

Short-Term Results of PCI on Native Coronary Arteries in Patients with Prior CABG

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Abstract

Objective- To investigate the short-term results of percutaneous coronary intervention (PCI) on native coronary vessels in patients with prior coronary artery bypass grafting (CABG).

Methods- Coronary angiography was performed for 82 patients with prior CABG who presented with typical chest pain during the interval from March 2007 to May 2008. PCI and stenting was performed on the eligible native vessels. The resolution of symptoms and the frequency of hospitalization were evaluated during the 6-month follow-up period.

Results- The technical success rate for PCI was 94%; the reduction in hospitalization rate and typical chest pain occurrence and improvement in functional class after PCI were statistically meaningful. There was no statistically significant relation between age, sex, triglyceride level, cholesterol level, diabetes, smoking, and ejection fraction with the above parameters.

Conclusion- PCI on native vessels is a well tolerated procedure with a minor morbidity and mortality rate and good symptomatic and anatomical outcome for patients with prior CABG (*Iranian Heart Journal 2008; 9 (3):6 -9*).

Key words: coronary artery bypass grafting ■ percutaneous coronary intervention ■ coronary artery disease

Our recommendation in patients who experience a recurrence of ischemia after coronary artery bypass grafting (CABG) despite optimal medical therapy is repeating revascularization, either percutaneous coronary intervention (PCI) or CABG.

PCI offers a less invasive alternative for revascularization in symptomatic bypass patients, including many who are not candidates for redo surgery because of contraindications (pulmonary and renal failure, old age, or malignancy). Other patients who undergo PCI with acceptable risks are patients with patent arterial grafts that would be jeopardized by reoperation, patients with relatively small amounts of ischemic myocardium, and patients with no arterial or venous conduits available for graft.¹ The status of the left anterior descending artery and its graft significantly influence the selection process.

The patent left internal mammary artery to left anterior descending graft favors the selection of PCI in the right coronary artery or left circumflex artery. Therefore, the selection of lesions for PCI must be based on a careful analysis of their probabilities of initial success, complications, and long-term safety and efficacy compared with competitive surgical strategies and medical therapies.

In our investigation, the outcome of PCI on native coronary arteries in patients with prior CABG was evaluated. Improvements in symptoms, hospitalization rate, and functional class were assessed during the 6-month follow-up. Technical success, rate of myocardial infarction, and rate of enzymatic rise after PCI were also evaluated. The rate of improvement in patient status and the correlation with factors such as age, sex, smoking, diabetes, and ejection fraction were assessed.

Received Jul. 23, 2007; Accepted for publication May 2, 2008.

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Methods

Coronary angiography and PCI on native vessels were performed for patients with prior CABG who presented with typical chest pain and functional class II or more despite maximal medical treatment. Patients were recruited between March 2007 and May 2008. Immediately after PCI, the following variables were checked:

1. Enzymatic rise,
2. Myocardial infarction, and
3. Residual restenosis in the vessel.

During the 6-month follow-up, the following variables were checked:

1. Frequency of typical chest pain/week,
2. Frequency of hospitalization, and
3. Functional class.

Statistical analysis was done using SPSS 15 software.

Results

In total, 82 patients (52 male and 30 female) were analyzed. The mean age was 58.94 years (± 9.36 , SD) with a range of 26-78 years. With respect to the other variables, 39 (47.6%) patients were hypertensive, 11 (13.4%) were smokers, and 23 (28%) were diabetic. Types of involved vessels are shown in Table 1.

Table I. Frequency of diseased vessels before CABG and during our study

Vessel	Significant stenosis Before CABG (%)	Significant stenosis Before PCI (%)
LAD	98.8	100
RCA	67.1	89
OM	61	86.6
Diagonal	29.3	50

LAD, left anterior descending artery; RCA, right coronary artery; OM, obtuse marginal

Enzymatic rise and myocardial infarction were seen in 7 (8.5%) and 2 (2.4%) patients, respectively.

No meaningful correlation was found between enzymatic rise or myocardial infarction with age, sex, LDL level, HDL level, diabetes, and smoking.

The rate of hospitalization was lower in the patients with no enzymatic rise ($P=0.0.16$). Functional class before and after PCI is depicted in Table II.

Table II. Functional class before and after PCI in patients

Functiona l class		Before PCI	After PCI
I	No.	2	62
	Percent	2.4	75.6
II	No.	44	15
	Percent	53.7	18.3
III	No.	34	5
	Percent	41.5	6.1
IV	No.	2	0
	Percent	2.4	0

Functional class before and after PCI was analyzed using the Wilcoxon signed ranks test and was improved significantly after PCI. The frequency of typical chest pain episodes before and after PCI is shown in Table III.

