

## THREE MONTHS CLINICAL OUTCOMES OF DRUG ELUTING STENTS IN PATIENTS WITH STABLE ANGINA PECTORIS

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### **Contribution**

YA, LN did literature review and research design. AN, MHD finalized the manuscript. HA, MH helped in data collection, analysis in the final draft. All authors contributed significantly to the submitted manuscript.

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## ABSTRACT

**Objectives:** The objective of this study was to determine the frequency of three months clinical outcomes of Drug Eluting Stents in patients with stable angina pectoris.

**Methodology:** This was a cross sectional descriptive study. Patients who were admitted to Cardiology unit Lady Reading Hospital through OPD or casualty department were included in the study. Our study included all the patients with stable coronary artery disease who had received Drug eluting stents from April 01<sup>st</sup> 2011 to July 31<sup>st</sup> 2012. The total study duration was 15 months. The primary end points were, rate of Myocardial infarction (MI), unstable angina(UA) and positive ETT at three months. All patients who underwent Percutaneous coronary intervention with Drug eluting stent for stable angina pectoris 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 included in this study. The mean age was  $57 \pm 9.313$  years. Males were 271 (72.1%). Majority of the patients got stented to Left anterior descending and left circumflex arteries. Mean length of drug eluting stent was  $27.313 \pm 7.235$  mm while mean diameter of stent was  $2.90 \pm 0.2483$  mm. About 11 (2.9%) patients suffered from MI. About 26 (6.9%) patients had unstable angina and 37 (9.8%) patients had positive ETT at three months followup post PCI.

**Conclusion:** Short-term results from this study suggest that real-world outcomes among 376 patients are comparable to those reported across other registries and trials, and safety outcomes as measured by rates of MI, UA and positive ETT were low. The long-term safety of drug-eluting stents needs to be ascertained in larger randomized trials

**Key Words:** Coronary Artery Disease, Drug Eluting Stents, Stable Angina, Percutaneous Coronary Intervention

## INTRODUCTION

Coronary heart disease is an international health problem in both men and women and is the leading cause of death in the developed countries. The prevalence is equally high in South Asia including Pakistan.<sup>1</sup> This is about 11.2% in our local population and is more prevalent in females (13.3%) than males (7.9%).<sup>2</sup>

The prevalence of stable angina increases sharply with advancing age in both sexes.<sup>3</sup> The recommended initial management of stable angina is life style modification, reduction in the risk factors and intensive medical therapy but percutaneous coronary intervention (PCI) is still used as the first line management strategy in some developed countries.<sup>4</sup>

The use of percutaneous coronary intervention (PCI) compared with medical treatment for stable angina improves symptoms and short term exercise capacity without any reduction in mortality.<sup>5-8</sup> The use of drug eluting stents shows a consistently better treatment effect compared to bare metal stents, reducing the risk of restenosis and major adverse cardiac events including target vessel revascularization. Studies show 12 months clinical outcomes for Drug Eluting Stents (DES) as unstable angina (11%), myocardial infarction (4%) and death (0.8%).<sup>5</sup> Drug Eluting Stents have been reported to have lower restenosis rate. Studies show that ETT results were positive in about 23.5% of the patients at 6 weeks after PCI.<sup>9</sup>

The aim of this study is to know the frequency of three months clinical outcomes of Drug Eluting Stents in patients with stable angina pectoris. Since there is no local data regarding the use of Drug Eluting Stents in stable angina pectoris with three months follow up, this study will guide the interventional cardiologists to choose the right type and measure of Drug Eluting Stents at particular sites in selected groups of patients with stable angina pectoris. It will also guide the interventional cardiologist to look for modification in DES techniques or alternatives if the results show worse clinical outcomes.

## METHODOLOGY

This was a cross sectional descriptive study based on our real-time clinical practice. Patients who were admitted to Cardiology unit of Lady Reading Hospital through OPD or casualty department, meeting the inclusion criteria, were included in the study. Our study included all the patients with stable coronary artery disease who had received Drug Eluting stents from April 01<sup>st</sup> 2011 to 31<sup>st</sup> 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 irrespective of the lesion length were included in the study. Patients with previous history of revascularization 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.

