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IMPACT OF SMOKING STATUS ON SHORT TERM CLINICAL OUTCOMES OF DRUG ELUTING STENTS IN PATIENTS WITH STABLE CORONARY ARTERY DISEASE

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ABSTRACT

Objectives: To evaluate the impact of smoking status on short-term clinical outcomes of Drug Eluting Stents (DES) in patients with stable coronary artery disease.

Methodology: This cross sectional study was carried out at the Department of Cardiology, Lady Reading Hospital Peshawar from April 2011 to July 2012. It included all patients with stable coronary disease undergoing DES implantation. Smoking status was assessed on the basis of information obtained from hospital medical records at the time of first medical examination and rechecked by telephone interview. All patients were classified as non-smokers and smokers. Clinical outcomes (Myocardial infarction [MI], unstable angina [UA], and positive ETT) at three months stratified by smoking status were measured in patients who received DES for coronary artery lesions. All patients were followed and reassessed after 3 months from the index procedure. Exercise Tolerance Test (ETT) was performed on every patient and recorded on proforma. Data analysis was done using SPSS version 16.

Results: A total of 376 patients were enrolled in this study. The mean age was 57 ± 9.313 years. Males were 271(72.1%). Among 376 patients who were followed up, 70 of them were smokers (18.6%) at the index procedure, 306 patients (81.4%) were non-smokers. The frequency of dyslipidemia and diabetes mellitus was higher in smokers as compared to non-smokers. Mean stent length in smokers was 27.824 ± 6.23mm as compared to 26.592 ± 4.73mm in non-smokers. Mean stent diameter was 2.91 ± 0.347mm in smoker group while it was 3.01 ± 0.141mm in non-smoker group. Most of the patients in both groups underwent DES implantation to LAD and LCx arteries. There were significantly higher rates of myocardial infarction (7.1% vs 2%, $p < 0.036$),unstable angina (22.9% vs 3.3%, $p < 0.001$) and positive ETT (30% vs 5.2%, $p < 0.001$) in the smoker group as compared to non-smoker group.

Conclusion: This study provides evidence that smokers treated with DES experience higher rates of myocardial infarction, unstable angina and positive ETT at three months as compared to non-smokers, particularly in the setting of stable coronary artery disease.

Key Words: Smokers, Coronary artery disease, Drug eluting stent

INTRODUCTION

Coronary artery disease (CAD) has been the second leading cause of death in the world. This disease not only increases the mortality but also affects the health-related quality of life (HRQOL) severely, exerting negative effects on the energy and vitality levels, social interactions and psychological aspects. The last five decades have seen impressive improvements in the diagnosis, evaluation, and therapeutic strategies in patients with symptomatic cardiovascular disease. Percutaneous coronary interventions (PCI) had been shown to effectively reduce mortality and morbidity in patients with CAD.[1] The continued evolution of PCI techniques, especially the introduction of using drug-eluting stents (DES), has reduced the incidence of coronary restenosis and the need for target vessel revascularization.[2,3]

One of the most significant modifiable cardiovascular determinants which is linked with poorer outcomes after PCI is cigarette smoking. There can be no doubt that, with the sole exception of advanced age, smoking is today the most significant cause of cardiovascular disease and the most common cause of death worldwide and it is preventable. The relation between smoking and cardiovascular disease has been proved in a multitude of studies, such as the British Doctors Study and the Framingham Study.[5] Smoking contributes to a greater degree to acute thrombotic events than to atherogenesis.[4]

Some investigations about the effect of smoking on clinical outcomes after PCI have been performed during the pre-drug-eluting stent (DES) era.[6-9] Importantly, more and more DES have been deployed in the real world.[10-13] However, to date, the impact of smoking status in Pakistani patients undergoing successful PCI with DES deployment remains unclear. Thus, it becomes necessary to investigate the major effects of smoking status in Pakistani patients undergoing successful PCI with DES.

Therefore, the aim of the present study was to investigate the association between smoking status at follow-up & the short-term clinical outcomes in our local patients.

METHODOLOGY

This cross sectional study included all patients with stable coronary disease undergoing DES implantation and fulfilling inclusion criteria. The study was carried out at the Department of Cardiology, Lady Reading Hospital Peshawar from April 2011 and July 2012.The total study duration was 15 months. All patients of stable angina pectoris of any age and sex who were treated with Drug Eluting Stents (DES) irrespective of the lesion length were included in the study. Patients with previous history of revas-cularization whether percutaneous coronary intervention or coronary artery bypass graft and primary percutaneous coronary intervention were excluded from the study. Patients with left main stem disease or triple vessel disease on coronary angiography were also excluded from the study.

Smoking status was assessed on the basis of information obtained from hospital medical records at the time of first medical examination and rechecked by telephone interview. All patients were classified as non-smokers and smokers. Nonsmokers, defined as patients who had never smoked before or after the index procedure while smokers were defined as patients who smoked during the year preceding their procedure and at any time during the follow-up period. Clinical outcomes (Myocardial infarction [MI], unstable angina [UI], and positive ETT) at three months stratified by smoking status were measured in patients who received DES for coronary artery lesions. All patients were followed and reassessed after 3 months from the index procedure. Exercise Tolerance Test (ETT) was performed on every patient and recorded on proforma. Data analysis was done using SPSS version 16.

