revealed adequate stent apposition. Postprocedure coronary blood flow was normal (TIMI 3), and there was good myocardial blush. Dr. St. John speculated that secondary problems in this patient may have increased the risk of stent thrombosis, such as lack of absorption of antiplatelet therapy in the setting of vomiting and the very quick time from door to balloon. This was based on a study that showed that among patients with STEMI undergoing primary PCI, antiplatelet action by ticagrelor (46% of platelets still active) was significantly delayed at 2 hours [Alexopoulos D et al. *Circ Cardiovasc Interv* 2012]. In addition and as noted, this patient received bivalirudin, which has been associated with increased rates of acute stent thrombosis relative to heparin.

The patient was admitted to the intensive care unit, placed on beta-blockers, angiotensin-converting enzyme I, and statins. He was discharged 4 days later and subsequently lost to follow-up.

Dr. St. John's key message was that there are many decision points along the way from door to balloon and decisions should be made according to evidence-based medicine. Platelet inhibition with newer agents is rapid but not instantaneous. Depending on time to PCI and risk factors for poor absorption (cardiogenic shock, vomiting), physicians should consider adjunctive treatment with a GP IIb/IIIa receptor antagonist IIb/IIIa as a "bridge" to adequate platelet inhibition with oral agents.

An additional lesson in this case is the importance of systems to maximize patient follow-up. This patient's risk of recurrent event is highest in the first year after his MI, particularly in the first 30 days. Compliance with evidence-based medications, including aspirin, ticagrelor (twice daily), statin therapy, and beta-blocker therapy, is critical; however, he was lost to follow-up after discharge. Should he remain stable for 1 year after his MI the next decision point with regard to antiplatelet therapy will be whether to continue his ticagrelor beyond 1 year. Currently, there are no data to answer this question. Nonetheless, the DAPT trial is anticipated to report in 2014 and the PEGASUS-TIMI 54 trial in 2015, and these will provide important evidence to support clinical decision making.

## Improving Outcomes in HF and Aortic Valve Stenosis With Advanced Technologies

Written by Toni Rizzo

Brian T. Bethea, MD, Tenet Florida Region, Florida, USA, discussed advanced treatments for heart failure (HF) and severe aortic stenosis (SAS). Patients with advanced HF require special intervention, including left ventricular assist device (LVAD) implantation. Studies of the HeartMate II LVAD reported 79% to 90% rates of survival to transplant, recovery, or ongoing device support at 180 days [John R et al. *Ann Thorac Surg* 2011; Starling RC et al. *J Am Coll Cardiol* 2011; Pagani FD et al. *J Am Coll Cardiol* 2009; Miller LW et al. *N Engl J Med* 2007] and 58% to 63% 2-year survival [Park SJ et al. *Circ Heart Fail* 2012; Slaughter MS et al. *N Engl J Med* 2009].

The Heartware Bridge to Transplant trial reported 82% survival at 2 years, with 34% still on the device, 40% transplanted, and 8% recovered [Strueber M et al. *J Am Coll Cardiol* 2011].

Recent LVAD improvements include decreased size and increased durability. Next-generation LVADs include the HeartMate III, HeartMate X, and HeartMate FILVAS.

SAS is life-threatening, and it progresses rapidly. In the PARTNER trial, 50% of inoperable patients died within 1 year [Leon MB et al. *N Engl J Med* 2010]. The 2014 Valvular Heart Disease guidelines recommend valve replacement for most patients with SAS promptly after symptom onset [Nishimura RA et al. *J Am Coll Cardiol* 2014]. Surgical aortic valve replacement (SAVR) is recommended for low- to moderate- and high-risk patients; transcatheter aortic valve replacement (TAVR) is recommended for high- and greater-risk patients.

The PARTNER trial evaluated TAVR versus SAVR in high-risk operable SAS patients (cohort A) [Smith CR et al. *N Engl J Med* 2011] and TAVR versus standard therapy in inoperable SAS patients (cohort B) [Leon MB et al. *N Engl J Med* 2010]. At 1 year, all-cause mortality in cohort A was 24.3% versus 26.8% in the TAVR and SAVR arms, respectively ($p = .001$ for noninferiority). Symptom improvement and hemodynamic performance were similar in both groups. There was no significant difference in stroke rates despite increased periprocedural events after TAVR at 30 days or 1 year; rates of all neurologic events were higher in the TAVR group at 30 days and 1 year ($p = .04$, both). In cohort B, TAVR versus standard therapy patients had a 25% absolute mortality reduction. Major vascular complications and major bleeding were more significant in the TAVR group at 30 days and 1 year ($p < .001$, all).

The CoreValve pivotal trial had superior 1-year all-cause mortality with TAVR (14.2%) versus SAVR (19.1%; $p = .04$) [Popma et al. *N Engl J Med* 2014]. Several next-generation valve systems are under development.

Dr. Bethea stressed the importance of a multidisciplinary approach to the treatment of HF and SAS patients, using a "shared care model" [Dickstein K et al. *Eur Heart J* 2008].