

# Interventional Cardiology



## NEWS



## RESEARCH HIGHLIGHTS



## Postdilation cryoplasty may be a potential adjunctive treatment in diabetics with peripheral arterial disease

Results from a recent trial suggest that postdilation cryoplasty of nitinol stents could significantly reduce in-stent restenosis in diabetics with peripheral artery disease.

In a recent study published in the *Journal of the American College of Cardiology*, a collaboration of scientists from the USA concluded that postdilation of nitinol stents in the superficial femoral artery with a cryoplasty balloon is an effective course of treatment for diabetic patients with peripheral arterial disease.

The current method of stenting of the femoropopliteal artery in patients with diabetes mellitus and claudication is associated with a high rate of in-stent restenosis. Cryoplasty is carried out using a balloon catheter (PolarCath, Boston Scientific, MA, USA) that is inflated with nitrous oxide in the femoropopliteal artery at the position of the lesion and freezes the arterial plaque. This causes vessel dilation (thereby reducing trauma), minimizes the recoil of the vessel and reduces neointima formation.

The results are detailed in a recent publication covering the COBRA trial: a prospective, multi-center, randomized trial conducted in a patient subgroup with diabetes mellitus, symptomatic peripheral arterial disease and lesions of the femoropopliteal artery that require stenting.

Seventy four patients, with 90 stented superficial femoral artery lesions (of which half were total occlusions), were given postdilation with either cryoplasty or conventional balloons. They were then followed-up over a 12-month period, with the primary end point being binary restenosis (at least a 2.5-fold increase in peak systolic velocity in the stented area).

In the group receiving postdilation with a cryoplasty balloon, binary restenosis was significantly reduced when compared with the conventional balloon group (29.3 and 55.8%, respectively). There was also an improvement in the secondary end point of the ankle-brachial index in the group receiving cryoplasty, but not in patients receiving the conventional balloon angioplasty.

The researchers claim that postdilation of superficial femoral artery stents with cryoplasty is an effective adjunctive treatment and can cause a significant decrease in the risk of restenosis in diabetic patients with peripheral arterial disease. According to the team, a larger trial, with more diverse patient groups (both diabetics and nondiabetics) is now needed in order to ascertain whether this method can be used conventionally in the clinic.

Source: Banerjee S, Das T, Abu-Fadel M et al. Pilot trial of cryoplasty or conventional balloon postdilation of nitinol stents for revascularization of peripheral arterial segments. *J. Am. Coll. Cardiol.* 60(15), 1352–1359 (2012).



## New device shows potential for closure of the left atrial appendage

*Results from a study utilizing the Lariat® device for left atrial appendage closure in patients with atrial fibrillation suggest that this procedure is both safe and effective.*

Researchers at the University of California San Francisco (CA, USA) have produced an observational study demonstrating a high success rate of the Lariat® (SentreHeart, Inc., CA, USA) device for the closure of the left atrial appendage (LAA) in patients with atrial fibrillation (AF).

Patients with AF are at risk of embolic stroke, but this risk has been shown to be significantly decreased with exclusion of the LAA. The Lariat device is a catheter-based device that is guided epicardially over the LAA and consists of a snare with a pretied suture.

Eighty nine patients with nonvalvular AF underwent LAA closure using the Lariat device in this single-center, observational study, published in the *Journal of the American College of Cardiology*. Candidates were an average of 62 years old, with at least one risk factor for embolic stroke and were contraindicated to, or intolerant of, anticoagulation therapy. The entire procedure took a median time of 45 min and the majority

of patients only required one pericardial access attempt. LAA closure (defined as a residual leak of less than 1mm by color flow Doppler) was monitored with contrast fluoroscopy and transesophageal echocardiography (TEE) immediately, then with TEE after 1 day, 30 days, 90 days and 1 year.

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***“The results appear promising and have the potential to benefit patients with atrial fibrillation...”***  
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Eighty five of these patients presented with successful LAA closure, with 81 of those patients having complete ligation immediately. No complications arose as a direct result of the device. There were, however, three access-related complications. After 90 days, 95% of the 81 patients undergoing TEE showed complete closure and after 1 year, 98% of

the 65 patients undergoing TEE showed complete closure. The procedure was associated with few adverse events but two cases of postoperative pericarditis were recorded, along with one case of unexplained sudden death and two cases of nonembolic stroke.

