

From the Society for Clinical Vascular Surgery

## Outcomes of infrageniculate retrograde versus transfemoral access for endovascular intervention for chronic lower extremity ischemia

Ashraf G. Taha, MD,<sup>a,b</sup> Adham N. Abou Ali, MD,<sup>a</sup> George Al-Khoury, MD,<sup>a</sup> Michael J. Singh, MD,<sup>a</sup> Michel S. Makaroun, MD,<sup>a</sup> Efthymios D. Avgerinos, MD,<sup>a</sup> and Rabih A. Chaer, MD,<sup>a</sup> Pittsburgh, Pa; and Assiut, Egypt

### ABSTRACT

**Objective:** Retrograde infrageniculate access is an alternative treatment strategy for patients who have failed to respond to antegrade endovascular intervention. This study compares the outcomes of infrageniculate retrograde arterial access with the conventional transfemoral access for the endovascular management of chronic lower extremity ischemia.

**Methods:** This was a retrospective single-center review of retrograde endovascular intervention (REI) from 2012 to 2016. Indications for intervention, comorbidities, complications, procedural success, limb outcomes, and mortality were analyzed. Technical failure was defined as the inability to complete the procedure because of failed access or unsuccessful recanalization. Infrageniculate access and transfemoral access were obtained with ultrasound or angiographic roadmap guidance. Patency rates were calculated for technically successful interventions.

**Results:** There were 47 patients (85% presenting with critical limb ischemia) who underwent sheathless REI after failed antegrade recanalization of TransAtlantic Inter-Society Consensus class D infrainguinal lesions, whereas 93 patients (83% with critical limb ischemia) underwent standard transfemoral access. There were 16 (34%) femoropopliteal, 14 (30%) tibial, and 17 (36%) multilevel interventions in the retrograde group compared with 41 (41%) femoropopliteal, 20 (20%) tibial, and 39 (39%) multilevel interventions in the transfemoral group. Access sites for the retrograde group included the dorsalis pedis (26%), midcalf peroneal (24%), anterior tibial (22%), posterior tibial (26%), and popliteal (2%) arteries. Overall technical success was achieved in 57% of the retrograde group compared with 78% of the transfemoral group.

Mean follow-up was 20 months (range, 1-45 months). There were no significant differences in the primary patency rates between the two groups at 1 year and 2 years. The primary assisted patency rates were significantly better in the transfemoral group at 1 year (66% vs 46%;  $P = .031$ ) and 2 years (56% vs 29%;  $P = .031$ ). The secondary patency rates were higher in the transfemoral group at 1 year (93% vs 83%;  $P = .079$ ) and 2 years (91% vs 76%;  $P = .079$ ), although this did not reach statistical significance. The rate of reintervention was 41% for the retrograde group vs 40% for the transfemoral group. Most of the reinterventions (70% in the retrograde group and 61% in the transfemoral group) were endovascular interventions for a restenosis or occlusion.

**Conclusions:** Infrageniculate access for REI can result in primary patency rates similar to those of antegrade interventions and does not compromise the access site. Technical failure is high in this initial experience and is mostly due to failed recanalization. Limb salvage may be achieved after technical failure with either repeated antegrade intervention or surgical bypass. (*J Vasc Surg* 2018;■:1-8.)

**Keywords:** Retrograde access; Tibial artery; Chronic lower extremity ischemia; Endovascular intervention

From the Division of Vascular Surgery, University of Pittsburgh Medical Center, Pittsburgh<sup>a</sup>; and the Department of Vascular Surgery, Faculty of Medicine, Assiut University, Assiut.<sup>b</sup>

Author conflict of interest: none.

Presented as an oral presentation at the Forty-third Annual Symposium of the Society for Clinical Vascular Surgery, Miami, Fla, March 29-April 2, 2015.

Correspondence: Rabih A. Chaer, MD, Professor of Surgery, Division of Vascular Surgery, University of Pittsburgh Medical Center, 200 Lothrop St, Ste A1011, Pittsburgh, PA 15213 (e-mail: [chaera@upmc.edu](mailto:chaera@upmc.edu)).

The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a conflict of interest.

0741-5214

Copyright © 2018 by the Society for Vascular Surgery. Published by Elsevier Inc. <https://doi.org/10.1016/j.jvs.2018.01.028>

Despite the significant improvement of endovascular techniques and development of multiple endovascular options to treat chronic lower extremity ischemia, the presence of complex arterial lesions creates significant challenges in the endovascular treatment of advanced arterial occlusive disease. Conventional femoral arterial access, whether through a contralateral retrograde or ipsilateral antegrade approach, fails in nearly 20% of patients with complex occlusive lesions. This is mainly due to the inability to cross or failure to re-enter the true lumen during subintimal recanalization.<sup>1,2</sup> In these patients, lower extremity bypass may not be the preferred treatment because of a lack of autologous vein conduit, poor runoff, or associated comorbidities.

