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Comparison of clinical outcomes of patients treated with Cre8TM versus Resolute Onyx™ stent

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ABSTRACT

Introduction: This study aims to compare the clinical outcomes of patients treated with Cre8TM versus Resolute Onyx™ stent.

Material and Methods: In this retrospective study, all patients who underwent Stenting in the catheterization department of ShahidMadani Hospital between 2015 and 2018, were included. Angiographic and angioplasty findings were recorded. The primary end point, which includes total mortality, myocardial infarction, revascularization (adverse events) were recorded.

Results: The mortality rates were similar in both groups. Moreover the myocardial infarction and repeated revascularization did not differ in both groups (p>0.05).The rates of adverse events wasn't significantly different between the two groups.

Conclusion: Our study showed that efficacy and safety of Cre8™ stents is non-inferior to the Resolute Onyx™ stent.

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Introduction

Coronary artery disease (CAD), is the leading cause of death for men and women in the world (1). The overall prevalence of CAD in Iran is estimated as 19% (2). Still, a restenosis following the insertion of a stent, mainly due to intimal hyperplasia of the vessel wall, remains a major problem (3-5). At the end of 2004, in the United States, more than 80 percent of the used stents were DES (6). After the initial excitement associated with the reduction of restenosis in the use of the first generation DES, Safety warning aroused the concerns regarding the late stent thrombosis and hence need to maintain patients on long-term dual antiplatelet therapy (DAT)(7,8). Cre8TM stent, a new generation DES based on Amphilimus™ formulation. This stent, known as resolute Zotarlimus-elutin stent

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(R-ZES), has a variety of types that are categorized according to the design, thickness, and release method of the drug. One of the latest version of R-ZES is Resolute Onyx™, which received certification mark at the end of 2014 (9, 10). Considering that no studies have ever compared the clinical outcomes of the CRE and Onyx stents. This study aims to compare the clinical outcomes of patients treated with Cre8TM versus Resolute Onyx™ stent.

Material and Methods:

In this retrospective study, all patients who underwent Stenting by Cre8TM or Resolute Onyx™ stent in the catheterization department of ShahidMadani Hospital between 2015 and 2018, were included. This hospital is the main tertiary heart center in north-west of Iran with about 1200 PCI procedures per year. The PCI procedure is done by five interventional expert cardiologists. In all patients 600 mg loading dose of Clopidogrel, 300 mg aspirin and 40 mg atorvastatin prescribed before procedure. Patients who had file defects, and also patients who used stents other than Cre8TM or Resolute Onyx™, patient who had no adherence to drugs or especial condition such as bleeding were excluded from the study. Selection of stent was done by patient's corresponding interventional cardiologist regarding to availability of stent and patient's medical condition and according to type in stents used for intervention patients were allocated into two groups.

Patients' information was collected through a questionnaire containing demographic and clinical information's. Angiographic and angioplasty findings, were recorded. Finally, the primary end point, which included total mortality, myocardial infarction, revascularization (major adverse cardiac events (MACE)) were examined by telephone or routine follow up visits. Independent t student test, Chi-square and Fisher's exact test. Tests were used for data analysis.

All statistical analyzes were performed by SPSS- version 22 software. A p value less carrier in the absence of polymer. In addition, the elution of a reservoir allows the than 0.05 was considered significant. The study was approved by ethics committee of Tabriz University of Medical Sciences.

Results

A total of 400 patients were met including criteria and enrolled in the study. Of these, 87 patients lost follow-up due to different reasons. Clinical and demographic characteristics of patients are summarized in (Table 1).

Patients in both groups presented predominately with stable angina. The final diagnosis did not showed any significant differences between the groups. CAD risk factors including Smoking, hypertension, hypertension and family history of CAD showed similar frequencies between the two groups. The majority of patients admitted with multi vessel involvement. There was a higher prevalence of type B2/C lesions in the both groups. The lesion site in more than half of patients was left anterior descending (LAD) artery in both groups. Totally two patients were dead in hospital.

All patients were followed for one year. All patients had adherence to antiplatelet drugs. The mortality rates were similar in both groups. Moreover the myocardial infarction and repeated revascularization did not differ in both groups ($p>0.05$). Finally the rates of MACE was not significantly different between the two groups (Table2).

