

Percutaneous transluminal coronary angioplasty and use of drug-eluting stent in shiraz catheterization centers during 2006

J Kojuri, AR Vosoughi, Sh Khosropanah

Cardiovascular Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

Background: The dominant role of percutaneous transluminal coronary angioplasty (PTCA), especially with drug-eluting stent is obvious in alleviating symptoms and improving life quality of patients with coronary artery disease.

Patients and Methods: We analyzed a total 2267 angioplasty cases (906 women, and 1361 men) in six public and private catheterization centers in Shiraz, from January 2006 to January 2007.

Results.

A) Pure old balloon angioplasties were performed only in 12 cases (0.52 %).

B) Drug-eluting stents (53.7 %) were placed more frequently than Bare-metal stents (46.3 %). There was 13% increase in placing drug-eluting stent during 2005.

C) Drug-eluting stents were used in 50.0 % and 54.9 % of patients in public and private hospitals, respectively.

D) In Shiraz centers, Cypher model was used more often than other models (29.1 %).

E) Single-vessel disease PTCAs were done in 65.5 % of patients followed by two (27.0 %), and three-vessel diseases (7.5 %).

Conclusion: We recommend the increasing use of drug-eluting stents especially in patients with three-vessel disease. However, the use of first generation of drug-eluting stents would increase the chance of subacute thrombosis. It is also essential to carry out especial surveys about drug-eluting stents in Iran and Middle East.

Key words: PTCA, drug-eluting stent, bare-metal stent.

Introduction

Cardiovascular disorders, in particular coronary artery disease, remains by far the major cause of death, disability, and hospitalization in the world. Delivery of adequate cardiovascular care therefore constitutes one of the most important public health issues in the future. In the care of patients with coronary artery disease, revascularization procedures such as percutaneous transluminal coronary angioplasty (PTCA) or coronary artery bypass

graft (CABG)^{1,2} have assumed a pivotal role in alleviating symptoms and improving quality of life. PTCA has long surpassed CABG as the most frequent revascularization modality both in Europe and the United States and has become one of the most frequently performed major therapeutic intervention in medicine. Balloon angioplasty was introduced first, but was limited when used for approaching certain types of anatomic lesions. It was plagued by the problems of intimal dissection and restenosis³. The development of coronary stent during the early 1990s has been a revolution in the field of interventional cardiology by reducing the incidence of restenosis after balloon

Correspondence:

Javad Kojuri MD, Cardiology Department, Shiraz University of Medical Sciences, Namazi Hospital, Shiraz, Iran.

Tel: +987116291159, Fax: +987116261089

Email: kojurij@yahoo.com.

angioplasty. of restenosis after balloon angioplasty. Despite significant progress in its prevention and treatment, however, in-stent restenosis is still common in the western hemisphere, and remains a challenge for the interventional cardiologist. There are two types of stent: Bare-Metal Stent (BMS) and Drug-Eluting Stent (DES). BMS is prone to thrombotic occlusion, requiring anticoagulant regimen. Some studies even reported a restenosis rate of 15% or lower for BMS placement. In addition, DES has emerged as a remarkably effective means in decreasing late luminal loss (the difference between the minimal luminal diameter immediately after the procedure and the diameter at 6 months) and angiographic restenosis, as compared with BMS. This decrease, in turn, reduces the need for subsequent revascularization procedures.³⁻⁴ Despite these benefits, DES may be detrimental to adverse arterial responses, including delayed endothelialization and hypersensitivity to the polymeric coating that regulates drug dose and release kinetics. These adverse effects are in conflict with previously tested animal models. Recent reports from randomized trials and observational studies using historical controls have suggested that DES may be associated with increasing rates of late stent thrombosis and death (major myocardial infarction in more than 70% of cases along with a mortality rate of 31%–45%), as compared with BMS. These studies, however, have been inconclusive⁵.

Any therapeutic intervention requires careful

scrutiny with respect to immediate and long-term outcome as well as adverse effects and benefits to ensure adequate quality. Furthermore, analysis of the need for revascularization procedures in the context of different medical and socioeconomic circumstances and cost-effectiveness considerations has become increasingly important, especially for our country. The present report constitutes a summery on PTCA in Shiraz hospitals during 2006.⁶⁻⁷

MATERIALS AND METHODS

From January 2006 to January 2007, we analyzed an annual survey on PTCA in catheterization centers of Faghihi and Namazi public Hospitals of Shiraz University of Medical Sciences, and private hospitals of Dena, Ordibehesht as well as heart centers of Kowsar and Shiraz central Hospitals. In total, 2267 patients (1361 males and 906 females) underwent PTCA, along with analysis of their angiography films and reports. Specifications such as; age, gender, number of vessels undergone angioplasty, and type, size, and length of stent were recorded in report sheaths.

The data were statistically analyzed using SPSS 13.0 for windows (SPSS Inc. Chicago, Illinois).

