# Short-term Follow-up Results of Drug-eluting Stenting in Premature Coronary Artery Disease Patients with Multiple Atherosclerotic Risk Factors

Ming-Hsiung Wang[1,2], Wen-Lieng Lee[1,3], Kuo-Yang Wang[1,4], Yu-Cheng Hsieh[1,3], Tsun-Jui Liu[1,3], I-Hsiang Lin[1,5], Wei-Wen Lin[1], Chih-Tai Ting[1,3], Kae-Woei Liang[1,3]*

*[1]Cardiovascular Center, Taichung Veterans General Hospital, Taichung, [2]Fong-Yuan Hospital, Fong-Yuan, [3]Institute of Clinical Medicine, Cardiovascular Research Center, and Department of Medicine, National Yang Ming University School of Medicine, Taipei, [4]Department of Medicine, Chung Shan Medical University, Taichung, and [5]Nantou Hospital, Nantou, Taiwan, R.O.C.*

**Background:** Premature coronary artery disease (CAD) is a special entity with a strong link to familial hypercholesterolemia, family history of premature CAD, or multiple coexistent atherosclerotic risk factors. Drug-eluting stenting (DES), including paclitaxel-eluting stenting (PES) and sirolimus-eluting stenting (SES), has been proven to have a lower restenotic rate. However, to date, few studies have investigated the clinical and angiographic results of DES in premature CAD patients.

**Methods:** Between February 2004 and October 2005, premature CAD patients, defined as those younger than 50 years of age, who were treated with DES in our medical center were all retrospectively enrolled. Their baseline clinical characteristics, clinical outcome and angiographic follow-up results were analyzed.

**Results:** A total of 26 patients (M/F: 23/3) were enrolled, with a mean age of 44 ± 6 years (range, 24–50 years). Conventional atherosclerotic risk factors were prevalent in this study group, including diabetes mellitus (35%), hypertension (35%), hyperlipidemia (54%) and smoking (73%). Moreover, there was 1 homozygous and 1 heterozygous familial hypercholesterolemia case in our study group. In terms of angiographic results, there were 40 target lesions in 34 target vessels. Forty DES (39 PES, 1 SES) were implanted with a median stent diameter of 3 mm and median length of 24 mm. The clinical follow-up was counted up to May 2006, with a mean follow-up duration of 540 ± 168 days; 11 (42%) patients had a second angiogram during the follow-up period (200 ± 98 days after DES). None of the patients had target lesion revascularization (TLR). In addition, there was no difference in TLR or stent thrombosis between patients with or without acute coronary syndrome.

**Conclusion:** Based on our single-center experience, DES had good short-term follow-up results for a premature CAD group with diverse and multiple atherosclerotic risk factors. [*J Chin Med Assoc* 2008;71(7):342–346]

**Key Words:** acute coronary syndrome, coronary artery disease, drug-eluting stent, familial hypercholesterolemia, premature CAD

## Introduction

Premature coronary artery disease (CAD) patients are a special subgroup among atherosclerotic patients. Premature presentation implies a rapidly progressive disease course. Moreover, the impact of premature myocardial infarction (MI) or CAD on the young patient and his/her family is particularly devastating. Fortunately, the incidence of MI and symptomatic CAD in young adults is low; most studies show that only about 3% of all CAD cases occur under the age of 40.[1,2]

The fact that clinically manifest CAD in the young adult is relatively uncommon implies that these patients are atypical of the general population.[3–8] Cigarette smoking has been shown to be the single factor most strongly associated with CAD in young adults.[9] Kannel et al found that in patients included in the Framingham

*Correspondence to: Dr Kae-Woei Liang, Cardiovascular Center, Taichung Veterans General Hospital, 160, Section 3, Taichung-Kang Road, Taichung 407, Taiwan, R.O.C.
E-mail: ekwliang@ms17.hinet.net • Received: July 25, 2007 • Accepted: May 22, 2008

Heart Study, the relative risk for CAD was about 3 times higher in smokers aged 35–44 compared to nonsmokers in the same age group.[9,10] Diabetes and hyperlipidemia are also important associated risk factors in premature CAD patients. Family history of CAD is another known risk factor and probably represents a combination of multiple risk factors.

