Devices Aid Artery Prep for Drug-Eluting Stents

Atheroablation could stave off thrombosis by improving stent apposition and vessel mechanics.

ARTICLES BY
JEFF EVANS
Senior Writer

WASHINGTON — Angioplasty techniques that use new devices to prepare selected complex lesions in coronary arteries for drug-eluting stents may provide better acute outcomes and potentially result in less late stent thrombosis than balloon angioplasty, Dr. Charles A. Simonton said at a symposium jointly sponsored by the Washington Hospital Center and the Cardiovascular Research Institute.

The indications for drug-eluting stents have expanded to include more patients with multivessel disease and longer and more complex lesions—those who used to be sent for coronary artery bypass grafting—because of their lower restenosis rate. This, however, has led to increased stent thrombosis rates and perhaps other as yet unknown complications, said Dr. Simonton, director of clinical innovation and research at the Carolinas Heart Institute, Charlotte, N.C.

There are no data to support the use of plaque modification with these devices to reduce restenosis, but they can help facilitate stenting procedures, he said.

"The data here are rather shallow, so a lot of it has to do with actual practical experience as opposed to strong data to support these devices," he said.

Interventional labs that take care of more complex cases "rely on these devices perhaps more than labs that do not do quite as much complex work."

The results of a meta-analysis of 16 randomized trials that compared balloon angioplasty with coronary atherectomy, laser angioplasty, or cutting ballon atherectomy in 9,222 patients showed that these debulking devices may help interventionalists get through procedures, but they increase major adverse cardiac event rates and do not improve restenosis rates or revascularization rates up to 1 year after treatment (J. Am. Coll. Cardiol. 2004;43:936-42).

'There has to be a good, strong motivational reason to use a debulking device for atheroablation in a procedure to help you get through it.'

Thus, these adjunctive devices appear to provide discouraging results in unselected patients. However, they may be beneficial in selected patients, Dr. Simonton said.

"There has to be a good, strong motivational reason to use a debulking device for atheroablation in a procedure to help you get through it," he advised.

A variety of devices may address problems related to plaque shifting, treating calcification in highly stenosed lesions, precisely dilating vessels, and reducing the risk of stent thrombosis by improving stent strut apposition and mechanical factors that may be associated with thrombosis.

► **Directional coronary atherectomy (DCA).** Dr. Simonton uses this procedure in ostial lesions, particularly true ostial stenosis of the left anterior descending coronary artery in which plaque shifting may compromise a small left circumflex artery.

Two-stent procedures should be avoided in that type of lesion.

Directional coronary atherectomy also can be used in ostial diagonal marginal branches and aorto-ostial lesions, occasionally in bifurcation lesions to help convert a two-step into a one-step procedure, in lesions near large side branches, and in some very eccentric bulky lesions.

The randomized AMIGO trial (Atherectomy Before Multilink Improves Lumen Gain and Clinical Outcomes), which compared directional coronary atherectomy followed by the multilink bare metal stent with the stent alone, showed no difference between groups in restenosis on angiography, except that restenosis was significantly lower in the subgroup of patients who had bifurcation lesions (Am. J. Cardiol. 2004;93:953-8).

► **Rotational atherectomy.** The Rotablator, a miniature, rotating, diamond-studded burr, is most effective on severely calcified lesions, which are associated with lower angiographic success and a higher rate of complications after many types of percutaneous coronary intervention.

Use of the Rotablator (Boston Scientific) before stenting in selected patients can help to avoid "stent regret" in which a lesion is covered by a partially deployed stent but is not dilatable.

This may make it difficult to get the balloon out and to get a high-pressure balloon into the stent to obtain adequate postdilatation, he said.

Small burr sizes on the Rotablator are currently preferred to alter the morphology and compliance of the plaque rather than to debulk and increase the size of the lumen.

► **Cutting balloon.** These devices provide focal dilatation by scoring and modifying the plaque without slipping from it. They work well on ostial lesions with or without calcification, lesions in small vessels, and highly resistant lesions.

► **Excimer laser.** The new technique of infusing saline while using the laser removes contrast medium and blood from the field to eliminate the large amount of bubbling that occurrs without the use of saline.

A new spatial configuration of the laser fibers also has increased the size of lumen that can be created by at least 22%.

But the laser is used more to facilitate a procedure in highly stenosed chronic total occlusions rather than to ablate a lesion.

Some of the other emerging coronary applications for the excimer laser include occluded saphenous vein grafts and in acute myocardial infarction to facilitate percutaneous coronary intervention. ■

ACS in Bare Stent Restenosis Has Low Risk, Good Prognosis

WASHINGTON — Many patients with bare metal stent restenosis have a favorable prognosis, even though they often present with acute coronary syndrome that requires intervention, Dr. Daniel H. Steinberg reported at a symposium that was jointly sponsored by the Washington Hospital Center and the Cardiovascular Research Institute.

Of 2,539 patients who presented with bare-metal stent restenosis, ACS and non-ACS patients had similar mortality and MI incidence at 30 days and 6 months.

Many interventionalists have begun to use more bare-metal stents (BMS) when they are appropriate for revascularization because of concerns over the increased risk of late stent thrombosis that has been associated with the use of drug-eluting stents and the need for prolonged use of dual antiplatelet therapy.

The increased use of BMS "will undoubtedly increase the number of patients with restenosis," said Dr. Steinberg, a fellow in cardiovascular disease at the Washington Hospital Center.

Recent reports have suggested that restenosis presents as an acute coronary syndrome (ACS) and may be associated with adverse outcomes, so Dr. Steinberg and his colleagues reviewed 2,539 patients who presented with BMS restenosis.

Most (53%) of those patients presented with features of ACS—unstable angina requiring hospitalization (46%) or myocardial infarction (7%)—whereas others had no ischemic symptoms (19%) or had stable exertional angina (28%), Dr. Steinberg stated on a poster that he presented at the symposium.

Both ACS and non-ACS patients had similar mortality at 30 days (1.2% vs. 1%) and at 6 months (3.4% vs. 3.3%). The incidence of MI also was similar at 30 days (1.3% vs. 1.4%) and at 6 months (4.7% vs. 4.3%).

Even though BMS restenosis often presents as an ACS, it "continues to be a relatively benign clinical entity," he concluded. ■

Intravascular Ultrasound Use in Stent Placement May Prevent Thrombosis

WASHINGTON — The use of intravascular ultrasound to guide the placement of drug-eluting stents may help to prevent stent thrombosis, according to findings from a review of a large database of lesions.

Lack of intravascular ultrasound (IVUS) guidance was the only significant independent predictor of stent thrombosis in a series of 5,066 native and coronary bypass graft lesions treated with the Cypher sirolimus-eluting stent or the Taxus paclitaxel-eluting stent since April 2003, Dr. Probal Roy reported during a poster session at a symposium jointly sponsored by the Washington Hospital Center and the Cardiovascular Research Institute.

The Cypher stent was approved by the Food and Drug Administration in that month, and the Taxus stent was approved in March 2004.

A total of 62 of these stented lesions presented with stent thrombosis within 1 year of their initial implantation, according to Dr. Roy of the division of cardiology at the Washington Hospital Center.

Lesions for which IVUS was used to guide drug-eluting stent placement were 58% less likely to develop stent thrombosis than were those for which IVUS was not used, according to a multivariate logistic regression analysis.

The investigators defined stent thrombosis as any partial or complete stent occlusion with or without the presence of thrombosis on angiography or autopsy.

"The use of IVUS to ensure excellent stent expansion and apposition should be considered during [drug-eluting stent] implantation in an attempt to prevent stent thrombosis," the investigators suggested. ■