Undersized Stents Boost Thrombosis Risk 10-fold

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MUNICH — The most powerful risk factor for coronary stent thrombosis was undersizing of the stent, in a review of 437 episodes of stent thrombosis.

Other major risk factors for coronary stent thrombosis included stopping treatment with clopidogrel (Plavix), malignancy, less-than-ideal coronary blood flow following stent placement, and the presence of other significant coronary stenoses near the stented segment, Dr. Jochem W. van Werkum and his associates reported in a poster at the annual congress of the European Society of Cardiology.

The analysis also revealed that the patients with the greatest risk for stent thrombosis are those who receive one or more coronary stents to treat an ST-elevation myocardial infarction. The incidence of stent thrombosis in this group of 5,842 patients was 4.3%. Patients who received a stent for unstable angina or a non–ST-elevation myocardial infarction, 3,960 patients in the review, had a 1.8% rate of stent thrombosis; those stented to treated stable angina, 11,207 patients reviewed, had a 1.0% rate, reported Dr. van Werkum, a cardiologist at St. Antonius Hospital in Nieuwegein, the Netherlands, and his associates.

The Dutch Stent Thrombosis Study reviewed 21,009 patients who received at least one coronary stent at any one of several participating Dutch centers during January 2004–February 2007. The group included 437 patients with definite stent thrombosis. About 60% had received a bare-metal stent, and the remainder received a drug-eluting stent.

In 32%, the thrombosis appeared acutely after stenting (within 24 hours); in 41%, it occurred subacutely (within 30 days); in 13%, it occurred late (within 6 months); and in 5%, the thrombosis appeared very late (at least 6 months after placement).

To assess the role of various risk factors, the researchers did a case-control analysis that compared the prevalence of each factor among each patient who developed thrombosis (the cases), with two patients from the study who did not develop thrombosis (the controls). The cases and controls were matched for the clinical indication that led to stent placement, the date of their index procedure, and the center where the stenting was done.

For the entire group, stent undersizing (when the stent diameter is smaller than the coronary artery it's placed in) was linked with a greater than 10-fold increased risk of thrombosis. Less-than-ideal blood flow through the artery following stenting (less than TIMI grade 3 flow) was linked with an almost fivefold increased risk. Malignancy was linked with about a fourfold increased risk, as was a significant coronary stenosis just proximal to the stented region.

Other significant risk factors for thrombosis for all patients included dissection, no aspirin treatment, stenting at a bifurcation, a left ventricular ejection fraction of less than 30%, a significant stenosis distal to the stented segment, and multivessel disease. For every 10-year increase in the patient's age, the risk for thrombosis fell by 17%.

An early halt to clopidogrel treatment was another potent risk factor, although its impact varied depending on when treatment stopped. When clopidogrel stopped during the first 30 days, the risk was boosted 36-fold. Stopping clopidogrel between 30 days and 6 months increased the risk more than fourfold, and stopping clopidogrel after 6 months boosted the risk for thrombosis by nearly sixfold.

The analysis also assessed risk factors in several subgroups of patients. Among those who received a stent for unstable angina, the top risk factors were undersizing, significant coronary disease distal to the stented segment, and malignancy. ■

Risk Factors for Stent Thrombosis

RISK FACTOR	ODDS RATIO FOR RISK CHANGE
Clopidogrel halted < 30 days after stent placement	36.5
Undersizing of stent	10.7
Clopidogrel halted > 6 months after stent placement	5.9
Poor coronary blood flow after stenting (TIMI grade < 3)	4.7
Clopidogrel halted 30 days to 6 months after stent placement	4.6
Malignancy	4.4
Coronary stenosis of at least 50% proximal to stented segment	4.2
Dissection	3.6
No aspirin	2.6
Stent placed at bifurcation	2.5
Left ventricular ejection fraction less than 30%	2.2
Coronary stenosis of 50% or greater distal to stented segment	1.9
Multivessel disease	1.7
Increased age (for each additional 10 years)	0.83

Note: Based on a study of 21,009 patients who received at least one coronary stent. All odds ratios are statistically significant.
Source: Dr. van Werkum