Previous studies have shown that retrograde endovascular intervention (REI) through popliteal, tibial, or pedal access is a safe and effective alternative in patients who could not be revascularized through the standard approach.<sup>3-7</sup> Therefore, the aim of this study was to compare the outcomes of infrageniculate retrograde arterial access with the conventional transfemoral access for the endovascular management of chronic lower extremity ischemia.

## METHODS

This study is a retrospective single-institutional review of a prospectively maintained vascular registry at the University of Pittsburgh Medical Center. The study protocol was approved by the Institutional Review Board of the University of Pittsburgh. The study exemption status was obtained, and no study-specific consent was required as no patient identifiers were collected. All patients provided informed consent to the planned operative procedure.

**Patients.** From January 2012 through February 2016, there were 47 patients with critical limb ischemia (CLI) or disabling claudication (47 limbs, retrograde group) who received infrageniculate REI at the University of Pittsburgh Medical Center for treatment of infrainguinal arterial lesions of TransAtlantic Inter-Society Consensus (TASC) class D.<sup>8</sup> These retrograde procedures were compared with a matched control of 100 consecutive conventional endovascular interventions performed during the same period. These were performed in 93 patients presenting with CLI or disabling claudication for treatment of infrainguinal TASC D lesions through a standard contralateral or ipsilateral femoral approach. All procedures were performed by vascular surgeons. Procedural success, perioperative complications, limb salvage, and outcome data were compared between the two groups.

**Technique.** All interventions were done under local anesthesia and moderate sedation. Our endovascular interventional protocol typically starts with the conventional transfemoral endoluminal approach to cross the arterial occlusive lesion using standard wire and catheter techniques. Crossing devices and microwires were used as needed with transfemoral recanalization. If this was unsuccessful, subintimal recanalization was attempted with the aid of a re-entry device if indicated. Failure of re-entry was particularly problematic in infrapopliteal targets. All patients were systemically anticoagulated with an unfractionated heparin bolus at a dose of 100 IU/kg after antegrade sheath placement. Heparin reversal was selectively performed at the completion of the procedure if the activated clotting time was >200 seconds.

Failure of the transfemoral approach prompted the initiation of the REI, which is typically performed as a separate procedure in patients deemed to be at high

## ARTICLE HIGHLIGHTS

- **Type of Research:** Retrospective comparative cohort study
- **Take Home Message:** Analysis of outcomes of endovascular treatment for chronic limb ischemia between 47 retrograde and 93 transfemoral access procedures revealed a technical success of 57% for retrograde and 78% for transfemoral access, but primary patency rates were similar in both groups at 2 years.
- **Recommendation:** If transfemoral access fails, the authors suggest a retrograde distal access for limb revascularization for chronic ischemia.

risk for surgical bypass for medical or anatomic reasons. The REI procedure starts with transfemoral access for imaging and administration of vasodilatory agents (200 µg nitroglycerin) as needed to minimize arteriospasm. Percutaneous retrograde access was obtained using duplex ultrasound guidance (pedal or perimalleolar) or with fluoroscopy and roadmapping in more proximal tibial access sites or in heavily calcified arteries. In general, the least diseased segment of the access artery is chosen for the arterial puncture. If percutaneous access fails, a small cutdown is performed.

By use of a 4F 15-cm micropuncture kit (Cook Medical, Bloomington, Ind), sheathless access is obtained. An exchange-length 0.014- or 0.018-inch wire is introduced through the retrograde access. A low-profile, over-the-wire angioplasty balloon is advanced in a “bareback” fashion and used as a supporting catheter. By use of the wire and the angioplasty catheter, recanalization is performed into a patent proximal arterial segment. The retrograde wire is snared from above and now used for antegrade access. If necessary, the wire can be externalized from the groin access. The through-and-through wire provides a stable platform for endovascular interventions. All interventions were performed in an antegrade manner following retrograde access.

In case of subintimal recanalization, if the retrograde wire fails to re-enter the true lumen after crossing the chronic total occlusion, the “double balloon” technique is used to gain re-entry.<sup>9</sup> In this technique, guidewires from both femoral and distal access sites are juxtaposed to one another above the chronic total occlusion. Within the size limit of the treated artery, a balloon is advanced over the proximal wire while a smaller one is advanced over the distal wire to meet at the patent part of the artery just above the recanalized occlusion. Both balloons are inflated simultaneously to disrupt the dissection membrane and position both wires in the true lumen.

At the end of the procedure, completion angiography is performed to assess the arterial response to the angioplasty and to check the quality of the runoff into the

Download English Version:

<https://daneshyari.com/en/article/10214588>

Download Persian Version:

<https://daneshyari.com/article/10214588>

[Daneshyari.com](https://daneshyari.com)