

Kubo and colleagues [Kubo T et al. *J Am Col Cardiol* 2010] used virtual histology (VH) IVUS to investigate the natural history of coronary artery lesion morphology. Lesions were classified into pathological intimal thickening (PIT), 6 thin-capped fibroatheroma (TCFA), thick-capped fibroatheroma (ThCFA), fibrotic plaque, and fibrocalcific plaque. Over the 12 months of follow-up, most VH-TCFAs healed; however, new VH-TCFAs also developed. PITs, VH-TCFAs, and ThCFAs showed significant plaque progression compared with fibrous and fibrocalcific plaque, indicating that this is a dynamic disease.

Transfemoral and Percutaneous TAVI: Prediction and Management of Vascular Complications

Written by Maria Vinall

Patients with severe aortic stenosis and high surgical risk can be treated less invasively with transcatheter aortic valve implantation (TAVI). Different access routes have been proposed for TAVI, including transapical, transsubclavian, and transfemoral, with percutaneous transfemoral being preferred because it is the least invasive and nonsurgical. Bernard Chevalier, MD, Institut Cardiovasculaire Paris Sud, Massy/Quincy, France, presented data from the Massy TAVI database regarding the institute's early and later experience with performing 170 transfemoral TAVIs (140 patients with full percutaneous approach).

Patients in the early and later experience groups had similar demographics, patients in the later group were at higher risk, based on Euro scores (26.9 ± 11.8 vs 21.1 ± 10.7 in the late group; $p=0.003$) and left ventricular ejection fraction (LVEF; 45.8 ± 13.1 vs 54.3 ± 14.2 in the late group; $p<0.001$). Access vessel diameter was measured angiographically or with multislice computed tomography (MSCT). Patients were required to have calcification and tortuosity scores between 0 and 3. Vascular complications (20 patients vs 8 in the late group; $p=0.012$) occurred significantly more often among patients in the early group, most likely due to a learning curve with the Prostar device. This translated into longer intensive care unit stays (7.5 vs 3.3 days; $p=0.039$) in the earlier cohort, despite their lower risk profile.

The optimum sheath:femoral artery ratio (SFAR) was 1.05 mm. Ratios that were higher than this were associated with significantly ($p<0.05$) more frequent femoral artery, iliac artery, and Valve Academic Research Council (VARC) major and minor vascular complications, as well as mortality (both in-hospital and 30-day). Factors that

were predictive of major VARC complications were body mass index, early experience, SFAR, and femoral artery minimum luminal diameter.

Prof. Chevalier presented his top tips to reduce vascular access complications during TAVI:

- Do not use an 18F sheath if common femoral artery (CFA) <6.8 mm
- Stick the middle of the anterior wall of the CFA
- Use fluoroscopy to check the deployment of the 4 needles
- Introduce large sheath only on extra stiff wire
- Progress with a back-and-forth rotation
- Eliminate large iliac dissections before removing the sheath
- Make the surgical knots with wet sutures at the end of the TAVI
- Keep the wire in place when pushing the first knot
- Check angiographically from the opposite side after closure

In order to deal with potential complications, it is important to be comfortable with specific techniques, including a crossover, balloon angioplasty, femoral stenting, and covered stenting. In concluding, Prof. Chevalier stressed the following:

- A full percutaneous approach allows a less invasive solution, but the operator will need to overcome a learning curve
- Avoid transfemoral TAVI if the CFA <6.8 mm, even with Corevalve (SFAR >1.05)
- A team approach is necessary (particularly if experience is limited)
- Optimal patient screening, approach selection, and device refinement may improve outcomes

Revascularization in the Diabetic Patient

Written by Maria Vinall

Diabetes is an independent predictor of many serious adverse events, including major adverse cardiac events (MACE). Spencer King, MD, St. Joseph's Heart and Vascular Institute and Emory University, Atlanta, Georgia, USA, reviewed several studies that evaluated revascularization in diabetic patients who have stable coronary artery disease (CAD). Dr. King discussed the issues that surround

the choice of revascularization approach and whether it is needed at all for this group of patients.

The consensus from the studies that he reviewed indicates that interventional revascularization is gaining parity with surgery for those diabetic patients who fall into a high-risk group, but for stable patients without high-risk CAD and ischemia, revascularization can be deferred. Intensive medical interventions, as described in consensus guidelines [Smith SC Jr. *Circulation* 2006], are recommended for all diabetic patients with CAD.