The primary end point was the rate of major adverse cardiac events (MACE) at three months, which included the rate of myocardial infarction, unstable angina and positive ETT at three months. Use of Drug Eluting Stents via radial or femoral routes in all patients from both genders of any age, stent size, stent diameter and stented coronary vessels was documented on a specified proforma.

All patients who underwent PCI (DES stent) for stable angina pectoris were recalled and reassessed after three months from the index procedure. History will be taken regarding unstable angina, myocardial infarction and hospitalization for any of these events over the last three months. ETT was performed on every patient and was recorded on proforma. Previous medical record in the form of Discharge slips, old ECGs and troponin I level (Architect I 2000 SR machine) was checked and recorded on the proforma. Study exclusion criteria were followed to control confounders and bias in the study results. Data analysis was done using SPSS version 16.

## RESULTS

Total of 376 patients were included in this study. Patients were followed for 3 months. Mean age was  $57 \pm 9.313$  years. Male were 271 (72.1%). Majority of the patients got stented to LAD and LCX. Mean length of drug eluting stent was  $27.313 \pm 7.235$ mm while mean diameter of stent was  $2.90 \pm 0.2483$ mm (Table 1).

Primary end points included myocardial infarction, unstable

**Table 1: Patients Demographic Data and Angiographic Characteristics (n = 376)**

Variables	Percentage % (n)
Age (mean $\pm$ SD)	$57 \pm 9.313$ years
Male	72.1% (271)
Target vessel	46.8% (176)
LAD	27.9% (105)
LCX	6.4% (24)
RCA	9.8% (37)
LAD and LCX	6.1% (23)
LCX and RCA	2.9% (11)
LAD and RCA	
Mean Length of stent	$27.314 \pm 7.234$ mm
Mean Diameter of stent	$2.903 \pm 0.248$ mm

**Table 2: Clinical Outcomes Among Male and Female Patients at Followup (n = 376)**

Outcomes	Male (n=271)	Female (n=105)	Odds Ratio (95% confidence interval)	P-value
Myocardial Infarction	2.6% (7)	3.8% (4)	0.67 (0.19-2.33)	0.509
Unstable Angina	6.3% (17)	8.6% (9)	0.71 (0.30-1.65)	0.497
Positive ETT	9.6% (26)	10.5% (11)	0.90 (0.43-1.91)	0.847

angina and positive ETT at three months. Out of 376 patients 11 (2.9%) patients suffered from MI during three months follow up. About 26 (6.9%) patients had unstable angina and 37 (9.8%) patients had positive EET at three months after PCI. (Fig.1)

Three months clinical outcomes were stratified among male and female patients. The 3 months event rate for the individual outcome of MI showed no statistical difference between male 2.6% and female 3.8% with  $p = 0.509$  (Table 2). The 3-months event rate of unstable angina was slightly lower in the male group 6.3% versus female group 8.6% with  $p=0.497$  which is statistically not significant (Table 2). Whereas event rate for individual outcome of positive ETT also showed no statistical difference between male 9.6% and female 10.5% with  $p=0.847$  (Table 2).

We divided the patients into two categories according to age of the patients. One category consisted of patients having age less than 60 years and the 2<sup>nd</sup> category consisted of patients having age 60-85 years. The rate of myocardial infarction was slightly higher in older age group 3.9% as compared to that of younger age group 1.4%, but it was statistically not significant. Similarly more patients suffered unstable angina in older age group 7.9% as compared to

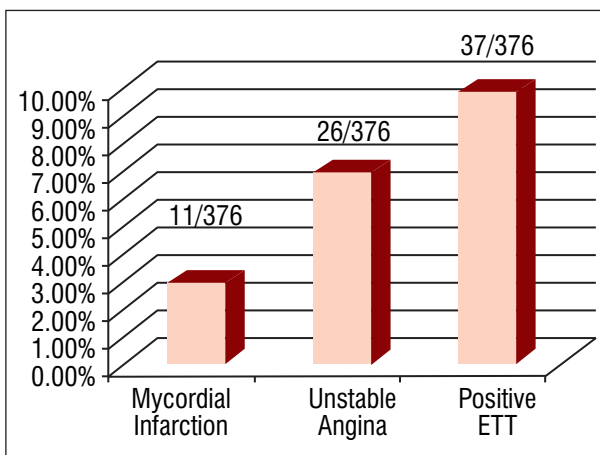
patients in younger age group 5.4%, but it was also statistically not significant. About 12.2% patients in older age group had positive ETT at three months as compared to 6.1% in younger age group, which was statistically not significant as well (Table 3).

