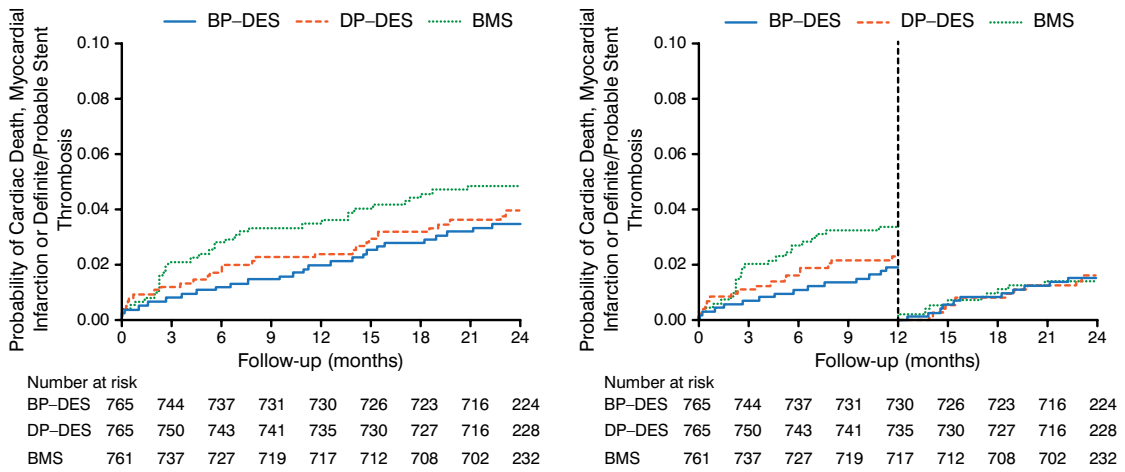
Figure 2. Key Safety Secondary End Point Between BP-DES and BMS



BMS, bare metal stent; BP-DES, biodegradable-polymer drug-eluting stent; DP-DES, durable-polymer drug-eluting stent.

Adapted from Kaiser C et al. Long-Term Efficacy and Safety of Biodegradable-Polymer Biolimus-Eluting Stents Main Results of the Basel Stent Kosten-Effektivitäts Trial- PROspective Validation Examination II (BASKET-PROVE II), A Randomized, Controlled Noninferiority 2-Year Outcome Trial. *Circulation*. E-pub ahead of print. DOI: 10.1161/CIRCULATIONAHA.114.013520. Accessed December 10, 2014. With permission from American Heart Association, Inc.

superior to BMS in efficacy. There was no evidence of superior safety of BP-DES beyond 1 year. The findings do not support the idea that polymers are key in the perceived association of DP-DES with very late ST, although the trial was not powered to definitively assess this.

SYNERGY Everolimus-Eluting Stent Noninferior to PROMUS Element Plus: Results From EVOLVE II Randomized Clinical Trial

Written by Brian Hoyle

Dean J. Kereiakes, MD, Christ Hospital Heart and Vascular Center, Cincinnati, Ohio, USA, reported on the primary outcomes of the prospective, randomized, single-blind, multicenter EVOLVE II Clinical Trial to Assess the SYNERGY Stent System for the Treatment of Atherosclerotic Lesion(s) [EVOLVE II; NCT01665053], which assessed the safety and effectiveness of 2 different everolimus-eluting stents, the second-generation SYNERGY stent and the PROMUS Element Plus durable-polymer drug-eluting stent (DP-DES).

The polymer in a DES acts as a drug reservoir and allows for the programmed release of the drug. Once drug release is complete, the polymer has no function and, if it becomes physically damaged, may be detrimental, leading to late/very late stent thrombosis (ST), chronic inflammation, late restenosis, or hypersensitivity. The SYNERGY stent features a platinum chromium platform coated with poly (lactic-co-glycolic acid). Everolimus is subsequently applied to the surface of the biodegradable coating.

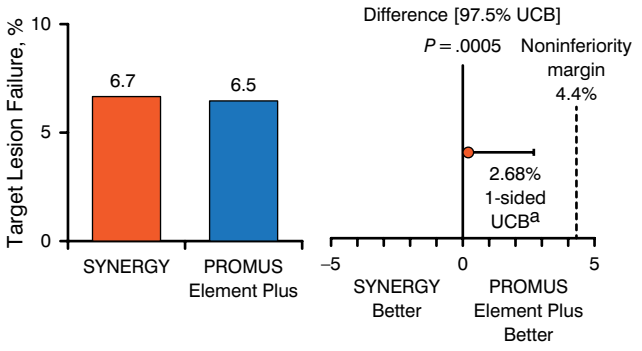
Drug release occurs fairly constantly and in parallel with polymer degradation. The potential value of the design has been indicated in a porcine model and in the 30-day EVOLVE trial involving 291 patients [Meredith IT et al. *J Am Coll Cardiol.* 2012]. These data prompted the EVOLVE II trial, in which 1684 patients were randomized to treatment with the DP-DES (n = 842) or the SYNERGY stent (n = 842). Exclusion criteria were left main disease, chronic total occlusion, saphenous vein graft, in-stent restenosis, and recent STEMI.

