Session 2

Bypass in the world of "endovascular first": How does it fit in today's treatment algorithm?

There Are Negative Consequences That Persist After Failed Endovascular Treatment of CLI

BY ROSS MILNER, MD

Patients often prefer endovascular therapy because the treatment can be performed in angiography suites and does not require hospitalization. Endovascular therapy may also be preferred because surgeons may be reluctant to perform bypass due to a previous failed ipsilateral percutaneous endovascular intervention, which is an established negative predictor for future lower-extremity bypass success.[1] We investigated these assumptions at our institution.[2]

We performed a retrospective review of patients with failed endovascular therapy at both a university medical center as well as a US Department of Veterans Affairs (VA) hospital. Approximately one-third of patients were claudicants, whereas approximately 45% had tissue loss and approximately 17% had ischemic rest pain. Primary patency overall was 24% at 1 year and secondary patency was 51%. Patients in the TASC A group had the best primary patency results (Figure 1). Although TASC C patients had better outcomes than TASC B patients, the study numbers were so small in every group that the difference did not reach statistical significance. With regard to primary assisted and secondary patency, patients in TASC A and B groups had better outcomes than patients in TASC C and D groups. While it was difficult to reach firm conclusions, smoking was shown to have a negative effect on treatment success. Of the failed interventions, 76% were current smokers. The results suggest that it may be a mistake to perform endovascular therapy on smokers. A review of the failed interventions, and the consequences for patients who failed treatment, revealed that 70% of those patients developed claudication or recurrent claudication, while the rest of the patients developed ischemic rest pain.

SUMMARY

Stenting for TASC C and TASC D lesions is more likely to fail than stenting for TASC A and TASC B lesions. The failure in TASC C and TASC D lesions is also more likely to lead to either bypass or amputations than failures in TASC A and TASC B lesions. Moreover, when endovascular therapy is performed on a TASC C or TASC D lesion, there can be negative effects on limb salvage. In addition, a patent peroneal artery does not increase the likelihood of patency from endovascular intervention on the femoropopliteal segment.

Patients with TASC A and TASC B lesions can be safely treated with endovascular therapy. In contrast, while it is technically feasible to treat TASC C and TASC D lesions, it may not be optimal for the patient because the failure of a TASC C or TASC D intervention can potentially compromise future

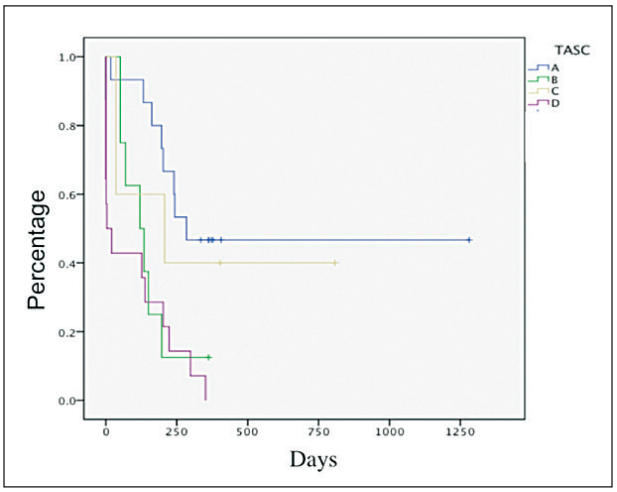

Figure 1. Primary patency by TASC classification. Reprinted from J Vasc Surg, 56, Al-Nouri O, Krezalek M, Hershberger R, et al, Failed superficial femoral artery intervention for advanced infrainguinal occlusive disease has a significant negative impact on limb salvage, 106-110, 2012, with permission from Elsevier.

bypass success. In addition, repeat interventions can be expensive. ■

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Gender Differences in PAD Treatment

Is an endovascular-first strategy worse for women?

BY VENITA CHANDRA, MD

Although traditionally underrepresented in the literature and underdiagnosed, after age adjustment, women in fact have a higher prevalence of peripheral artery disease (PAD) as compared to men. Despite these findings, women have traditionally undergone revascularization, in particular open revascularization, at lower rates than men.[1] With the increasing trend toward endovascular strategies, the question remains whether such disparities continue to exist with this modality.

Several studies have evaluated the role of gender in outcomes from endovascular procedures. A study of a little under 400 men and women examined outcomes from endovascular infrainguinal revascularization that took place from 2001 to 2006.[2] The investigators found a similar patency rate between men and women; however, they also noted that women were older, had higher reintervention rates (17% vs 12.3%), and usually presented with limb threat. Another study by Pulli and colleagues[3] examined revascularizations that occurred from 2000 to 2010 at their institution,[4] and once again found that women tended to be older and have more advanced disease, but no significant difference in lesion location or intervention was found. However, a trend demonstrated poorer results in women.

