of PCI in symptomatic patients with prior history of CABG and its low mortality and morbidity rate comparing to Redo-CABG which have been proven in different studies, it seems that there is not much difference that PCI is performing on SVG or Native vessel ,the intervention itself improves the patients' quality of life.

Authors' Contributions

The main Idea belongs to Dr Mahmood Dargahi and he performed all the PCI procedures. Dr Tayebi did manage the team and wrote the paper, Mr Jamshid Jamali analyzed the data and others contibuted to collecting data.

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All the financial rights of this manuscript belong to Dr Mahmood Dargahi.

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