Percutaneous Coronary Intervention in Saphenous Vein Graft Lesions

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Saphenous vein grafts (SVGs) are commonly used conduits for surgical revascularization of coronary arteries but are associated with poor long-term patency rates. Percutaneous intervention (PCI) in SVGs continues to be challenging because it is associated with a significantly increased rate of periprocedural complications and late clinical and angiographic restenosis compared with PCI of native coronary arteries.

Although stent implantation is shown to have better outcomes compared to balloon angioplasty alone, restenosis rates after stenting are as high as 50% in SVGs. Use of embolic protection devices is a Class I indication according to the American College of Cardiology/American Heart Association guidelines to decrease the risk of distal embolization, no-reflow, and periprocedural myocardial infarction (MI). Various pharmacological agents are available that may also reduce the risk of or mitigate the consequences of no-reflow. Covered stents do not decrease the rates of periprocedural MI and restenosis. RECOVERs trial conducted a randomized, multicenter trial to evaluate the usefulness of a polytetrafluoroethylene (PTFE)-covered stent compared with a bare stainless steel (SS) stent for prevention of restenosis and major adverse cardiac events (MACE) in patients undergoing SVG treatment. The study did not demonstrate a difference in restenosis rate and 6-month clinical outcome between the PTFE-covered stent and the SS stent for treatment of SVG lesions. However, a higher incidence of nonfatal MI was found in patients treated with the PTFE-covered stent (Circulation. 2003;108:37-42.)

Most available evidence supports treatment with drug-eluting stents (DESs) in this high-risk lesion subset to reduce angiographic and clinical restenosis (J Am Coll Cardiol Intv 2011;4:831–43). A recently-reported RCT based update by a comprehensive meta-analysis of these RCTs, included largest sample size ever reported. Data from five RCTs showed that SVG intervention with a DES reduced MACE rate (RR, 0.72; 95% CI, 0.58-0.90; P = 0.004),

target vessel revascularization (TVR; RR, 0.58; 95% CI, 0.42-0.78; P < 0.001) and target lesion revascularization (TLR; RR, 0.54; 95% CI, 0.35-0.81; P =0.004) compared to BMS. No differences between the stents were found in rates of stent thrombosis (RR, 0.52; 95% CI, 0.16-1.70; P = 0.284), recurrent MI (RR, 0.64; 95% CI, 0.39-1.04; P = 0.076), or all-cause mortality (RR, 1.25; 95% CI, 0.71-2.19; P = 0.437). For SVG intervention, DES decreases MACE rate predominately driven by a reduced TVR rate. Rates of recurrent MI, stent thrombosis, and all-cause mortality were not different between the stents. (ACC 2017).

The treatment results of in-stent restenosis (ISR) are disappointing, with repeat restenosis rates of up to 60% regardless of conventional percutaneous coronary intervention (PCI) modalities. Intravascular radiation therapy (IRT) proved to be an effective method of ISR treatment in native coronary arteries, with long-term benefits maintained up to 5 years. In the Washington Radiation for In-Stent Restenosis Trial in Saphenous Vein Grafts (SVG WRIST) study, the efficacy and safety of adjunctive IRT with the use of the gamma-emitter Ir-192 compared with placebo were reported up to 12 months. Rha SW et al. reported the 3-year clinical outcomes of SVG WRIST, a prospective randomized double-blind trial examining the effectiveness and safety of intravascular catheter-based radiation therapy as compared to placebo as an alternative for patients requiring treatment for ISR. [Cathete Cardiovasc Interv 65:257–262 (2005)], Nowadays, the current generation drug-eluting balloons (DEBs), especially for focal DES ISR or newer generation repeat DESs would be the best treatment option despite we need more data.