Clinical Trials >The EMPIRE Registry Study

Background : Percutaneous transluminal coronary angioplasty (PTCA), now known as percutaneous coronary intervention (PCI), was described for the first time 26 years ago and has undergone many technological advances, most notably the introduction of endovascular metallic scaffolding, more commonly referred to as coronary stents. Stenting has become widespread over the last 10 years and has resulted in lower rates of restenosis, the Achilles heal of angioplasty. In an attempt to further reduce restenosis rates, drug-eluting stents have recently been added to the therapeutic armamentarium.

Sirolimus, a cytostatic drug which is also a cell cycle inhibitor and thus prevents the replication of cells from the G1 to S phase, has been approved in the US as well as Europe for coating the Stents so as to reduce Restenosis.

The EMPIRE study was conducted to evaluate the safety and efficacy of slow release sirolimus eluting PRONOVA stent in de novo coronary artery lesions with single or overlapping stents in patients with single or multi vessel disease.

Methodology : 300 patients meeting inclusion and exclusion criteria were enrolled in a single centric registry. Following treatment with ProNova, a sirolimus eluting stent (SES), all patients were followed up clinically at 30 days and binary restenosis rate was assessed at 6 months by angiogram.

Observations and Results: The baseline demographics of the patients included in the trial showed that 36% patients were smokers. 58% had a history of hypertension and 32% patients had diabetes, 87% of patients had angina and a history of Myocardial infarction was present in 67% patients. All patients were pre-treated with oral antiplatelets therapy (Aspirin & Clopidogrel). During the procedure i.v. bolus of heparin was administered and the use of GP IIb/IIIa inhibitors was at the discretion of the operator. Lesions were treated with the use of standard intervention techniques.

Total 386 stents were deployed in 300 patients with an average of 1.29 stents per patient. The study also included more complex patient demographics like hypertension, diabetes, small vessels and thrombotic lesions as compared to other randomized trials on DES. The average stent length was 21.4mm per patient and the average stent size was 2.92mm. All the stents (100%) were successfully deployed. 101 patients had angiographic follow up whereas 196 patients had a clinical follow up at the end of six months. None of the patients had in hospital MACE. However in 30 days follow up, one patient (diabetic) with anginal symptoms was found to be having a significant lesion in the left main for which he underwent coronary artery bypass grafting and died subsequently due to heart failure. In six months follow up two patients had sudden cardiac death and could not reach the hospital.

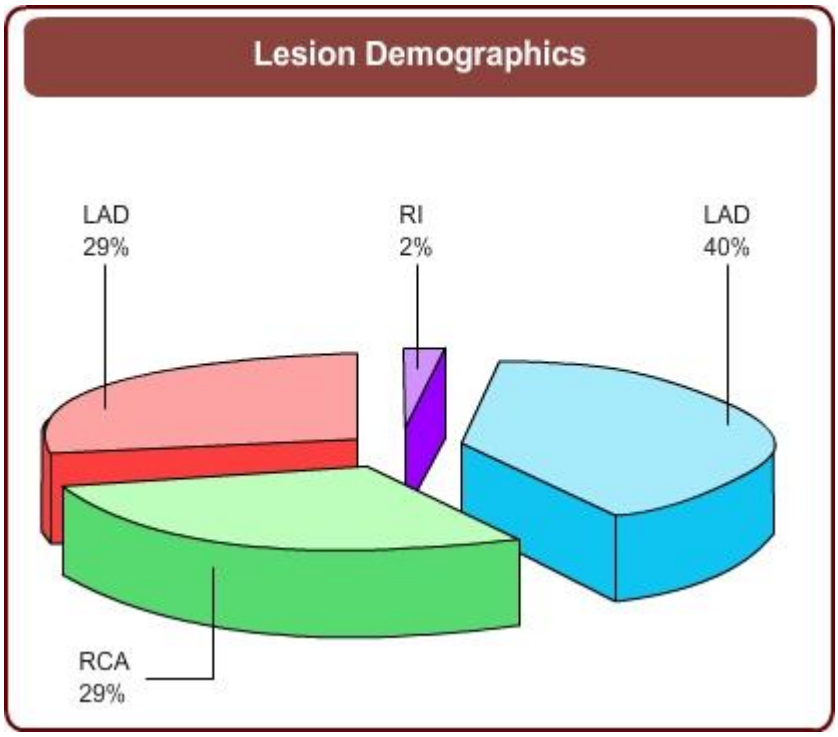
The angiographic in-stent restenosis was found to be 12.6%.
Interestingly it was observed that the mean lesion length in the EMPIRE registry trial was 19mm which is more than the lesions treated in the previous studies, Overlapping stents were used in 66 (22%), patients were implanted with 2 stents, 11 (3.7%) patients with three stents, 2 (0.67%) patients with four stents and 1 (0.33%) patient with 5 stents. A total of 237 (79%) patients were implanted with stents less than 3mm size. GP IIb/IIIa inhibitors were used in 78% of the patients. This shows that the lesions treated in the EMPIRE registry trial were more complex when compared to previous trials.

