

Diffuse Coronary Artery Disease—Scope of PCI in the Era of Drug Eluting Stent, A single center experience

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Abstract

Background: Treatment of focal or short length coronary lesions with drug eluting stents has low rate of target vessel revascularization and other major adverse cardiac events. However, safety and efficacy use of overlapping drug-eluting stents with diffuse coronary artery lesions is debatable and we do not have much experience in our country. We like to report the clinical outcome of diffuse coronary artery disease with overlapping stents in our hospital. **Methods:** From September 2007 to October 2011, we evaluated 241 consecutive patients who required overlapping stents for diffuse coronary artery disease (>40 mm). A retrospective review was conducted to see in-hospital, short term 1 to 9 months and beyond 9 months clinical outcome. Those who presented with acute myocardial infarction or in cardiogenic shock, resuscitated and intubated before the procedure were excluded from the study. **Results:** The study population consists of 241 patients out of which 91.7% were male, minimum age was 31 years and maximum 82 years (53.69 ± 10.96). Among coronary artery risk factor 59.6% were diabetic, 59.8% were hypertensive, 47.3% were dyslipidaemic, 29.9% were smokers, and 28.8% with positive family history of coronary artery disease. The number of stents implanted per patient was 2.26 and mean total length was 56.44 ± 12.56 . One patient had in-hospital stent thrombosis, 5 patients had in-stent restenosis, and 8 patients died during follow-up. One hundred and eighty-two (75.5%) patients completed minimum 9 months clinical follow-up. Forty patients underwent relook CAG (conventional or CT-CAG). Among them 34 patients had patent stents and 5 patients had in-stent restenosis. Four patients (2.1%) required repeat stenting and one patient (0.04) required CABG. Overall survival was 97.90%. **Conclusion:** Patients with long lesion had very high risk of restenosis in the past. In these patients drug eluting stent dramatically reduce the risk of restenosis translating into a good clinical outcome.

Key words: Coronary artery disease; PCI; Drug eluting stent.

INTRODUCTION

The percutaneous implantation of bare metal stent in long lesion is associated with high rate of restenosis.¹ The use of drug eluting stents (DESs) has greatly attenuated the relationship between stent length and restenosis.² The purpose of this study is to evaluate clinical outcome of overlapping DES in long lesion.

METHODS AND PATIENTS

Retrospective, observational study includes consecutive patients who required overlapping stents for diffuse coronary artery disease (>40 mm) from September

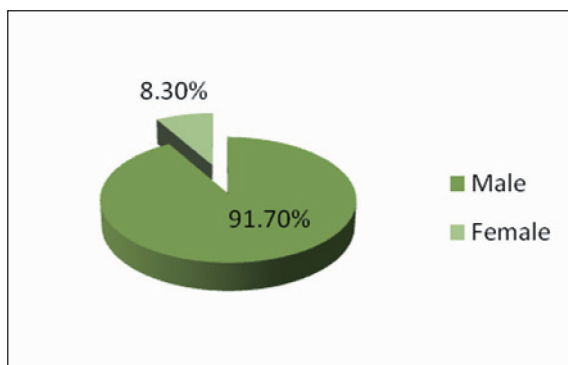


Figure 1: Male–female distribution

2007 to October 2011. All patients had a combination of at least two overlapping stents with at least 2 mm overlapping segments. All patients were pretreated with clopidogrel at least 10 days before the procedure and with a loading dose of 300 mg of clopidogrel to the patients who were not pretreated. Heparin was administered at the beginning of the procedure at the dose of 10,000 unit bolus to achieve activated clotting time 250–300 sec. Glycoprotein IIb/IIIa inhibitor was administered at the discretion of the operator. Double dose of clopidogrel (150 mg) and 300 mg of Aspirin were continued for at least one month after procedure. Clinical follow-up were performed at 1 month and 9 months post procedure, thereafter it was performed yearly once either by office visit or telephone contact. At first visit we only consider the symptomatic status of the patients. At 6 months exercise tolerance test (ETT) was done. Those who were symptomatic with positive ETT underwent angiography either conventional or CT angiogram. Restenosis was defined as >50% diameter stenosis within previously stented segment or within 5 mm of the stent (persistent). Postprocedural stent

thrombosis was defined as new ST elevation in ECG with angiographic documentation of stent thrombosis.

RESULTS

Total 241 patients were included in this study from September 2007 to October 2011. Minimum age included was 31 years, maximum 82 years with mean age 55.69 ± 10.09 . Majority patients were male 221(91.7%) (Figure 1).

Risk factors analysis showed 59.8% were hypertensive, 59.6% diabetic, 47.3% dyslipidaemic, 29.9% smokers, and 28.8% patients had positive family history of coronary artery disease (Figure 2). Indications for stenting were stable angina 78(32.4%), unstable angina 66 (27.4%) (Figure 3) and following myocardial infarction 96 (39.8%). Number of stents per person was 2.26. In 45.7% cases stented vessel was RCA, in 42.1% cases it was LAD, and in LCX it was 8.5% (Figure 4). In one case, stented vessel was RSVG to OM.