Gender differences after open surgical bypass have also been demonstrated in a number of studies with variable results. Lancaster et al[5] evaluated the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) data from 2005 to 2008 to assess predictors of early surgical bypass graft failure. This large study found that being female was an independent risk factor for early graft failure; however, other large studies did not find any difference in terms of primary patency or limb salvage between genders.[6]

Review of the 2012 NSQIP data (author's unpublished data analysis) focusing on PAD in men and women revealed that, of the more than 12,000 patients who underwent open (approximately 60%) and endovascular (approximately 40%) revascularizations that year, approximately 60% of the procedures were performed in men and approximately 40% were performed in women. Women had a higher complication rate after endovascular procedures (12% vs 9.9%; $P = .017$), but no significant difference in 30-day mortality was found. After open procedures, however, women were found to have both higher complication rates (38.9% vs 28.9%; $P < .001$) and higher 30-day mortality rates (2.8% vs 1.9%; $P = .01$). The reason for these differences between men and women is unclear; vessel sizing and anatomic distribution in women may be contributing factors.

SUMMARY

Differences in outcomes for PAD treatment between women and men exist for both endovascular and open strategies. The issue of gender disparity in PAD treatment outcomes cannot be resolved until there are more studies that specifically address the subject. Therefore, further investigation with specific emphasis on tools and techniques targeted for women is warranted. Until then, consideration must be given to the fact that women have high complication and mortality rates, and consequently current vascular approaches may not be ideal for the female anatomy or common female comorbidities. ■

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The BEST-CLI Trial: Will It Conclusively Direct Treatment?

BY MICHAEL S. CONTE, MD

In an effort to address the lack of data surrounding optimal treatment for patients with critical limb ischemia (CLI), the National Institutes of Health (NIH) has invested $25 million in the Best Endovascular vs. Best Surgical Therapy in Patients with Critical Limb Ischemia (BEST-CLI) trial. The NIH felt strongly that BEST-CLI must include all of the key stakeholders who currently treat CLI: vascular surgeons, interventional cardiologists, interventional radiologists, and vascular medicine specialists. The main differences between BEST-CLI trial and the Bypass vs. Angioplasty in Severe Ischemia of the Limb (BASIL) trial[1] are that BEST-CLI is a a pragmatic trial fully incorporating current therapies, is meaningfully stratified by clinical and anatomic severity, and uses a primary endpoint (major adverse limb event-free survival) that is more sensitive to clinical failure.

The BEST-CLI trial also differs from the BASIL trial in design. The BEST-CLI trial is based on the premise that event rates are different for patients who have an expected bypass with a good-quality saphenous vein when compared with those who do not. It includes two independently powered, parallel trials comparing bypass and endovascular intervention in patients with adequate saphenous vein (N = 1,620) and those lacking adequate saphenous vein (N = 480), as determined by preoperative vein mapping. The design of the BEST-CLI trial is complex because it will include all types of interventions (eg, angioplasty, stenting, and atherectomy). Minimum follow-up is 2 years.

Currently, 112 sites have been selected for the BEST-CLI trial (Figure 1). Although the sites are dominated by vascular surgery investigators (n = 492), other specialties are also represented, including cardiologists (n = 155), radiologists (n = 113), and vascular medicine specialists (n = 2). Each site has a CLI team that includes all individuals who treat CLI at that particular site. The BEST-CLI trial defines specific criteria for both open reconstruction and below-the-knee intervention, which are required in order for the patient to be approached for inclusion in the study. Two physicians on each team must evaluate the patient's case and confirm that the patient meets inclusion criteria and is therefore eligible for randomization. Two individual physicians on the team must also agree on the need for and the type of reintervention. The study was designed in this way as an acknowledgment that the type and timing of reintervention are both critical drivers of the trial endpoint. The trial also includes multiple measures of functional outcome and cost-effectiveness.

Not surprisingly, the BEST-CLI trial also has limitations, largely arising from the heterogeneity of patients and procedures that characterize current CLI practice. Despite its limitations, BEST-CLI represents a critical opportunity to collect high-quality, multicenter data from a randomized trial. Ultimately, more than one

