Comprehensive Care of the Critical Limb Ischemia Patient From Preprocedure to Long-term Follow-up

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It is important for the critical limb ischemia (CLI) provider to grasp the totality of optimal care for a CLI patient. That is, before embarking on limb salvage, the provider and patient should plan a strategy not only for revascularization, but also for meticulous wound care, diabetic management, foot surgery consultation, detection and treatment of infection, nutrition, secondary prevention of atherosclerotic events, antithrombotic therapy, surveillance for patency, and secondary prevention of CLI following limb preservation. Preoperatively, a frank discussion with the patient addressing the importance of this approach and acknowledging the commitment to optimal CLI care is paramount. Patient motivation is a key component for clinical success, as these marginally ambulatory patients often are best served by attending multiple appointments across several specialties for at least several months, if not years.

Often, revascularization is the most urgent component of care for a CLI patient, because typically appropriate debridement and foot surgery are postponed until revascularization is achieved. Additionally, definitive management of infection may depend on the results of live tissue culture obtained at the time of foot surgery, which may be delayed until revascularization is achieved. As such, an important part of preprocedural care is to minimize unnecessary diagnostic testing that might delay revascularization. Our approach is to use diagnostic testing to identify ideal access sites for revascularization. We reserve catheter-based angiography to delineate the tibioperoneal anatomy, which is nearly always diseased in the CLI patient.

Intraprocedurally, a sound strategy for CLI management is to restore inline flow to the wound. This approach is a balance between revascularizing what is most technically feasible, even if that arterial conduit is not in the angiosome of the wound, and revascularizing a target that directly supplies a wound. In the common scenario of multivessel, below-knee disease, our approach is to revascularize the more technically straightforward tibioperoneal vessel first and then proceed with the more challenging tibioperoneal vessel, either in the same procedure or in a staged manner. In this high-risk population, strategies to minimize access sites, arteriotomy size, and contrast administration serve the patient well.

In the early postprocedural period, an admission to the hospital can be a convenient opportunity for multiple specialties to assess the CLI patient. The patient can receive appropriate debridement and quantitative live tissue culture in the operating room. This period also provides the opportunity for advanced imaging for infection, diabetes management, creation of nutrition goals, and, if not already established, initiation of a wound care algorithm.

Following hospital discharge, the CLI patient will need meticulous wound care and surveillance for patency at a minimum. Intravenous antibiotics may also need to be managed. It is biologically plausible, even if not yet proven in the evidence base, that ongoing hyperglycemic management likely decreases time to wound healing, an important outcome for the CLI patient. Simultaneously, optimal medical therapy for secondary prevention of atherosclerotic disease is important. Almost every CLI patient requires mono-antiplatelet therapy, but often, dual antiplatelet therapy is appropriate following revascularization. Emerging clinical evidence even suggests that newer antiplatelet agents prevent acute limb ischemia and decrease repeat revascularizations.[1] And although it is not evidence based, we occasionally allow permissive hypertension until the wound has healed, after which time more aggressive blood pressure management is pursued.

After a patient's wound has healed, the patient should continue to be followed for recurrent CLI in the index or contralateral limb. American College of Cardiology Foundation/American Heart Association guidelines recommend at least biannual follow-up for the stable CLI patient for surveillance of new foot wounds and review of optimal foot hygiene.[2] Titration of medical therapy for prevention of stroke, myocardial infarction, and ischemic limb events should also occur at these visits. If the sequelae of restenosis and occlusion are expected to be recurrent CLI (or acute limb ischemia), then more frequent follow-up visits with patency surveillance seems indicated. However, often the CLI patient with good foot hygiene will not have clinical evidence of restenosis following wound healing.

In summary, comprehensive care of the CLI patient may be one of the the most challenging programs to deliver for multiple reasons. This medical problem is underdiagnosed and underrecognized. The patients have many comorbidities, and major amputation has dire consequences. The number of specialties required to take care of this patient population is great. The demands on the marginally ambulatory patient to attend these various appointments can be unreasonable. These challenges are not present in the care of many other disorders, such as isolated coronary artery disease or in populations with claudication but not CLI. Comprehensive care of CLI calls for "CLI Centers of Excellence" staffed by passionate providers from all CLI specialties to achieve optimal outcomes. Institutions that can offer these services in a coordinated fashion in the same physical space are desired to reduce patient visits, allow CLI specialists to collaborate side by side and thereby facilitate care of CLI patients. In fact, the concept of CLI Centers of Excellence has been eloquently described previously in the CLI Global Compendium.

REFERENCES

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2. Anderson JL, Halperin JL, Albert NM, et al. Management of patients with peripheral artery disease (compilation of 2005 and 2011 ACCF/AHA guideline recommendations): a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2013;127(13):1425-1443.