Peripheral artery disease (PAD) has been associated with reduced survival in addition to increased morbidity including amputation, decreased quality of life, and immobility (1). Endovascular revascularization has emerged as an attractive alternative to surgical revascularization for the treatment of patients with PAD, especially for those with critical limb ischemia (2,3). Indeed, data from a nationwide inpatient sample demonstrated a marked increase in endovascular revascularization in the past decade, which has been temporally associated with a reduction in the rates of major amputation (4). However, endovascular therapy encompasses a number of tools and approaches (balloons, self-expanding stents, balloon-expandable stents, covered stents, and atherectomy, among others), without a clear algorithm in many instances. Furthermore, unlike surgery, which is mainly performed by one specialty (i.e., vascular surgery), endovascular treatment is offered by interventional radiologists, cardiologists, vascular surgeons, and vascular medicine specialists, with varying degrees of skill sets and biases. Because of these facts, frequently, there is a lack of clear consensus regarding the best treatment option, approach, or device selection in treating PAD. Concordant with this is the current treatment of severe aortoiliac disease. The TransAtlantic Inter-Society Consensus (TASC) II guidelines, in general, recommend the endovascular approach for TASC A and B and the surgical approach for TASC C and D lesions. However, a high percentage of operators consider the endovascular approach to be the preferred therapy for the majority of aortoiliac lesions, regardless of TASC classification (5,6). Although many factors should be considered when deciding the best treatment for aortoiliac disease, patency remains an important endpoint. To that end, in this issue of JACC: Cardiovascular Interventions, Kumakura et al. (7) report 15-year survival and patency after primary stenting of TASC A through D iliac artery lesions guided by intravascular ultrasound (IVUS).

In this single-center study spanning June 1993 to December 2013 with 455 patients, the authors demonstrated the safety and efficacy of performing primary stenting in lower extremity vasculature guided by IVUS (7). The authors must be complimented on a high overall initial success rate with primary stenting (97.2%), although the initial success rate for complex TASC II type D lesions was slightly lower (91.1%). There are several notable findings reported in the paper. First, overall long-term survival among patients undergoing aortoiliac interventions was poor, emphasizing the continuous need for more aggressive risk factor and lifestyle modification in these patients.
Last, discontinuation of antiplatelet therapy was associated with lower primary patency.

The study cohort was largely male dominated (88%) and included mainly elderly patients with mean age of 72 years. The reported incidence of critical limb ischemia was rather low (11.6%) in the cohort, which might account for the higher initial success rates and higher long-term patency rates. Furthermore, 203 patients were excluded because they underwent angioplasty alone. However, the reason for angioplasty alone in these patients is not reported, and this exclusion may have resulted in significant selection bias. More important, assessment of patency was not adjudicated and was assessed by various tools and differing time intervals. For example, a significant portion of patients underwent resting ankle brachial index assessment during follow-up for primary patency assessment. However, resting ankle brachial index is known to have a significant limitation, especially in the setting of aortoiliac lesions (8). Furthermore, there was also a high attrition rate of patients during the follow-up period. Overall survival rates at 10- and 15-year follow-up were mere 56% and 40%, respectively. As expected, survival was worse in patients presenting with more complex lesions (TASC II type C/D) with 10- and 15-year survival rates of 47% and 23%, respectively. Although this leaves relatively fewer patients “at risk” of analysis of patency at 15-year follow up (n = 15), the statistics are telling in terms of high level of cardiovascular mortality in these patients. Competing risk analyses would likely yield greater insight into the statistical validity of patency comparisons among the different subgroups in the face of high attrition rates due to mortality.

Although the current study has many limitations inherent in a retrospective cohort study over a 15-year interval, 2 points require further attention. First, there was a considerably lower use of aspirin (69%), thienopyridine (36%), and statin (35%) therapies, with mean low-density lipoprotein cholesterol of 118 mg/dl, which is reflective of suboptimal control of hyperlipidemia in this high-risk population for future cardiovascular events. Although the impact of aggressive risk factor modification on long-term patency is controversial, there is little doubt that lipid lowering, smoking cessation, and antiplatelet therapy will reduce major adverse cardiovascular events in this population (1). Second, Kumakura et al. (7) provided data to demonstrate the utility of adjunctive imaging in peripheral vascular interventions. To date, endovascular revascularization has been performed using angiography alone, with little contribution of adjunctive revascularization such as IVUS, optical coherence tomography, or fractional flow reserve (FFR), which are routinely used for coronary interventions. Hitchner et al. (9) demonstrated that IVUS evaluation provided more accurate intraprocedural insight on the extent of residual stenosis after superficial femoral artery interventions, using a cohort of 59 patients. Similarly, small studies have demonstrated the utility of endovascular hemodynamic pressure wire assessment in lower extremities (10–12).

We have learned several concepts from the assessment of coronary artery lesions that can and should be successfully applied to peripheral arteries. Visual estimation of stenoses has been shown to be imprecise in the coronary arteries (13,14). FFR-guided percutaneous coronary intervention (PCI) has been associated with improved outcomes with judicious use of stents and similar relief of ischemia compared with angiography-guided PCI (15). Similar to FFR-guided interventions, IVUS-guided PCI has been also associated with improved mortality as well as target vessel revascularization compared with angiography-guided PCI alone (16,17). Recently, there have been nationwide concerns raised regarding the appropriateness of PAD interventions in several large clinical practices, leading to heightened scrutiny of these procedures (18). This underscores the importance of adjunctive imaging such as IVUS or FFR to determine the “appropriateness” of interventions and allow objective assessment of peripheral interventions to gain better patency and outcomes (18).

Treatment of lower extremity PAD continues to evolve with better diagnostic tools, equipment advances, and increased operator experience. The Affordable Care Act and higher emphasis on quality rather than quantity should support the use of adjunctive tools to make peripheral interventions more accurate, safer, and better.

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