first 3 months after the intervention. Patients with diabetes and gangrene who undergo infrapopliteal interventions are at significantly higher risk. Adjuncts to reduce tissue loss, preserve limb function, and prevent recurrent infection are needed to prevent limb loss despite PETAS, especially in diabetic patients.

AUTHOR CONTRIBUTIONS

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INVITED COMMENTARY

Frank B. Pomposelli, MD, Harvard University, Beth Israel Deaconess Medical Center, Boston, Mass

Kahn and associates have made the observation that amputation with a patent intervention or bypass performed for critical limb ischemia occurred in nearly 40% of the patients losing limbs after arterial bypass surgery and in an astounding 80% of those having amputation after a catheter-based intervention. They attribute these findings to having adopted an “endovascular first” approach coupled with an increasingly aggressive philosophy towards limb salvage attempt even in marginal situations. They base this approach on two assumptions: The physiological insult to the patient treated with endovascular therapy is far less than bypass surgery, so why not try it in marginal situations? There are no objective clinical criteria that can reliably predict the likelihood of limb salvage or limb loss in all patients prior to treatment.
Overall, their limb salvage rate at three years was excellent at 81% and 78%, respectively, in the endovascular and bypass cohorts, a difference that was not statistically different.

On first pass, this approach would seem to be both very reasonable and appropriate. Indeed, the authors state that this policy reduced their primary amputation rate (amputation with no attempt at revascularization) in their patients from 15% to 4%. The question is, however, does reducing the rate of primary amputation makes sense as a goal if some of the limbs intervened upon are best served by primary amputation? In comparing the endovascular and open surgery cohorts, significant differences did exist, with those in the endovascular group being older, more frequently diabetic, and presenting more commonly with gangrene and heel ulcers. This may explain why this phenomenon was seen more commonly in the endovascular cohort. The cause for amputation with a patent intervention was failure to reverse ischemia in 21% of cases and this same cause was attributed to 50% of the amputations with a patent bypass surgery. These numbers seem high and raise questions about the adequacy of the endovascular intervention performed or the choice of outflow target in the bypass surgical group but more likely reflect a decision to perform revascularization in some patients with no hopes of salvage. Is it really that difficult to determine who those patients are? Moreover, only one patient had a bypass after a failed endovascular intervention. Were most patients too ill to then have an attempt at a limb saving bypass, or was the time delay such that the opportunity to salvage the limb was lost before bypass could be performed? This exact scenario is why I personally eschew the endovascular first philosophy for all patients.

The approach they describe for wound and foot care is comprehensive and mimics the approach that we use in our own practice. It is therefore somewhat surprising that the cause of amputation nearly 80% of the endovascular cohort and 30% of the bypass cohort was attributed to continued tissue loss, “limb dysfunction after debridement,” or from recurrent infection, and an additional 21% lost their limbs due to prosthetic graft infection. Their approach to perform debridement and drainage procedures at the same time as revascularization may explain this finding. Our approach has always been to drain and débride infection first and delay revascularization for few days until active spreading infection has subsided. This is especially critical when placing prosthetic grafts but may also be important when placing other foreign materials like stents or stent grafts. An added advantage in delaying revascularization is the ability to assess the viability of the foot as a consequence of the infection. Often, the extent of infection and necrosis is underestimated by physical examination especially in diabetics, and its true extent only becomes clear during surgical debridement under anesthesia with good lighting in the operating room. The futility of limb salvage becomes evident when the amount of destruction uncovered along with the amount of soft tissue and bone removed to control infection renders the foot nonfunctional even with revascularization. There is obviously no advantage to attempting revascularization in this circumstance and doing so inadvertently by performing bypass or angioplasty simultaneously will result in some amputations with patent interventions.

The advent of endovascular therapy has dramatically altered the treatment paradigm in patients with lower extremity ischemia. The ability to salvage the limb at a lower physiological cost is especially beneficial to our very ill or elderly patients. Yet while the way we play the game may be different, the rules remain the same. Arterial reconstruction is only one part of the complex treatment strategy employed to treat critical limb ischemia. Applying it wisely, be it bypass surgery or catheter based intervention, recognizes the fact that, for some patients, it has no role at all. The ultimate goal should be not to reduce the rate of primary amputation, but to eliminate the rate of needless amputations. The same can be said for needless arterial interventions.