Chronic Total Occlusion Success Rates Are Stalled

BY BRUCE JANCIN
Denver Bureau

CHICAGO — Cardiologists have become more willing to tackle chronic total occlusions in recent years, but their procedural success rate remains "very modest"—and essentially unchanged since the early 1990s, Dr. Ryan D. Christofferson said at the annual meeting of the Society for Cardiovascular Angiography and Interventions.

He presented a retrospective analysis of the Cleveland Clinic Foundation's prospectively acquired interventional cardiology database for 1992-2005. This study showed that the number of percutaneous coronary interventions (PCIs) performed for chronic total occlusions (CTOs) at the clinic began rising in about 2000, with access to improved operator techniques and better guidewires and other devices. But the overall procedural success rate during 1992-2005 was just 56% in the 1,003 patients who underwent 1,062 PCIs for chronic total occlusion in a native coronary vessel, with no significant year-by-year differences.

The 'very modest procedural success rate' may reflect 'increasing attempts at more difficult lesions over time.'

DR. CHRISTOFFERSON

"We do report a very modest procedural success rate, which hasn't particularly changed over time. This may reflect … increasing attempts at more difficult lesions over time," said Dr. Christofferson of the clinic.

The analysis makes it clear that there is no downside in attempting to open a CTO in the catheterization lab and there is much to be gained if the effort is successful.

Indeed, successful opening of a chronic total occlusion by PCI independently predicted improved 5-year survival in a Cox multivariate regression analysis, which conferred an adjusted 44% mortality reduction compared with the death rate in patients who underwent an unsuccessful attempt. Overall mortality in the study population was 9.4% at an average follow-up of 39 months; however, there was an absolute 7.2% increase in 5-year survival in patients with successful PCI, compared with patients in whom PCI failed to open the blockage.

Other studies have provided considerable evidence that successful treatment of CTO in patients with viable myocardium also improves other outcomes: angina, left ventricular function, need for coronary artery bypass surgery, and risk of MI.

Adverse events in the Cleveland series comprised a 4% incidence of periprocedural acute MI and a 0.7% rate of coronary perforation; most cases were asymptomatic. There were no periprocedural deaths or strokes, and 30-day mortality was 0.6%.

"The safety profile is similar to that of traditional non-CTO PCIs at the Cleveland Clinic, so the procedure doesn't appear to be associated with any increased harm to the patients in our experience," Dr. Christofferson added.

Blockages in the right coronary artery accounted for 40% of the PCIs attempted. The remainder of cases were divided equally between the left anterior descending and left circumflex arteries.

There was no significant difference in procedural success rates on the basis of an individual operator's volume of CTO PCIs. "This is consistent with my hypothesis that people take on what lesions they're able to handle. Those who are less experienced will not attempt more difficult lesions," said Dr. Christofferson.

CTO of a native coronary artery is frequently encountered at diagnostic angiography. Roughly one-quarter of patients with angiographically significant coronary artery disease have a CTO. Historically, cardiologists have been reluctant to take on these lesions because of the difficulty in opening them and the high restenosis rate, so patients were often referred for cardiac bypass surgery or left to the mercy of their collateral circulation, he said. ■

Strokes After Carotid Stenting Linked to Preventable Errors

BY MITCHEL L. ZOLER
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PHILADELPHIA — Strokes and technical failures following carotid artery stenting are often caused by preventable errors, according to an analysis of 207 procedures in high-risk patients at one center.

Based on an analysis of six strokes and four technical failures that occurred in these 207 patients, vascular surgeons at Washington University, St. Louis, have changed their carotid artery stenting protocols to avoid these errors in the future, Dr. Ravi K. Veeraswamy said at a session of the Peripheral Vascular Surgery Society during the Vascular Annual Meeting.

As a result of the errors, the group has applied the '3-30' rule: They now do not use more than three catheters or try for more than 30 minutes to cannulate.

To eliminate the errors, Washington University surgeons now use early anticoagulation before any catheter manipulation; they also limit catheter manipulation within the aortic arch, obtain a right anterior oblique view of the carotid artery and associated vessels, and match the embolic protection device and stent that they use to the patient's vascular anatomy and lesion, said Dr. Veeraswamy, a vascular surgeon at the university.

