Studies show everolimus-eluting stent implantation reduces restenosis and repeat revascularizton

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Two new studies have determined that everolimus-eluting stent (EES) implantation reduced the incidence of restenosis and repeat revascularization in patients with calcified culprit lesions, and had fewer clinical events. Results show the rate of major cardiac adverse events in EES-treated patients with calcified lesions were higher than in those for noncalcified lesions, but remained lower than the results of previously reported stent studies. Details of both studies are published in the November issue of Catheterization and Cardiovascular Intervention, a peer-reviewed journal from The Society for Cardiovascular Angiography and Interventions.

The treatment of calcified coronary stenosis is associated with a high frequency of restenosis and target lesion revascularization (TLR). Drug-eluting stents (DES), known to reduce the rates of restenosis and TLR in patients with relatively simple coronary artery lesions when compared with bare metal stents (BMS), are now successfully being used for more advanced lesions such as calcified coronary stenoses.

The XIENCE V EES emerged in 2008 as a new option in DES. Following favorable results with this device in the SPIRIT FIRST randomized study, the SPIRIT II and III trials were performed to evaluate the EES in comparison with the widely used TAXUS paclitaxel-eluting stent (PES) in the treatment of patients with coronary artery disease. The SPIRIT studies suggested positive outcomes for EES

implantation in calcified culprit lesions, with the aim of the current analysis to confirm its safety and efficacy in patients with calcified and noncalcified culprit lesions.

In the first study, researchers from the Erasmus Medical Center in the Netherlands identified 212 patients with 247 lesions, who were treated with EES alone. Target lesions were angiographically classified as none/mild, moderate, or severe grades of calcification. The population was divided into two groups: those with at least one target lesion moderately or severely calcified (the calcified group: 68 patients with 75 calcified lesions) and those with all target lesions having mild or no calcification (the noncalcified group: 144 patients). Six-month and 2-year angiographic follow-up and clinical follow-up to 3 years were completed.

At the 6-month and 2-year follow-ups, the calcified group (compared with the noncalcified group) had significantly higher rates of in-stent angiographic binary restenosis (ABR) and ischemia-driven (ID) TLR, resulting in numerically higher major cardiac adverse events (MACE). While at 3 years, only ID-TLR tended to be higher in the calcified group than in the noncalcified group, resulting in numerically higher MACE.

"The geometry and rigidity of calcified culprit lesions often prevent optimal device delivery, deployment, and conformability," explained study leader Patrick Serruys, M.D., Ph.D. "Consequently, the treatment of this lesion subset with percutaneous coronary intervention (PCI) is associated with a high frequency of acute complications and a low-success rate. Our study showed high-clinical device success (98.7%), excellent clinical procedural success (100%), and the absence of MACE during the acute phase (up to 30 days after stent implantation) in the calcified group."

Additionally, no patient in the calcified group suffered from stent

thrombosis up to 3 years after PCI, while two thrombotic complications occurred in the noncalcified group. Although large population studies with long-term follow-up are mandatory, the authors concluded that EES implantation for calcified culprit lesions appears to be safe up to 3 years. This study also demonstrated that the rates of in-stent ABR (4.3%) and ID-TLR (5.9%) at 6 months for calcified culprit lesions are remarkably lower than that in previous BMS studies, in which these rates ranged from 12 to 23% and from 18 to 23%, respectively, suggesting that EES implantation is more effective for calcified culprit lesions than BMS implantation.

In a related study, researchers from the Wake Forrest University School of Medicine in North Carolina analyzed data from SPIRIT III clinical trial to evaluate whether EES, with thinner stent struts and polymer, results in less adverse outcomes. Findings from the SPIRIT III trial indicated that the newer generation of DES, the EES, was associated with fewer clinical events than the first generation PES. In an effort to determine whether this benefit extended to all patient subgroups, Robert Applegate, MD, FSCAI, and colleagues assessed the impact of jailed side branches on clinical outcomes and periprocedural myonecrosis within each stent treatment group.

The Wake Forest researchers identified 113 patients in the EES group and 63 patients in the PES group who met the criteria of having a lesion with a jailed side branch (less than 2 mm diameter, and less than 50% stenosis). Two-year clinical outcomes were evaluated, revealing that MACE (cardiac death, myocardial infarctions (MI), or TLR) occurred in 6.8% of EES and 19.0% of PES jailed side branch patients, with numerically lower rates of MI and TLR in the EES group, with comparable rates of cardiac death.

Use of a PES was associated with an increase in rates of periprocedural creatine kinase-MB fraction (CK-MB) elevation, which was most

prevalent in those patients with a jailed side branch. In contrast, rates of CK-MB elevation were similar in those patients receiving an EES, and lower when compared to PES, regardless of the presence or absence of a jailed side branch. The clinical outcomes at 1 and 2 years were similar in the EES treated patients with and without a jailed side branch, but were numerically higher in the PES treated patients with a jailed side branch compared to those without a jailed side branch.

Dr. Applegate concluded, "Our observations confirm previous studies demonstrating a relative increase in the incidence of periprocedural elevation of biomarkers with PES use, and demonstrate the absence of this phenomenon with EES."

More information: "Efficacy of Everolimus Eluting Stent Implantation in Patients With Calcified Coronary Culprit Lesions: Two-Year Angiographic and Three-Year Clinical Results From the SPIRIT II Study." Yoshinobu Onuma, Shuzou Tanimoto, Peter Ruygrok, Jörg Neuzner, Jan J. Piek, Ashok Seth, Joachim J. Schofer, Gert Richardt, Marcus Wiemer, Didier Carrié, Leif Thuesen, Cecile Dorange, Karine Miquel-Hebert, Susan Veldhof, and Patrick W. Serruys. Catheterization and Cardiovascular Intervention; Published Online: March 19, 2010; DOI:10.1002/ccd.22541

"Evaluation of the Effects of Everolimus-Eluting and Paclitaxel-Eluting Stents on Target Lesions With Jailed Side Branches: 2-Year Results From the SPIRIT III Randomized Trial" Robert Applegate, James Hermiller, Jerome Williams, Paul Gordon, Julie Doostzadeh, Sherry Cao, Xiaolu Su, Krishnankutty Sudhir, Alexandra Lansky, Charles Simonton, and Gregg Stone. Catheterization and Cardiovascular Intervention; Published Online: April 29, 2010; DOI:10.1002/ccd.22606