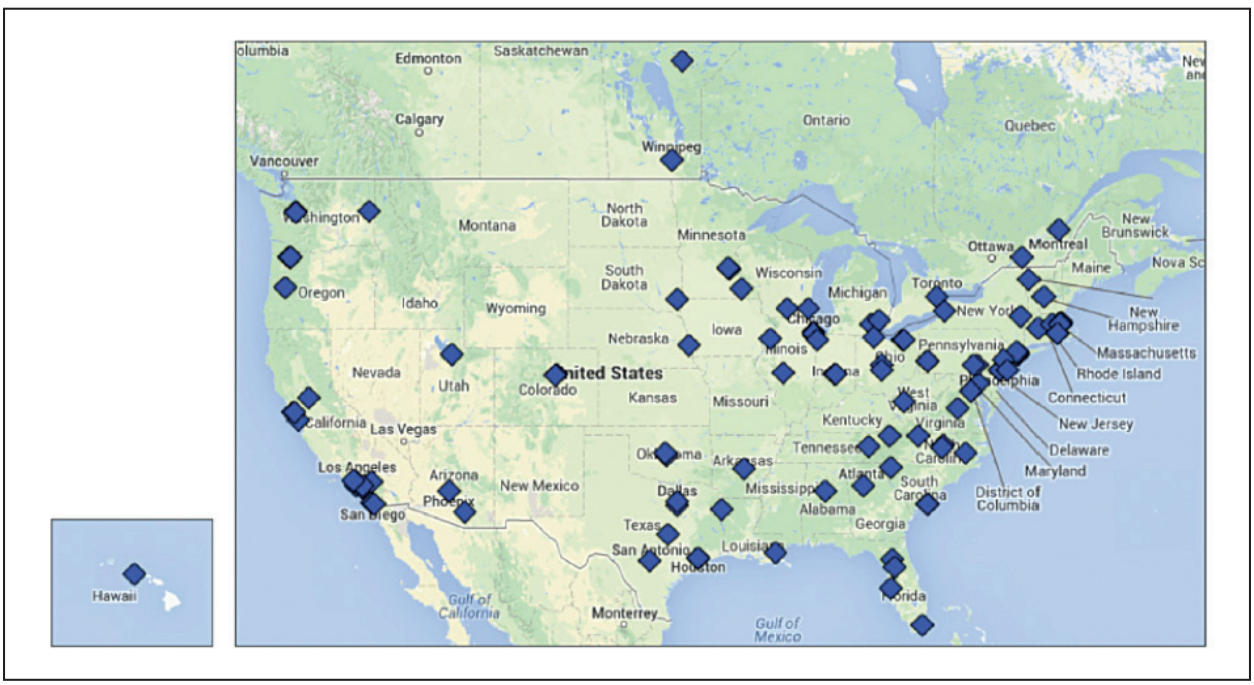

Figure 1. Site summary for the BEST-CLI trial. At the time of this writing, 92 of the selected sites have been activated. Figure and personal communication courtesy of Alik Farber, MD.

trial will be required to build a comprehensive evidence base in CLI.

SUMMARY

The field of CLI treatment needs high-quality, randomized controlled trials and other comparative effectiveness studies. The BEST-CLI trial was designed to address many of the key limitations of the BASIL trial. BEST-CLI is a landmark trial that will define the current state of outcomes for interventions in CLI. In particular, quality of life and cost-effectiveness outcomes from BEST-CLI will be carefully scrutinized by managed care organizations. That said, no single trial can address all of the evidence gaps in the treatment of CLI. BEST-CLI must be followed by additional comparative studies. ■

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TAKE HOME POINTS

ROSS MILNER, MD

The debate over surgical bypass or endovascular therapy for CLI has clearly tilted toward endovascular approaches. The expanding availability of less invasive technology (drug-eluting balloons/drug-coated balloons, drug-coated stents, atherectomy) has assumed the forefront of the podiums and journals. There is a large investment by industry in these technologies, and a desire from our patients to have less invasive repairs with shorter hospital stays. But, surgical bypass still has a significant role in the management of lower extremity arterial disease. There is only a small literature on the failure modes of endovascular interventions and risk of major amputation. TASC C and D lesions, despite initial effective treatment, can lead to a higher risk of a failed bypass when needed, as well as a higher risk of amputation.

VENITA CHANDRA, MD

While traditionally underrepresented in the literature and underdiagnosed, women actually have a higher prevalence of PAD as compared to men. In addition, they more often present at an older age, with more advanced disease, and with more significant mobility impairment. Despite these findings, women undergo revascularization, in particular open revascularization, at lower rates than men. The reason for this is unclear. Female vessel sizing and anatomic distribution may be different than in men. In addition, women have higher complication rates and, in some instances, higher mortality rates than men after revascularization for PAD; however, patency and limb salvage rates appear to be similar. These findings suggest that current vascular approaches/tools and techniques may not be ideally suited for female anatomy/comorbidities. Further study on this topic, with a focus on the development of tools and techniques targeted for women with PAD, is warranted.

MICHAEL S. CONTE, MD

Results from the BEST-CLI trial will help vascular specialists select treatment for patients with CLI. Although the BEST-CLI trial is unlikely to provide a singular answer accepted by all, it will provide contemporary, high-quality evidence to guide clinical decisions. Until the results from the BEST-CLI trial are in, most patients with advanced limb ischemia should be offered revascularization based on stratification by patient risk, limb severity, and anatomic pattern of disease.