According to the researchers, the purpose of this study was to demonstrate the safety and efficacy of this procedure. The results appear to be promising and have the potential to benefit patients with AF who are poor candidates for coagulation therapy. The researchers state that the next step will be to set up a registry with long-term data in order to compare the Lariat device with other medical therapy trials.

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 Source: Bartus K, Han FT, Bednarek J et al. Percutaneous left atrial appendage suture ligation using the LARIAT device in patients with atrial fibrillation: initial clinical experience. *J. Am. Coll. Cardiol.* doi:10.1016/j.jacc.2012.06.046 (2012) (Epub ahead of print).

## Call for closer follow-up of patients with left bundle branch block

*Research highlights dangers of persistent left bundle branch block following transcatheter aortic valve implantation.*

In a recent study published in the *Journal of the American College of Cardiology*, a team of researchers from Laval University (Sainte-Foy, Canada) have evaluated the occurrence and prognostic value of persistent left bundle branch block (LBBB) following transcatheter aortic valve implantation (TAVI) with a balloon-expandable valve.

It has long been understood that LBBB is a risk associated with TAVI, but the prognostic significance has remained largely unknown. Most conduction abnormalities

resolve themselves within days of the procedure. These transient cases do not appear to be associated with any harmful clinical outcomes. Cases of new-onset, persistent LBBB are associated with an increased risk of syncope, complete atrioventricular block and a requirement for permanent pacemaker implantation (PPI).

The study comprised 202 consecutive patients with no baseline ventricular conduction abnormalities or previous PPI who were subject to TAVI with a balloon-expandable aortic valve (Sapien XT™,

Edwards Lifesciences, CA, USA). Patients averaged 80 years of age and 60% were female. Patients were monitored by ECG daily until discharge.

Sixty one patients presented with new-onset LBBB after TAVI during their time in hospital. LBBB had resolved in 37.7% of patients at the time of discharge, and in 57.3% at the 6–12-month follow-up. Four of the patients with persistent LBBB at discharge needed PPI due to high-degree atrioventricular block. Of the 25 patients who presented with persistent LBBB at



discharge, 16% developed syncope and 20% experienced complete atrioventricular block, and therefore required PPI. Persistent LBBB was associated with a 4.75% decrease in left ventricular ejection fraction at 1 year, whereas in patients with transient or no LBBB at discharge, a 2.52% increase in left ventricular ejection fraction was observed.

It was also observed that the depth of prosthesis in the ventricle and a longer baseline QRS complex were associated

with a higher risk of LBBB. The authors state that these results highlight a requirement for closer follow-up of patients with LBBB, including regular ECG monitoring, or potentially Holter monitoring.

Source: Urena M, Mok M, Serra V et al. Predictive factors and long-term clinical consequences of persistent left bundle branch block following transcatheter aortic valve implantation with a balloon-expandable valve. *J. Am. Coll. Cardiol.* 60(18), 1743–1752 (2012).

## Researchers warn against off-label use of dabigatran with mechanical valves

*A recent report highlights two cases where patients with mechanical valves have suffered adverse effects after being switched from warfarin to dabigatran.*

In a letter to the editor, published in the *Journal of the American College of Cardiology*, researchers from the University of Ottawa Heart Institute (ON, Canada) have warned against off-label use of dabigatran in patients with mechanical heart valves. The team detail two cases in which patients with prosthetic valves, who had been compliant with warfarin anticoagulation therapy, were switched to dabigatran and experienced subsequent valve thrombosis.

Dabigatran is a novel anticoagulant thrombin inhibitor that has been accepted for use in the treatment of nonvalvular atrial fibrillation. It is a potential candidate for an alternative to warfarin, but it has not yet been adequately tested for other indications.

The first case studied was that of a 51-year-old woman who had undergone a mechanical aortic valve replacement 8 years previously. She had been compliant with warfarin and had suffered no adverse effects, but 2 months earlier had been switched to dabigatran (150 mg twice daily). The patient presented with a 4-week history of progressive exertional dyspnea. An ECG showed left ventricular dysfunction with severe prosthetic valve

stenosis. The patient went into cardiogenic shock before being operated on and presented with an activated partial thromboplastin time of 27 s. Surgical intervention revealed severe valve thrombosis.

“...these cases demonstrate the importance of testing each medication for use with specific indications.”

