A Cross-Disciplinary Application for the Microvascular Coupling Device: the Creation of Multi-Vein Segment Conduits for Lower Extremity Revascularization

Alyssa R. Golas, MD; Rachel C. Hooper, MD; John K. Karwowski, MD; Jason A. Spector, MD

Abstract

Background: The greater saphenous vein (GSV) has long been accepted as the preferred conduit for infrainguinal arterial revascularization. However, whether due to trauma, previous lower extremity revascularization or coronary artery bypass, or venous insufficiency, GSV of adequate length and caliber is unavailable in up to 15%-45% of patients.[1-4] To overcome these limitations, both alternate (i.e., basilic, cephalic) and GSV conduits may be "spliced" together in series via venovenostomy. Although vascular surgeons typically perform a hand-sewn venovenostomy, device-based venous coupling has been performed by plastic surgeons for many years. Use of the anastomotic coupler to perform venovenostomy for spliced autogenous conduit assembly for lower extremity revascularization was a natural evolution of this technique. As venous coupling for segmental graft assembly has not to our knowledge been reported in the literature, we sought to review our experience with this well-studied device this novel setting.

Methods: A retrospective review was performed of all patients who underwent lower-extremity revascularization using segmental autogenous vein graft coupled with the Synovis® anastomotic coupler at a single tertiary care center.

Results: Six patients were included. A 3.5 or 4mm coupling device was used to fabricate saphenosaphenous (n=2), basilocephalic (n=2), basilocephalocephalic (n=1), and saphenocephalic (n=1) conduits. Assembly of each conduit required ~2-3 minutes. Follow-up ranged from 2 to 48 months, with one patient lost to follow-up. One patient suffered graft failure after 2 months due to severe pyoderma gangrenosum and significant resultant soft tissue loss. An additional patient developed an asymptomatic drop in ABI after 5 months, for which angiography demonstrated moderate stenosis at the distal graft-artery anastomosis with a widely patient venovenostomy. The remaining three patients remain asymptomatic with patent grafts by duplex surveillance.

Conclusions: Given the well-known benefits of the anastomotic coupler in lower-extremity reconstruction (including shorter operative times, decreased vasospasm and thrombosis rates, and the ability to overcome moderate conduit diameter mismatch[5]), transition of this device to the vascular surgery realm represents the next logical progression. Although small, our series demonstrates that the coupler can successfully be used for the formation of spliced autogenous grafts for lower-extremity revascularization with patency rates that compare with standard hand-sewn autogenous conduits. Furthermore, its use requires approximately one-tenth the time of traditional venovenostomy methods.

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Disclosure/Financial Support
None of the authors have anything to disclose. This work was not supported by outside funding.