Table III. Comparison of episodes of typical chest pain during a week before and after PCI

TCP/ week	Freq.	Before PCI	After PCI
0	No.	1	50
	Percent	1.2	61
1	No.	12	21
	Percent	14.6	25.6
2	No.	42	10
	Percent	51.2	12.2
3	No.	21	1
	Percent	25.6	1.2
4	No.	6	0
	Percent	7.3	0

TCP, typical chest pain

Rate of typical chest pain per week, before and after PCI, was analyzed via the Wilcoxon signed ranks test. The mean was 2.33 before PCI and 0.54 after PCI ($P = 0.0001$).

The number of involved vessels had a correlation with improvement in typical chest

pain. In the patients with a lower number of diseased vessels, improvement in typical chest pain was greater. The rates of hospitalization before and after PCI are shown in Table IV.

Table IV. Comparison of hospitalization rates during a week before and after PCI

After PCI	Before PCI	Frequency	Rate of hospitalization
71	11	number	0
86.6	13.4	percent	
8	35	number	1
9.8	42.7	percent	
3	34	number	2
3.7	41.5	percent	
.	1	number	3
.	1.2	percent	
.	1	number	4
.	1.2	percent	

Table V depicts the rate of hospitalization, rate of occurrence of typical chest pain, and functional class.

Table V. Typical chest pain episodes, hospitalizations and functional class before and after PCI

Percent	Number		
0	0	Tcp 0 < tcp 1	Tcp0-Tcp1
14	12	Tcp 0 = tcp 1	
86	70	Tcp 0 > tcp 1	
0	0	Hosp 0 < Hosp 1	Hosp0-Hosp1
20	17	Hosp 0 = Hosp 1	
80	65	Hosp 0 > Hosp 1	
0	0	FC 0 < FC1	FC0-FC1
18	15	FC 0 = FC1	
82	67	FC 0 > FC1	

TCP, typical chest pain

Discussion

Technical success of PCI in this study was 94% and is comparable with results in the literature.^{3,4} This shows that PCI is a good option for patients with prior CABG who return because of recurrent typical chest pain. The rate of Q-wave myocardial infarction in this study was 2.4%, which was comparable

with the results in the literature.^{5,6} No case of emergency CABG was needed in our study. Non-Q wave myocardial infarction and enzymatic rise was seen in 8% of the patients, and hospitalization after PCI was higher in these patients.

Typical chest pain, rate of hospitalization, and functional class during the 6-month follow-up were improved by PCI significantly (P <0.05). No correlation was found between age, sex, diabetes, HDL, LDL, TG, or smoking and this improvement. A small sample size may be the reason.

Conclusion

In light of our findings, we conclude that PCI on native vessels in patients with prior CABG is a procedure with high technical success, low incidence of complications, and good clinical outcome.

The type of stents was not evaluated in this study; new PCI techniques and use of drug-eluting stents may improve the rate of success.

The follow-up period in this study was 6 months. Longer follow-up periods in these patients may yield more conclusive results.

Conflict of Interest

No conflicts of interest have been claimed by the authors.

References

- Braunwald E, Zipes D: Braunwald’s Heart Disease: A Textbook of Cardiovascular Medicine. 7th ed. Philadelphia, Elsevier-Saunders, 2005, p. 1325.
- Thach N, Loan P, Tan H. Approach to the patient with prior bypass surgery. J Interven Cardiol 2004; 17: 339-346.
- Avital S, Wacksman R, Rozenman Y, Mosseri M, Lotan C, Hasin Y, Gotsman MS. Angioplasty for vein grafts and native coronary arteries after previous coronary artery bypass grafting. Harefuah. 1995 Aug; 129 (3-4): 96-9, 159.

4. Okada H, Tsurumi Y, Kasanuki H. Initial results and long-term outcome of percutaneous coronary intervention in patients with previous coronary artery bypass grafting. *J Cardiol* 2001 Sep; 38(3): 111-21.
5. Bartlett JC, Tuzcu EM, Simpfendorfer C. Percutaneous transluminal coronary angioplasty of native coronary arteries via saphenous vein grafts. *J Invasive Cardiol* 1991 Mar-Apr; 3(2): 62-5.
6. Webb JG, Myler PK, Shaw RE. Coronary angioplasty after coronary bypass surgery: initial results and late outcome in 422 patients. *J Am Coll Cardiol* 1990 Oct 16 (4): 812-20.

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