The second case reported a 59-year-old female who had undergone mechanical mitral valve replacement in 2007 for rheumatic disease with no adverse effects. 3 months after being switched to dabigatran (150 mg twice daily) from warfarin, the patient reported progressive dyspnea over the previous 2 months. Transesophageal ECG revealed a large thrombus on the prosthetic valve and the patient had an activated partial thromboplastin time of 54 s.

In both cases, dabigatran was halted, the thrombotic valves replaced, and both patients experienced an uneventful recovery. Both patients had experienced

no complications whilst using warfarin after mechanical valve replacement but became symptomatic shortly after being switched to dabigatran and went on to be given the diagnosis of valve thrombosis. The authors stress that a causal link is not definite but the evidence for an association is strong.

Although dabigatran has undergone extensive clinical trials for approval for use in the treatment of nonvalvular atrial fibrillation, it has currently only been tested *in vitro* and in animal models for use in mechanical valve anticoagulation therapy.

According to the authors, these cases demonstrate the importance of testing each medication for use with specific indications. The authors state that, although dabigatran does have the potential to be applicable for this indication, extensive dose-finding studies and clinical trials are needed to understand safety and efficacy before its use in a clinical setting. Until this time, off-label use of this drug should be avoided.

Source: Price J, Hynes M, Labinaz, M et al. Mechanical valve thrombosis with dabigatran. *J. Am. Coll. Cardiol.* 60 (17), 1710–1711 (2012).

### About the News and Views

The News and Views highlights some of the most important events and research in the field of interventional cardiology. If you have newsworthy information, please contact: Michael Dowdall, Managing Commissioning Editor, *Interventional Cardiology*, Future Medicine Ltd, Unitec House, London, N3 1QB, UK; m.dowdall@futuremedicine.com



## Fractional flow reserve-guided intervention shows promise for the treatment of stable coronary artery disease

*Study demonstrates improved patient outcomes when fractional flow reserve measurements are used to guide interventions in the treatment of stable coronary artery disease.*

A recent publication in the *New England Journal of Medicine* has revealed the results of the FAME II trial, which build upon data from the original FAME trial, that demonstrated improved outcomes and cost savings when fractional flow reserve (FFR) was used to guide procedures. These updated findings demonstrated that, in patients with stable coronary artery disease, FFR-guided stenting, when combined with the best available medical therapy, was associated with more favorable outcomes than with medical therapy alone.

FFR is measured using PressureWire™ FFR measurement systems (St. Jude Medical, Inc. MN, USA) and it highlights the severity of coronary artery lesions, thereby identifying the arteries that require stenting.

In the FAME II trial, patients with an FFR of  $\leq 0.80$  were randomly allocated to FFR-guided stenting with the best available medical therapy (PCI group) or the best available medical therapy alone (MT

group). The primary end points included death, myocardial infarction and urgent revascularization.

The trial registered 1220 patients with stable coronary artery disease across the USA, Canada and Europe. Enrollment was terminated prematurely on ethical grounds after it was found that patients in the PCI group had significantly fewer primary end point events than those in the MT group (4.3 and 12.7%, respectively). FFR-guided stenting plus the best available medical therapy was associated with an 86% decrease in hospital re-admission and requirement for urgent revascularization.

Researchers claim that this trial provides convincing evidence that, for patients with stable coronary artery disease with at least one functionally significant stenosis, FFR-guided stenting plus the best available medical therapy, as opposed to the best medical therapy alone, was associated with superior clinical outcomes, namely, a significant reduction in the requirement

for urgent revascularization. By accurately identifying which occlusions warrant stenting, this method has the potential to save substantial resources, as well as improving patient outcomes.

St Jude Medical, Inc. have also announced the results of an analysis revealing that the use of FFR-guided intervention has the added benefit of saving a significant amount of money. Original data from the FAME trial were analyzed to determine cost–effectiveness and results suggest that the procedure could save the British healthcare system over £1.1 million over 2 years.

Sources: De Bruyne B, Pijls NH, Kalesan B et al. Fractional flow reserve-guided PCI versus medical therapy in stable coronary disease. *N. Engl. J. Med.* 367(11), 991–1001 (2012); St. Jude Medical, Inc. press release: <http://investors.sjm.com/phoenix.zhtml?c=73836&p=irol-newsArticle&ID=1565982&highlight=>

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