The Emory Angioplasty versus Surgery Trial (EAST), which compared coronary angioplasty (percutaneous transluminal coronary angioplasty; PTCA) with coronary bypass surgery (coronary artery bypass graft; CABG) for patients with multivessel CAD, was the first study to suggest slightly (but not significantly) better survival outcomes for diabetic patients who received CABG compared with those who received angioplasty [King SB III et al. *J Am Coll Cardiol* 2000]. This trend was confirmed in the Bypass Angioplasty Revascularization Investigation (BARI I) trial, in which the survival rate for diabetic patients who received CABG was significantly ($p=0.001$) improved when compared with those who received PTCA [King SB III et al. *N Engl J Med* 1994]. This difference was not apparent when comparing similar procedures in nondiabetic patients.

The SYNTAX (Synergy between PCI with TAXUS and Cardiac Surgery) trial, which assessed the optimal revascularization strategy for patients with previously untreated three-vessel or left main CAD, reported no difference between the treatment approaches in medically treated diabetic patients with regard to all-cause death/cerebrovascular events/myocardial infarction (MI) at 12 months. However, a follow-up subgroup analysis suggested that at 1 year, the MACE and cerebrovascular event rates were higher in the angioplasty group, driven by an increase in repeat revascularization and MACE in patients with high SYNTAX scores [Banning AP et al. *J Am Coll Cardiol* 2010].

One year results from the Coronary Artery Revascularization in Diabetes (CARDIA) trial showed no apparent difference between CABG and PCI in terms of the composite endpoints of death, nonfatal MI, and non-fatal stroke; however, repeat revascularization was higher in the PCI group, which was expected [Kapur A. ESC 2008].

The question of which treatment approach is best, remains unanswered. The Future REvascularization Evaluation in patients with Diabetes mellitus: Optimal management of Multivessel disease (FREEDOM; NCT00086450) Trial is an ongoing study that is designed to provide the definitive answer to which treatment approach is best. This trial

enrolled 1901 patients with diabetes and multivessel CAD who were eligible for PCI or CABG. Results are anticipated in 2012.

But is revascularization needed in all diabetic patients with CAD? The BARDI 2D trial compared prompt revascularization with delayed or no revascularization for patients with type 2 diabetes, CAD, and ischemia and no prior CABG or PCI within the past 12 months. The choice of PCI or CABG was selected, based on clinical or angiographic factors. Among high-risk patients (based on angiographic severity) who were selected for CABG, prompt revascularization reduced major cardiovascular (CV) events compared with delayed or no revascularization ($p=0.01$). Among lower-risk patients who were selected for PCI, the rates of major CV events were similar for the three options.

CV morbidity is a major burden in patients with type 2 diabetes. A target-driven, long-term, intensified intervention that is aimed at multiple risk factors in patients with type 2 diabetes and microalbuminuria reduces the risk of CV and microvascular events by about 50% [Gaede P et al. *New Engl J Med* 2003].

Strategies for Thrombus Management In STEMI Interventions

Written by Phil Vinall

“The major procedural difference between elective primary percutaneous coronary intervention (PCI) and an ST-segment elevation myocardial infarction (STEMI) intervention is thrombus, and you will encounter thrombus,” warned Sameer Mehta, MD, University of Miami, Miami, Florida, USA. “The major component of intervention for STEMI is understanding thrombus and how to manage it effectively.”

In a retrospective study that investigated the impact of thrombus burden on clinical outcomes in 812 consecutive patients who were treated with drug-eluting stents (DES), large thrombus burden (defined as thrombus burden ≥ 2 vessel diameters) was an independent predictor of mortality (HR, 1.76; $p=0.023$) and major adverse cardiac events (MACE; HR, 1.88; $p=0.001$) [Sianos G et al. *J Am Coll Cardiol* 2007]. Small thrombus burden was associated with less distal emboli and incidence of no reflow, greater final TIMI 3 flow, and higher rates of myocardial blush grade 3. The initial amount of thrombus impacted both acute and long-term outcomes.

Svilaas and colleagues randomly assigned 1071 patients to receive manual thrombus aspiration or conventional