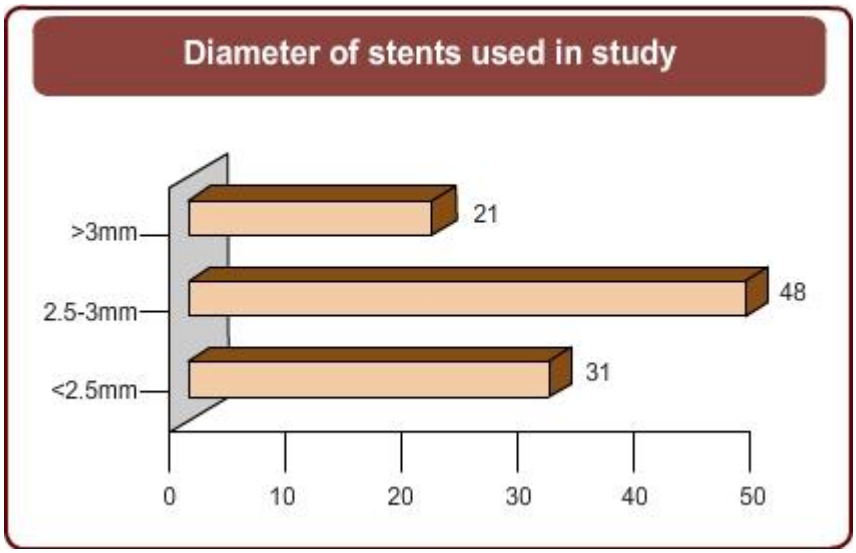
Primary results : The pre PTCA mean minimum luminal diameter (MLD) was 0.49 mm (SD = 0.3), whereas the post-PTCA mean MLD was 2.91 mm (SD = 0.43). The pre-PTCA mean reference vessel diameter was 2.42 mm, while post-PTCA mean reference diameter was 3.2 mm. On check angiogram carried out on the consenting patients (n = 101 no. of lesions =117) presenting for follow up at 6 months, the mean MLD was 2.34 mm (SD = 0.78). The mean early gain in luminal diameter was 2.43 mm and the mean late loss was 0.59 mm.

Table 1: Baseline Demographic Characteristics and Risk Factors in Study Population

BASELINE DEMOGRAPHICS AND RISK FACTORS		
Total no. of patients	300	
Male/ Female	246 / 54	82% / 18%
Mean Age	56.8 years	
Diabetes	96	32%
Hypertension	174	58%

Family history	93	31%
Smokers	108	36%
Angina	261	87%
Stress Test Positive	60	20%
Post MI	201	67%
Recent MI	141	47%
Old MI(> one month)	60	20%