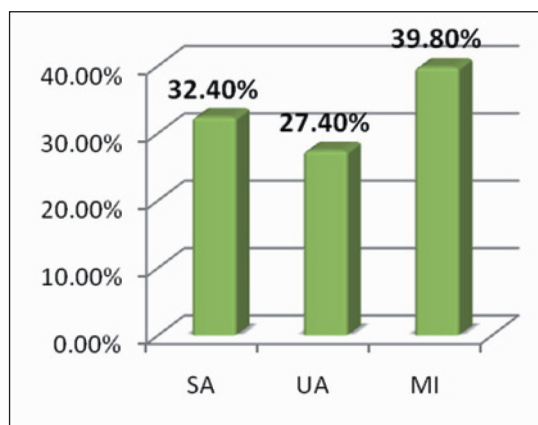


Figure 3: Indication of transluminal coronary angioplasty (PTCA)

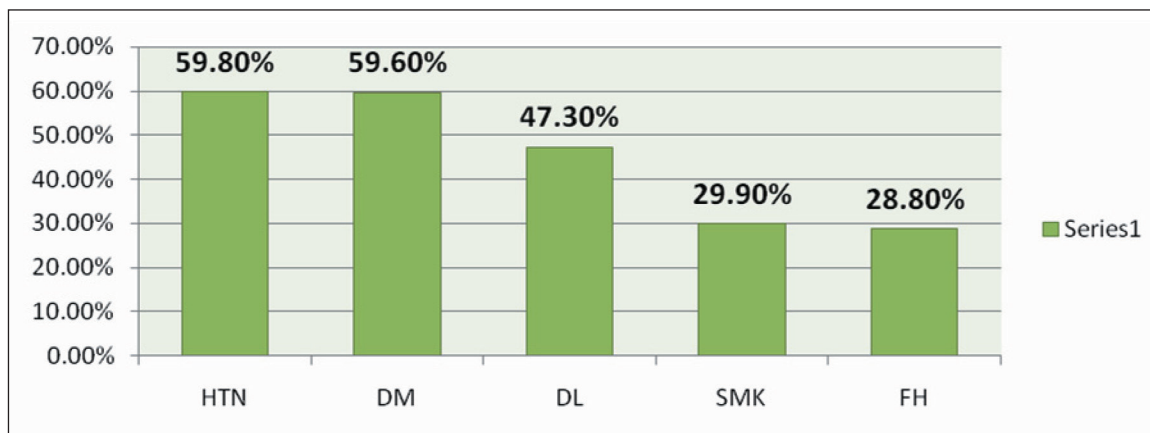


Figure 2: Risk factors distribution

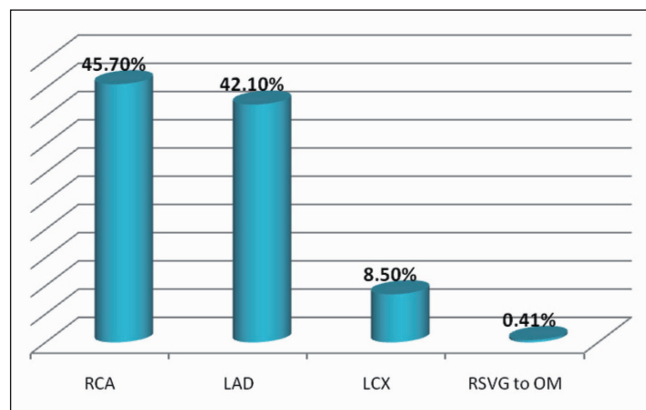


Figure 4: Target vessel revascularization

All patients were followed up at 1 month post implantation and later at 9 months, thereafter yearly follow-up was taken. Those unable to give hospital, visit telephonic follow-up were taken. During follow-up 216 (89.6%) patients were asymptomatic. At 9 months 117 (48.5%) patients underwent ETT. Among them, 96 (39.8%) patients were found to have normal exercise tolerance test, 11 (4.6%) found to have positive ETT, and 10 (4.1%) had equivocal ETT. During follow-up, 40 patients underwent angiogram either conventional or CT angiogram. Among them, 34 patients had patent stent. Five patients had in-stent restenosis and one patient had acute stent thrombosis (Table 1).

Five patients had repeat revascularization with another DES and one patient underwent CABG. Among 241 patients, 8 (3.3%) patients died. One patient died in hospital due to

Table 1: Major adverse cardiac events during hospitalization and at follow-up

Characteristics	In hospital	Follow-up
Death	1	7
Thrombosis	1	0
TVR	0	5
CABG	0	1

stent thrombosis, 5 patients died within 9 months, and 3 patients died after 9 months.

DISCUSSION

Diffuse coronary artery disease poses a significant therapeutic challenge. Lesion length is an independent predictor of in-stent restenosis especially with BMS.³ The use of DESs has markedly reduced the incidence of restenosis in long lesions and has greatly attenuated the relationship between stent length and restenosis.⁴ Increasing DES length has had little impact on in-stent or in-segment restenosis especially for sirolimus-eluting or paclitaxel-eluting stents. This contrasted with BMS where restenosis increased markedly with increasing lesion length,⁵⁻⁹ when multiple overlapping sirolimus-eluting stents compared with single DES use.¹⁰ A pooled analysis of five clinical trials examined three randomized (SIRIUS, E-SIRIUS, and C-SIRIUS) and two non-randomized clinical trials (DIRECT and SVET) also found that patients requiring treatment with two or more overlapping stents experienced better outcomes when receiving sirolimus-eluting coronary stents than when receiving bare metal stents.¹¹

In the SIRIUS trial, there was no difference in target lesion revascularization (4.5 vs. 3.9) or other major adverse cardiac events (MACEs) when multiple overlapping sirolimus-eluting stents compared with single DES use. In contrast, there was an increase in MACE with overlapping BMS compared with single BMS.¹²⁻¹⁴

In our study, 5 patients had in-stent restenosis and one patient had acute stent thrombosis. Five patients had repeat revascularization with another DES and one patient underwent CABG. Among 241 patients, 8 (3.3%) patients died.

CONCLUSION

From different studies we can conclude that implantation of multiple long overlapping DES in patients with diffuse coronary artery disease is relatively safe and is associated with good clinical outcome.

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