Discussion

In the present study, the long-term clinical outcomes of patients undergoing stenting were evaluated and compared based on the type of stent (Cre8 or Resolute Onyx™). The idea of designing a polymer-free DES was of great interest. However, in contrast to the use of porous surfaces, the binding of the drug to the metal surface of the stent induces rapid elution of the drug and ultimately reduces the antirestenotic effect of it, even with using the higher doses of the drug.

In contrast, the findings of this study, in line with other previous studies, suggest that drug-elution can be done correctly by combining the drug with an amphiphilic-

whole drug to reach the vascular wall, while polymer-coated DES releases a significant amount of the drug into the bloodstream.

Table1. Patients' demographic and angiography findings

Variables		Cre8 n=179	Resolute Onyx™ n=134	P value
Age		68.72±10.8	68.52±9.5	0.86 2
Gender	Male	123(68.7%)	88(65.7%)	0.321
	Female	56(31.3%)	46(34.3%)	
Diagnosis	STEMI	20(11.2%)	10(7.5%)	0.723
	NSTEMI	22(12.3%)	18(113.4%)	
	Unstable Angina	42(23.5%)	31(23.1%)	
	Stable Angina	95(53.1%)	75(56%)	
Risk Factors	Smoking	22(12.3%)	17(12.7%)	0.916
	HTN	85(47%	68(50%)	0.568
	FH	13(7.3%)	6(4.5%)	0.307
	HLP	72(53,7%)	62(46.3%)	
Vessels	IVD	81(45.3%)	66(49.3%)	0.27
	Multi vessel	98(54.7%)	68(50.7%)	
Site	RCA	32(17.9%)	32(23.9%)	0.56
	LAD	114(63.7%)	81(60.4%)	
	LCX	31(17.3%)	19(14.2%)	
	SVG	2(1.1%)	2(1.5%)	
Lesion type B2c		130(72.6%)	100(74.6%)	0.39
In-hospital death		1(0.6%)	1(0.7%)	0.67

STEMI: ST elevated myocardial infarction
NSTEMI: non-ST elevated myocardial infarction
HTN: Hypertension
FH: Familial hypercholesterolaemia
HLP: Hyper lipoprotinemia
IVD: Single vessel disease
RCA: right coronary artery
LAD: Left Anterior Descending artery
LCX: left circumflex artery
SVG: Saphenous vein grafts

Table2. Outcome of patients Incidence of adverse cardiovascular events according to type of stents

Outcome	Cre8 n=179	Onyx n=134	P value
Mortality	1(0.6%)	1(0.7%)	0.67
Myocardial infarction	3(1.7%)	2(1.5%)	0.63
Repeated Revascularization	3(1.7%)	2(1.5%)	0.63
MACE *	7(3.9%)	5(3.7%)	0.59

The small amphipathic molecules has excellent penetrating ability in the cell membrane, which results in the homogeneous distribution and, as a result, the same function on whole of the tissue. Amphilimus, elutes by the Cre8™ stent. This drug is a combination of Sirolimus and a permeation enhancer organic acid. In 2013, Moretti and colleagues in a preclinical study, found that the chronic inflammation in using Cre8™ stent was less than that of Cypher stent in the 90 days after the implantation of the stent. Moreover they also reported less neointimal hyperplasia in those stenting with Cre8™(7). The reduction of neointimal hyperplasia in using Cre8™ DES was also reported by Prati et al (11). In another study, Carrie et al showed that the late lumen loss in Cre8™ was significantly less than that of TAXUS. They concluded that Cre8™ could emerged with a higher efficacy (12). A study also followed-up 215 patients with Cre8™ stent for 1 year. They showed that Cre8™ DES could be very effective with very low rates of target-vessel failure (13, 14). Romaguera et al in a randomized clinical trial study compared the polymer-free Amphilimus-Eluting stents (AES) vs.Everolimus-Eluting stents (EES) with durable polymer in 112 patients with diabetes mellitus. Their findings showed that the ESS and AES stents have a relatively similar effect (15).

Conclusions

The findings of this study indicate that the rates of MACE in patient's stenting with Cre8™ and Resolute Onyx™ does not show a Significant differences. We suggest more multicenter randomized controlled trials to evaluate non-inferiority of a Cre8™ compared with the Resolute Onyx™ especially in high risk CAD population.

Conflicts of interest

The authors have declared no conflict of interest.

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