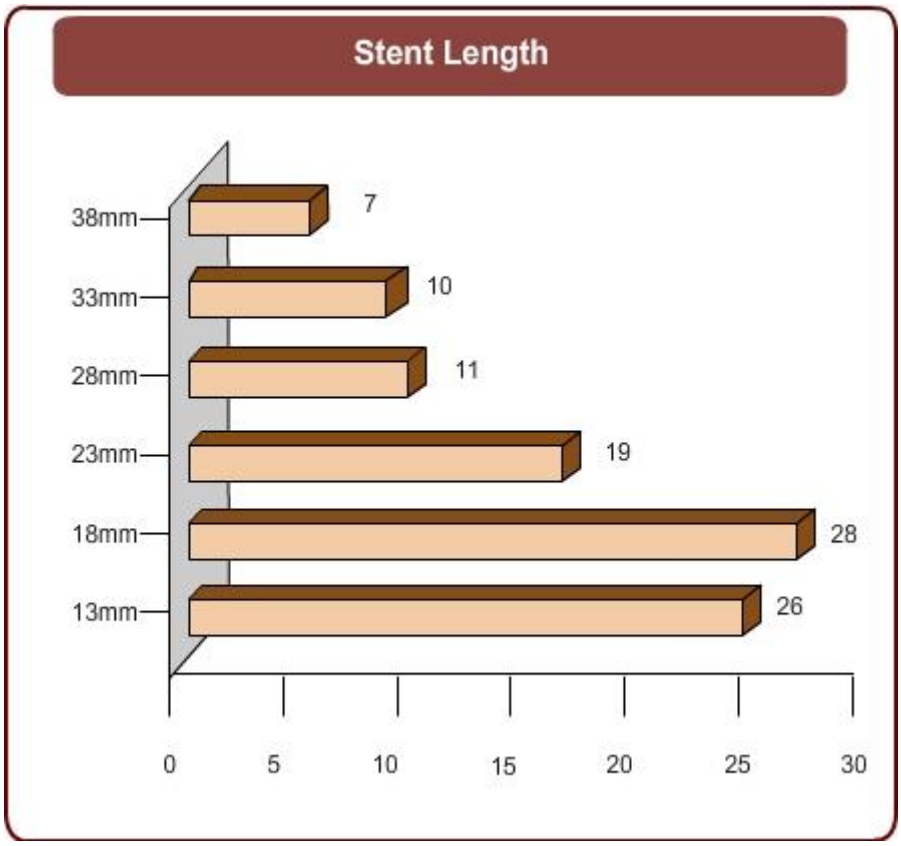


Table 2: Procedural and Stent Details

Total Stents deployed	386	
Average Stent / Patient	1.29	
Average Stent Length	21.4mm	
Average Stent Size	2.92mm	
No. of Patient with overlapping stents	22	7.3%
No. of Patient with two pronova stents	66	22%
No. of Patient with three pronova stents	11	3.7
No. of Patient with four pronova stents	2	0.67%
No. of Patient with five pronova stents	2	0.3%
No. of Patient with stents <3mm size	237	79%

Table 3: Use of GP IIb / IIIa Inhibitors

GP IIb/IIIa Inhibitor used	
Integrelin	52%
Reopro	24%
Aggramed	2%
Total	78%

Table 4: In-hospital Major Adverse Cardiac Events

IN HOSPITAL MACE	
Acute Thrombosis	0%
Death	0%
MI	0%
Urgent PCI	0%

Urgent CABG	0%

No patient needed any re-intervention procedure during hospital stay.

Table 5: Major Adverse Cardiac Events at 30 Days

30 DAYS MACE	
Sub-Acute Thrombosis	0%
Death	0.33%(1)
MI	0%
Urgent PCI	0%
Urgent CABG	0.33%(1)
CABG and Death was in the same patient.	

* One patient (diabetic) was diagnosed with a new lesion underwent CABG procedure and subsequently died.

Table 6: Major Adverse Cardiac Events at 30 Days

6 MONTHS MACE (0 to 180 Days)	
Death	1%(3)
MI	0
Repeat Procedure	3 patients
TLR	2 patients
Non TLR	1 patient
CABG	1 patient

Two patients suffered from cardiac arrest and died before coming to the hospital.

Table 7: Follow-up data of study population

Follow Up Data	
Total No. of Patients	300
Angiographic Follow up	101
Clinical Follow Up	196
ANGIOGRAPHIC IN-STENT RESTENOSIS	12.6%

Conclusions : Restenosis rate of 12.6% in this group of patients comparable to the other drug eluting stents in similar subsets. Therefore it was confirmed that the ProNOVA SES was found to be safe and effective in a variety of complex CAD cases.

Key Take Aways :

* The study was conducted at Escorts heart Institute and Research centre with the unconditional approval from the ERB.
* Reduction in Angina by 96% was observed in this complex set of patients.
* Restenosis rate of 12.6% was observed