Patients received acetylsalicylic acid plus clopidogrel, ticlopidine, prasugrel, or ticagrelor for at least 6 months. The primary end point in the intention-to-treat and per-protocol populations was target lesion failure at 12 months (defined as a composite of cardiac death, myocardial infarction [MI], or ischemia-driven revascularization). Secondary end points included the individual components of target lesion failure, definite or probable ST (Academic Research Consortium definition), technical and clinical success of stenting, and longitudinal deformation of the stent.

Baseline characteristics in the 2 groups were similar for a number of demographic and clinical features. Procedural and postprocedural characteristics and outcomes were also comparable between groups. Antiplatelet medication use was similar at 6 and 12 months.

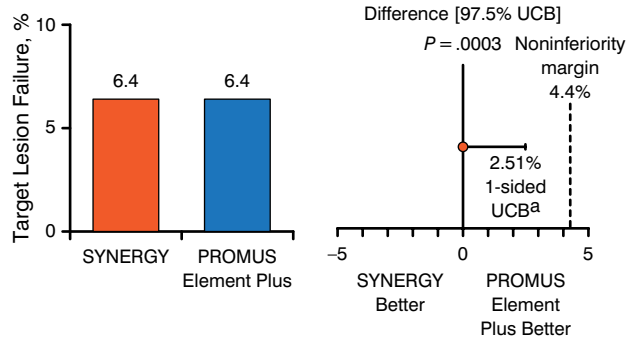
At 1 year, complete follow-up was available in 806 (96.2%) patients in the DP-DES group and 831 (98.2%) patients in the SYNERGY group. The primary end point

Figure 1. Primary End Point in the Intention-to-Treat Population



[a]One-sided 97.5% Farrington-Manning upper confidence bound.
UCB, upper confidence bound.
Reproduced with permission from DJ Kereiakes, MD.

Figure 2. Primary End Point in the Per-Protocol Population



[a]One-sided 97.5% Farrington-Manning upper confidence bound.
UCB, upper confidence bound.
Reproduced with permission from DJ Kereiakes, MD.

in the intention-to-treat and per-protocol populations respectively occurred in 6.7% and 6.5% of patients receiving the SYNERGY or DP-DES, respectively, and 6.4% and 6.4% of those receiving the SYNERGY or DP-DES, respectively. Thus, noninferiority was proven to a high level of significance between the 2 stents (Figures 1 and 2).

In addition, 12-month rates of revascularization, stent-related thrombosis, cardiac death, target vessel-related MI, and clinically indicated target lesion revascularization were similar between stents. Two definite and 3 probable cases of ST occurred with the DP-DES. The SYNERGY stent was associated with 2 definite cases and 1 probable case of ST.

The data demonstrate the noninferiority of the SYNERGY stent compared with the PROMUS Element Plus DP-DES for target lesion failure at 1 year. Longer-term efficacy and safety analyses are currently ongoing.

AVOID: Oxygen Use Damaging in STEMI

Written by Brian Hoyle

The findings from the Air Versus Oxygen in Myocardial Infarction [AVOID; Stub D et al. *Am Heart J.* 2012] study were presented by Dion Stub, MBBS, Baker IDI Heart & Diabetes Institute, Melbourne, Australia.

The use of oxygen in the initial treatment of patients with suspected myocardial infarction (MI) dates back over a century. However, there is scant evidence for the benefit of oxygen in patients without hypoxia [Cabello JB et al. *Cochrane Database Syst Rev.* 2010]. In fact, as little as 15 minutes of supplemental oxygen via a face mask may result in hyperoxemia, resulting in diminished coronary blood flow and increased coronary vascular resistance and reperfusion injury.

The multicenter controlled AVOID trial compared routine supplemental oxygen with no supplemental oxygen on myocardial infarct size in normoxic (≥94%) patients with STEMI. In the trial, 638 patients were assessed by paramedics for symptoms of STEMI and randomized 1:1 to receive oxygen at the rate of 8 L/min delivered through a face mask (n=318) or no oxygen (n=320). At hospital arrival, STEMI was confirmed in 218 patients receiving oxygen and 223 patients not receiving oxygen, and the randomized conditions were continued until the end of the primary percutaneous coronary intervention. In the no-oxygen arm, if saturation dropped <94%, supplemental oxygen was added and titrated to a goal of 94%. As expected, the oxygen saturation level was consistently higher in oxygenated STEMI patients before hospital arrival and ≤4 hours after arrival. Cardiac enzymes were monitored for 72 hours, with cardiac magnetic resonance imaging (MRI) and clinical follow-up for ≤6 months.

The co–primary end point was myocardial infarct size based on mean peak levels of creatine kinase and troponin I and areas under the curve for these biomarkers. Clinical secondary end points included ST segment resolution, survival to hospital discharge, major adverse cardiac and cerebrovascular events (MACCEs; death, MI, revascularization, stroke at 6 months), and myocardial infarct size determined at 6 months by cardiac MRI.

Baseline characteristics, including the prevalence of cardiac arrest and cardiogenic shock, were comparable in the oxygen and no-oxygen arms. Procedural details were also similar between the groups (Table 1).

The use of oxygen was associated with a significant 26% increase in mean peak creating kinase, as well as an increase in area under the curve, suggestive of oxygen-related cardiac damage (Figure 1). The trend for troponin