RESULTS

A total of 376 patients were enrolled in this study. The mean age was 57 ± 9.3 years. Males were 271(72.1%). Among 376 patients who were followed up, 70 of them were smokers (18.6%) at the index procedure, 306 patients (81.4%) were non-smokers. Most of the patients in the smoker groups were male about 94%. There were more patients with dyslipidemia and diabetes mellitus in the smoker group as compared to non-smoker group. Mean stent length in smokers was 27.824 ± 6.23mm as compared to 26.592 ± 4.73mm in non-smokers. Mean stent diameter was 2.91 ± 0.347mm in smoker group while it was 3.01 ± 0.141mm in non-smoker group. Most of the patients in both groups underwent DES implantation to LAD and LCX arteries. Baseline characteristics of the study population stratified by smoking status are presented in Table 1.

Our report described 3-months data of clinical outcomes of the DES in smoker and non-smoker patients. The three months clinical outcomes included MI, U.A and positive ETT. No patient was lost to follow-up. At three months follow up there was a higher rate of myocardial infarction (7.1% vs 2%) in the smoker group as compared to non-smoker group with a statistically significant p <0.036. During follow up about 22.9% (n=16) patients developed unstable angina in the smoker group as compared to 5.2% (n=10) in non-smoker group with a p<0.001 which was statistically significant. Similarly, 30% (n=21) patients were having positive ETT in the smoker group vs 5.2%(n=16) in the non-smoker group with a p<0.001 (Table 2).

Table 1: Demographic Variables and Angiographic Characteristics of the Study Population (n=376)

	SMOKERS n =70 (%)n	NON-SMOKERS n=306 (%)n
Age	55±7.221	59±9.131
Male	94.3% (66)	67%(205)
Target vessel		
LAD	34.3%(24)	49.7%(152)
LCX	20%(14)	29.7%(91)
RCA	10%% (07)	5.6%(17)
LAD and LCX	24.3% (17)	6.5%(20)
LCX and RCA	8.6% (06)	5.6%(17)
LAD and RCA	2.9% (02)	2.9%(09)
Mean Stent Length	27.824±6.23mm	26.592±4.73mm
Mean Stent Diameter	3.01±0.141mm	2.91±0.347mm
Hyperlipidemic Patients	55.7%(39)	41.2%(126)
Hypertensive Patients	69.60%(213)	68.51%(48)
Diabetes Mellitus	36.60%(112)	45.71%(32)

Table 2: Comparison of Clinical Outcomes in Study Groups Groups (n=376)

	SMOKERS %(n)	NON-SMOKERS %(n)	p-value
MI	7.1% (5)	2% (6)	0.036
U.A	22.9% (16)	3.3% (10)	<0.001
Positive ETT	30% (21)	5.2% (16)	<0.001

DISCUSSION

Smokers have 3 times the risk of suffering a non-fatal acute myocardial infarction and are at increased risk of sudden cardiac death.[14] Smoking leads to the development of a state of hypercoagulability, endothelial dysfunction with a reduction in NO release and creation of a chronic inflammatory state (increase in white cells and C-reactive protein values).[15] In patients with already manifested cardiovascular disease (previous infarction, stroke, coronary intervention)smoking cessation reduces the risk of death and other endpoints by 35-40%; thus, it is equivalent to the administration of full medical therapy including aspirin, statins, beta-blockers, and angiotensin converting enzyme inhibitors.[16]

Our report describes 3-months data of clinical outcomes of the Drug Eluting Stents stratified by smoking status in patients with stable coronary artery disease. There were significantly higher rates of myocardial infarction (7.1% vs 2%, p<0.036), unstable angina (22.9% vs 3.3%, p<0.001) and positive ETT (30% vs 5.2%, p<0.001) in the smoker group as compared to non-smoker group. These results are mainly due to deleterious effect of smoking on coronary arteries. We also noticed that there were more patients with diabetes mellitus, hypertension and dyslipidemia in the smoker group. All these risk factors might also be responsible for worst outcomes in smoker group. In one of the recent studies there were significantly higher rates of all-cause mortality and MACE in persistent smokers treated with DES.[17]

The benefits of smoking cessation in patients with cardiovascular disease, including those undergoing PCI have been clearly established. The risks of adverse cardiac events would diminish in patients with CAD with smoking cessation and these benefits continued to increase over time after quitting.[18] Critchley et al. reviewed 20 studies with 12,603 smoking patients with ischemic heart disease in a meta-analysis and documented that cessation of smoking after acute myocardial infarction or cardiac surgery could significantly reducemortality.[19] Therefore smokers should be encouraged to quit smoking.

CONCLUSION

This study provides evidence that smokers treated with DES experience higher rates of myocardial infarction, unstable angina and positive ETT at three months as compared to non-smokers, particularly in the setting of stable coronary artery disease. Efforts should be made to stop smoking at the time of PCI in order to improve the health outcomes.

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