## DISCUSSION

Our report describes 3-months data of clinical outcomes of the Drug Eluting Stents. These results, obtained from 376 patients, provide compelling evidence for the safe and effective use of the DES in routine clinical practice. The results are similar to those reported in randomized clinical trials in the past.<sup>5,9</sup> All reported events were adjudicated.

The three months clinical outcomes included MI, U.A and positive ETT. In our study rate of MI was 2.9%, rate of U.A was 6.9% and that of positive ETT was 9.8%. The rates were slightly lower in our study as compared to previous randomized trials.<sup>5,9</sup> However, it is worth noting that in our study we excluded patients with TVD and those with complex lesions which might be the reason for slightly better outcomes.

In our study 11(2.9%) patients developed myocardial infarction which was lower than observed in previous study. In one large randomized trial the rate of MI was 4% at one

**Figure 1: Three Months Clinical Outcomes of DES (n=376)****Table 3: Clinical Outcomes Among Younger and Older Patients at followup (n=376)**

Outcomes	35-59 years (n=147)	60-85 years (n=229)	Odds Ratio (95% confidence interval)	P-value
Myocardial Infarction	1.4% (2)	3.9% (9)	0.34 (0.07-1.58)	0.213
Unstable Angina	5.4% (8)	7.9% (19)	0.67 (0.28-1.59)	0.412
Positive ETT	6.1% (9)	12.2% (18)	0.46 (0.21-1.02)	0.075

year.<sup>5</sup> As we followed the patients for initial 3 months when the incidence of MI is low and beyond three months after deployment of DES, the incidence of MI increases. Data from post hoc analyses, meta-analyses and registries have suggested an increased risk of adverse ischaemic events at long-term follow-up possibly related to stent thrombosis in patients treated with DES (hence the recent aphorism 'trading restenosis for thrombosis').<sup>10-13</sup>

The event rate for unstable angina was 6.9% in our study which was slightly lower than the previous studies.<sup>5,7</sup> In one of the previous trial comparing bare metal stents with drug eluting stents, the incidence of unstable angina was 11% at one year.<sup>5</sup> As mentioned earlier our follow up was for just three months and we also excluded patients with complex lesion, which might be the reason for better outcome in this study.

In our study ETT was performed on all patients at 3 months after the index procedure. ETT was found to be positive in 37 (9.8%) patients. One of the previous study showed that ETT was found to be positive in 23.5% patients following PCI or PTCA.<sup>9</sup> But in that particular study they included patients with deployment of BMS, DES and even patients who just underwent balloon angioplasty, while we just included patients with DES deployment having non-complex lesion, accounting for significantly lower rates of positive ETT in our study. Two studies examining the role of ETT post-PCI suggest that it may predict events (restenosis), although the majority of observational studies suggest that it does not.<sup>14,17</sup>

The rate of restenosis is between 30–40% following balloon angioplasty and 20–30% following stenting with bare metal stents, and < 10% with drug-eluting stents.<sup>18,19</sup>

We also found that rate of clinical outcomes were slightly lower in male as compared to female patients, but it was statistically not significant. Clinical outcome of women after PCI has been challenging. Historically, female sex has been associated with increased complications during and after PCI.<sup>21-23</sup>

## CONCLUSION

Short-term results from this study suggest that real-world outcomes among 376 patients are comparable to those of the pooled clinical trials. The 3-month rates of clinical outcomes were comparable to rates reported across other registries and trials, and safety outcomes as measured by rates of MI, U.A and positive ETT were low. These 3-month results clearly provide evidence for the safety and effectiveness of the DES for patients with stable angina and are consistent with those reported in the previous trials. Further research is necessary to ascertain long-term safety of drug-eluting stents and to identify additional factors to promote long term efficacy and safety of DES.

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