RESULTS

Complete demographic characteristic of patients are shown in Table 1. As shown in Figure 1, patients with single-vessel disease constituted the majority of cases (65.5 %), followed

Table 1. Demographic characteristics of patients

	Number	Minimum Age (year)	Maximum Age (year)	Mean Age (year)
Men	1361	23	84	56
Women	906	40	89	59
Total	2267	23	89	57

Table 2. Frequency and percentage of seven types of stent used in Shiraz catheterization centers

	Cypher	Infinium	Taxus	Vasmed	Endeavor	Supralimus	Janus
Number	656	509	439	254	180	169	48
Percent	29.1 %	22.5 %	19.4 %	11.2 %	8.0 %	7.5 %	2.3%

by two-vessel disease (27.0 %).

Pure old balloon angioplasty was performed on only twelve patients (0.52 %), and other patients underwent stent placement (99.48 %). BMS and DES were placed in coronary arter-

Table 3. Size and length of Balloons and stents used in Shiraz catheterization centers

	Minimum	Maximum	Mean
Balloon Size	1.50	4.00	2.24
Balloon Length (mm)	9	20	14.08
Stent Size	2.00	4.00	2.87
Stent Length (mm)	8	39	19.94

ies of 1044 (46.3 %), and 1211 patients (53.7 %) respectively (Figure 2). Drug-eluting stents were used in 50.0 % of patients in public and 54.9 % of cases in private hospitals.

Stent models, size, and length

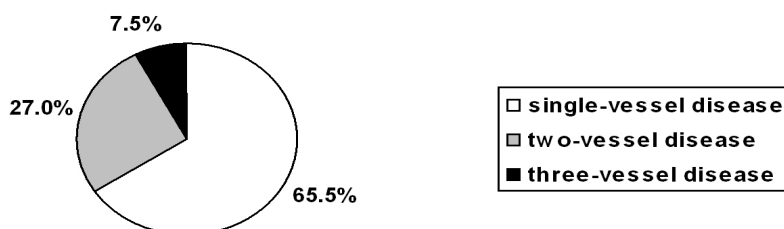
During year 2006, seven models of DES (Cypher, Infinium, Taxus, Vasmed, Endeavor, Supralimus, and Janus) were used. Cypher

stents had the highest (29.1 %), and Janus stents the lowest (2.0 %), application rates. Different models of DES frequencies are expressed in Table 2.

According to Table 3, Maximum stent length and size were 39mm, and 4.00, respectively.

DISCUSSION

Nowadays, PTCA has essential role in eliminating symptoms and improving quality of life of coronary artery disease patients. This procedure has surpassed CABG as the most frequent revascularization method in the world.⁵ Application of pure old balloon angioplasty is limited due to its problems. Stent placement is more acceptable and drug-eluting types are the best worldwide. However, in Shiraz hospitals, CABG is done more than PTCA for revascularization (36.7 % versus . 25.1 %) ⁷ which maybe due to poor compliance of our patients, the role of cardiac surgeons, and the lack of experience of some cardiologists. Stent placement in Shiraz centers is performed more frequently compared with balloon angioplasty (99.48 % versus 0.52 %). DES is inserted more than BMS, (53.7 % versus 46.3 %) with 13%

**Figure 1.** Percentage of vessels undergoing angioplasty

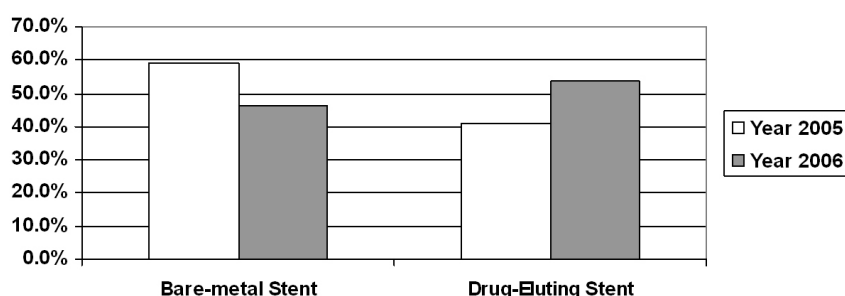


Figure 2. Comparison of using bare-metal stent and drug-eluting stent during 2005 and 2006 in Shiraz hospitals

increase on the preceding year (Fig. 2). We, therefore, recommend a more extensive application of DES as a stent of choice in our centers. In regard to DES insertion, the probable aspects to be considered include the cost of DES, lack of experience of some cardiologists in DES placement, and the chance of late subacute thrombosis. Only 7.5 percent of cases underwent PTCA due to three-vessel disease,

which is less than other centers in the world. The advantages of using DES are decreasing cost of DES with increasing insurance support, upgrading and improving catheterization centers equipment, employing more experienced interventional cardiologists and using new generation of DES with lower chance of subacute thrombosis.

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