One stroke in the series was associated with inadequate anticoagulation. Systemic heparin treatment had not been started before the femoral sheath was displaced, which led to embolization within the catheter.

Two other strokes appeared to be caused by excessive manipulation of catheters within aortic arches that had severe atherosclerotic disease. As a result of these errors, the group began to apply the "3-30" rule: They now do not use more than three catheters or try for more than 30 minutes to cannulate the carotid artery.

A fourth stroke was attributed to inadequate imaging of the carotid artery and associated vessels. In this case, the surgeons relied entirely on a left anterior oblique view, but this did not provide enough anatomic information. The surgeons now routinely get a right anterior oblique image, which gives them important, additional information.

The fifth stroke was linked to stent selection. There is increasing awareness that open-cell stents can allow soft plaque to extrude through the stent struts and potentially cause embolization. Although open-cell stents have better mobility and are easier to use in vessels with difficult anatomy, the threat of embolization is a major drawback. In the case evaluated, the patient received an open-cell stent and within 2 hours began to show neurologic complications. Imaging showed that small particles were pushed through the stent cells. The surgeons placed a second, closed-cell stent inside of the open-cell stent, and the neurologic symptoms resolved.

The sixth stroke case involved an embolic protection device that was not suited to work in a long and irregular lesion that had a difficult anatomy. A better approach in such patients is flow reversal to remove emboli. In the current series of 207 patients, flow reversal was used in 27% of patients, a higher rate than in other reported series, Dr. Veeraswamy said.

The four technical failures included a conversion to carotid endarterectomy after the carotid artery was dissected by an advancing sheath. A second conversion to open surgery was done because circumferential arterial calcification caused persistent, severe stenosis. Two other patients had their stenting aborted when it became apparent that their lesions could not be safely crossed with a stent. ■

Stroke Risk Cut by 67%

Enoxaparin *from page 1*

25, involved the 4,676 participants in the larger trial who subsequently underwent percutaneous coronary intervention with stenting. (See box.) The purpose was to learn whether the advantages documented with enoxaparin in the overall study, in which the great majority of participants were managed medically, held up in patients undergoing invasive revascularization.

Dr. Gibson said the PCI-EXTRACT-TIMI 25 findings make enoxaparin the preferred anticoagulant in the setting of ST-elevation MI because it is safe and effective in both the medical and PCI settings.

Enoxaparin is also much easier to use, he added. In the catheterization laboratory, it offers the practical advantage of avoiding the cumbersome monitoring of activated clotting time required when using unfractionated heparin, he explained.

Dr. Christian W. Hamm commented that PCI-EXTRACT-TIMI 25 has what he looks for in a high-quality clinical trial: a large sample size, randomization, a double-blind design, and objective clinical end points. The study, he said, makes a convincing case for enoxaparin as a good option in patients with a relatively low risk of periprocedural bleeding. However, other large trials have shown that fondaparinux, a selective inhibitor of factor Xa, carries a substantially lower bleeding risk than either enoxaparin or unfractionated heparin does, making it an attractive option in patients at increased risk.

The other important point regarding PCI-EXTRACT-TIMI 25 is that the results shouldn't be extrapolated to the large population of ST-elevation MI patients encountered in clinical practice who have renal insufficiency, because impaired kidney function was a study exclusion criterion, said Dr. Hamm of the Kerckhoff Heart Center in Bad Nauheim, Germany.

PCI-EXTRACT-TIMI 25 was sponsored by Sanofi-Aventis. ■

Key 30-Day Outcomes in PCI-EXTRACT-TIMI 25

	Death or Recurrent MI	Stroke	Recurrent MI
Enoxaparin group	10.7%	0.3%	7.8%
Unfractionated heparin group	13.8%	0.9%	10.9%
Relative risk reduction with enoxaparin	23%	67%	28%

Note: Based on data from 4,676 patients.
Source: Dr. Gibson

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