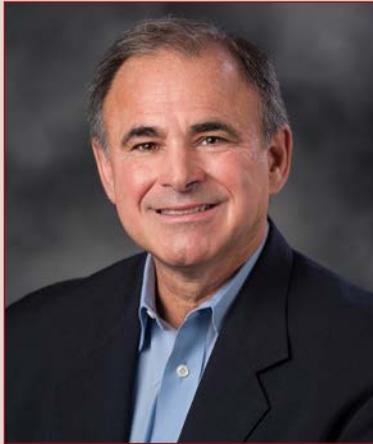


The Utilization of Pedal Access for Limb Salvage Intervention



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Hello and welcome to the October edition of *Vascular Disease Management*. I have chosen to comment on Dr Zaitoun and colleagues' article on the utilization of pedal access for limb salvage intervention. Although pedal access has now been utilized for two decades, I think that it is appropriate to highlight this technique, as many practitioners performing peripheral vascular interventions are not utilizing this technique or techniques such as pedal loop reconstruction and trans-collateral crossing of total occlusions in select cases of critical limb ischemia. Distal access can include access of vessels as distal as the digital vessels of the foot, as described by Manzi and colleagues. These retrograde techniques can dramatically increase the likelihood of crossing total occlusions when an antegrade approach has failed. Once crossed, the vast majority of lesions can be treated successfully with peripheral intervention.

There has been great progress in distal bypass surgery for the treatment of critical limb ischemia. Durable patency and excellent rates of success at achieving limb salvage are being reported. Unfortunately, there are many limitations to distal bypass surgery. Surgery requires good inflow, which is almost always achievable. Surgery also requires a good conduit (typically a long segment of saphenous vein that is often not present), good outflow (often not present in cases of critical limb ischemia, particularly in the angiosome related vessel), and a patient healthy enough to withstand the surgical procedure. Active infection can be problematic, resulting in catastrophic graft infection. Because of these limitations, many patients presenting with critical limb ischemia are not candidates for bypass surgery.

Endovascular treatment is a viable option in the overwhelming majority of these patients not amenable to surgical therapy. Intervention is less invasive and better tolerated by critically ill patients. No vein conduit is required. Occluded or diseased outflow vessels can be opened at the same time. More than one infra-popliteal vessel can be opened during a single interventional procedure. The risk of infection is less. Interventional procedures can be

repeated in this group of patients where progressive disease is common. As a result of these factors, many physicians have adopted an "interventional first" approach to treating critical limb ischemia.

Retrograde access has dramatically improved the chance of crossing totally occluded vessels that can't be crossed utilizing antegrade approach alone. There may be a softer or geometrically more favorable distal cap of the totally occluded vessel. There is often hibernating patent vessel discovered with retrograde injection, allowing the operator to cross shorter totally occluded segments with high-tip penetrance chronic total occlusion wires with both ends of the totally occluded segment clearly demonstrated. Combining antegrade and retrograde approach facilitates controlled antegrade and retrograde subintimal tracking (CART) and reverse CART technique crossing of occluded vessels. Retrograde access is associated with low risk of bleeding and may allow the procedure to be performed in patients who can't breathe when fully recumbent. When procedures are performed totally via retrograde tibial access, quicker ambulation is possible.

Unfortunately, retrograde tibial access does have associated risks. Small densely calcified vessels may be difficult to access and difficult to treat as spasm, elastic recoil, and dissection in the treated vessel are common. Careful attention to guidewire passage is mandatory to avoid retrograde wire dissection of patent vessels. If sheaths are occlusive, then distal vessels may become occluded, taking away potential future surgical options. Despite these potential limitations, retrograde tibial access has been shown to be a safe and effective access and treatment delivery modality in the Cook multicenter registry of pedal access. When there are occlusions distal to tibial access sites, pedal loop reconstruction, as described by Graziani and colleagues, can be utilized to establish outflow.

Limb salvage interventional procedures are being performed around the world with excellent limb salvage rates. Clearly new approaches and tools have facilitated therapy. Restenosis and re-occlusion remain problems that have not been solved. Ongoing trials utilizing drug-eluting balloons, stents, and atherectomy devices are attempting to establish how outcomes can be improved further.