Drug-eluting stenting (DES) has been shown to have a lower restenotic rate in comparison with bare-metal stenting.[11,12] Recently, several clinical trials and registries have proven the efficacy of DES in high-risk subsets such as diabetes, small vessels or long lesions.[13–15] However, few studies have investigated the efficacy and safety of DES for premature CAD patients, who are usually associated with multiple atherosclerotic risk factors. We conducted this retrospective study and investigated the short-term results of DES in premature CAD patients with diverse and multiple risk factors.

## Methods

### *Study population*

Between February 2004 and October 2005, premature CAD patients, defined as those younger than 50 years of age, who were treated with DES in Taichung Veterans General Hospital (Taichung, Taiwan) were all retrospectively enrolled. Their clinical characteristics, clinical outcome and angiographic follow-up results were analyzed. Angiographic follow-up was at the discretion of the interventional cardiologists in charge. The clinical follow-up was retrospectively counted up to May 31, 2006.

### *Definition of demographic data and conventional atherosclerotic risk factors*

Acute coronary syndrome (ACS) included ST elevation or non-ST elevation MI with cardiac enzyme elevation or unstable angina with crescendo chest pain, and ischemic electrocardiographic changes but no cardiac enzyme elevation. Hypertension was defined as systolic blood pressure over 140 mmHg or diastolic blood pressure over 90 mmHg after multiple measurements in the sitting position at rest or patients already on antihypertensive medication. Diabetes mellitus was defined as fasting blood sugar over 126 mg/dL on 2 occasions or patients already on oral hypoglycemic agents or insulin shot. Hyperlipidemia was defined as total cholesterol over 200 mg/dL or low-density lipoprotein cholesterol (LDL-C) over 130 mg/dL or patients already on HMG-CoA reductase inhibitor treatment. Family history of premature CAD was defined as CAD history in a first-degree male relative before the age of 55 or female before the age of 65.

### *Percutaneous coronary intervention*

Patients received 325 mg of aspirin and a 300-mg oral dose of clopidogrel before or immediately after the procedure. Dual antiplatelet agents were maintained for at least 3 months in sirolimus-eluting stenting (SES) and for 6 months in paclitaxel-eluting stenting (PES). The use of either PES or SES was dependent upon mutual agreement between the patient and the interventional cardiologist in charge. Target vessel revascularization (TVR) was considered to be driven by ischemia if the stenosis of the target vessel was at least 50% of the luminal diameter on the basis of a quantitative analysis, with either electrocardiographic changes while the patient was at rest or a functional study indicating ischemia in the distribution of the target vessel, or if there was stenosis of at least 70% in conjunction with recurrent symptoms alone. Target lesion revascularization (TLR) was defined as repeat revascularization for ischemia owing to stenosis of at least 50% of the luminal diameter anywhere within the stent or within the 5-mm borders proximal or distal to the stent. Target vessel failure was defined as death, MI, or ischemia-driven TVR. If an adverse event could not conclusively be attributed to a non-target vessel, the event was considered a target vessel failure.

### *Definition of angiographic parameters*

The complete angiogram record was reviewed and angiographic measurements were made on a dedicated workstation with software for quantitative analysis of angiograms (QCA) (Philips Inturis Suite, R2.2). The classification of coronary lesion types was made based on the American College of Cardiology (ACC)/American Heart Association (AHA) guidelines. Binary restenosis was defined as stenosis of at least 50% diameter of the luminal diameter of previously treated lesions.

### *Definition of stent thrombosis*

Stent thrombosis was defined as an ACS with angiographic documentation of either vessel occlusion or thrombus within or adjacent to a previously successfully stented vessel or, in the absence of angiographic confirmation, either acute MI in the distribution of the treated vessel or death from cardiac causes up to the end of the defined study period.

### *Statistical analysis*

Continuous variables are expressed as mean ± standard deviation and categorical data as percentages.