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Original article

# Two-year clinical outcome in patients with small coronary artery disease treated with everolimus- versus paclitaxel-eluting stenting

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ABSTRACT

*Background:* Percutaneous coronary interventions involving small coronary vessels represent a true challenge because of the increased risk of restenosis and adverse outcomes. We evaluated the 2-year clinical outcomes between single everolimus-eluting stents (EES) and paclitaxel-eluting stents (PES) in small coronary artery disease.
*Methods:* From the data of SACRA (SmAll CoronaRy Artery treated by TAXUS Liberté) and PLUM (PROMUS/Xience V Everolimus-ELUting Coronary Stent for sMall coronary artery disease) registries, 245 patients with 258 lesions and 264 patients with 279 lesions, respectively, were enrolled in this study.
*Results:* The 2-year clinical driven target lesion revascularization (4.5% vs. 10.6%, $p = 0.01$) and target vessel revascularization (8.0% vs. 13.9%, $p = 0.03$) rates were significantly lower in the EES group compared with the PES group. Major adverse cardiac events in the EES group tended to be lower than those in the PES group (8.7% vs. 14.3%, $p = 0.05$). On the other hand, all new lesions for remote target

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vessel revascularization were observed at the proximal site of target lesions in both groups and those rates were not different between the two groups (3.4% vs. 3.3%, $p > 0.99$).
*Conclusion:* EES showed better clinical results at 2-year follow-up compared with PES in small coronary artery diseases, however, new lesions at the proximal remote site of the target lesion remain problematic.


## Introduction

Lesions in small coronary vessels comprise a challenging disease subset in contemporary interventional practice. Although drug-eluting stents (DES) have been able to strikingly reduce the rate of in-stent restenosis, vessel size is still one of the strong independent predictors of angiographic and clinical restenosis [1,2]. Previous studies have shown that an everolimus-eluting stent (EES), a second-generation DES, was superior to a paclitaxel-eluting stent (PES) in terms of a significant reduction of in-stent late loss and target lesion revascularization (TLR) rate in small coronary vessels [3–6]. However, long-term (more than two-year follow-up) results after single-stent implantation have not been evaluated between these two stents.

Most small coronary artery disease is located from mid to distal portion in the coronary artery and some small coronary artery disease includes very long diffuse lesions that require multiple overlapping stents. However, after multiple overlapping stenting, many predictors were associated with clinical results and the difference of effect by each DES was ambiguous [7–9].

The aim of this study was to evaluate the 2-year clinical results following single small coronary stenting between EES and PES.

## Methods

### *Study population*

This study was designed to compare 2-year clinical results between the two registries that evaluated the efficacy of single EES and PES for small coronary artery disease. This study was not a randomized study and each registry was performed consecutively because the launch date of EES in Japan was delayed almost one year from that of PES. SACRA (SmAll CoronaRy Artery treated by TAXUS Liberté) was a prospective multi-center registry performed at 26 sites in Japan in which 245 patients with 258 lesions were enrolled from April, 2009, to February, 2010. After the enrollment of the patients for SACRA registry, the enrollment for PLUM (PROMUS/Xience V Everolimus-ELUting Coronary Stent for sMall coronary artery disease) was started (Fig. 1). PLUM registry was also a prospective multi-center registry performed at the same 26 sites in which 264 patients with 279 lesions were enrolled from March 2010 to June 2011. The objective of both registries was to evaluate the efficacies of EES [PROMUS (Boston Scientific, Natick, MA, USA)/XIENCE V (Abbott Vascular, Santa Clara, CA, USA)] and PES [TAXUS Liberte (Boston Scientific)] for small coronary artery disease. Both registries adopted the same inclusion and exclusion criteria. Inclusion criteria were: (1) males and non-pregnant females, aged 20 years or older, with evidence of myocardial ischemia; (2) the de novo target lesion(s) in the native coronary artery with a reference vessel diameter <2.5 mm by visual estimation; (3) a target lesion length <28 mm for single stenting; and (4) a visually estimated stenosis of the luminal diameter between 75% and 99%. Exclusion criteria were: (1) primary angioplasty for ST-elevation myocardial infarction; (2) left ventricular ejection fraction <30%; (3) other concomitant disease or medical condition that could impact patient/procedural outcomes, such as history of bleeding diathesis, stroke, or transient ischemic neurological attacks within the past year; or hypersensitivity to stainless steel, everolimus, paclitaxel, heparin, aspirin, ticlopidine, clopidogrel, or X-ray contrast media; (4) chronic total occlusion; (5) in-stent restenosis; (6) severe vessel tortuosity or calcification that would hinder successful stent delivery; and (7) serum creatinine level >2 mg/dL. The protocol was approved by ethics committees in all participating institutions, and all eligible patients gave written informed consent.

### *Study procedure*

More than 100 mg/day of aspirin was continued if the patients had an established regimen of more than 7 days on this medication. If not, 300 mg of aspirin was given more than 3 h before the procedure. Clopidogrel was administered before the procedure in a loading dose of 300 mg followed by 75 mg once daily, or a maintenance dose of 75 mg for >1 week before the procedure. Alternatively, ticlopidine in a dose of 200 mg was administered >1 week before the procedure. During the procedure, heparin was given as a bolus of 150 U/kg with additional bolus to 2000 U/h. All baseline, post-procedure, and follow-up angiography was performed after administration of 200 μg of nitroglycerin. Percutaneous vascular access was obtained according to each institution's standard procedure. After guidewires were inserted, pretreatment with a conventional balloon, cutting balloon, or atherectomy device (directional coronary atherectomy or rotational atherectomy) was permitted according to operator discretion.

Post-procedure, creatine kinase or troponin was measured, and a 12-lead electrocardiogram was obtained 16–24 h after the

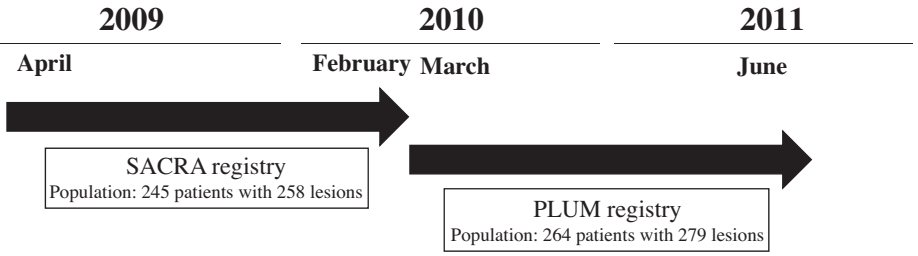


**Fig. 1.** Enrollment summary of the two registries. SACRA, SmAll CoronaRy Artery treated by TAXUS Liberté; PLUM, PROMUS/Xience V Everolimus-ELUting Coronary Stent for sMall coronary artery disease.