

## CASE REPORT

# Successfully Tackling the Complex Clinical Challenge of Isolated Popliteal Artery Disease With Excimer Laser Photoablation and PTA

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Endovascular intervention for femoropopliteal lesions of claudication and critical limb ischemia has been widely accepted as a first-line therapeutic modality. Despite this, limited data are available on isolated popliteal artery (PA) disease. The PA presents unique challenges, including extreme mobility between the proximal and distal fixation points and the potential for recurrence and stent fracture due to repetitive motion and injury. Furthermore, changes of axial compression, bending, and twisting of the PA increase with severity of calcification.<sup>1</sup> Therefore, nonstent endovascular treatment of the PA with “stent-like” results is preferred. To achieve this superior endovascular result, we perform maximum debulking followed by balloon angioplasty in our practice. We present two case reports of isolated PA disease that were treated with DABRA Excimer Laser (Ra Medical Systems, Inc.) photoablation and percutaneous transluminal angioplasty (PTA).

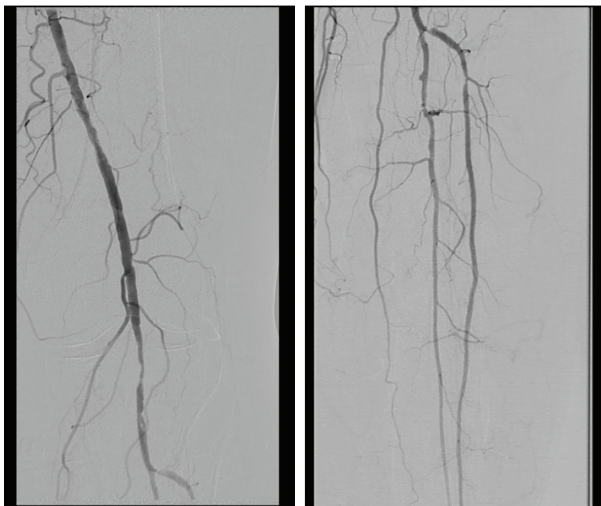


Figure 1. Isolated left PA stenosis and 70% occluded eccentric lesion at the origin of the left anterior tibial artery.

## CASE PRESENTATION #1

### Patient Presentation

A 66-year-old man presented with severe lifestyle-limiting claudication of the left lower extremity. His prior medical history consisted of hypertension, hyperlipidemia, chronic kidney disease, carotid artery disease, and status after liver transplantation. He underwent arterial duplex examination, which revealed severe stenosis of the left PA. The patient was referred for peripheral angiography and endovascular therapy. Peripheral angiography revealed an isolated left PA stenosis. On below-the-knee angiography, his left anterior tibial artery was found to have a 70% occluded eccentric lesion at the origin. The left peroneal artery was found to be patent (Figure 1).

### Course of Treatment and Results

Maximum debulking with photoablation followed by PTA was chosen as the endovascular treatment. Photoablation was performed with the DABRA Excimer Laser. After photoablation, balloon angioplasty was performed with a 5- X 60-mm Stellarex drug-coated balloon (DCB; Philips). Additionally, balloon angioplasty of the anterior tibial artery was performed with a 3.5-mm balloon. After angioplasty, a stent-like result was achieved (Figure 2).



Figure 2. Final angiogram showing a “stent-like” result after treatment with DABRA, DCB, and standard PTA.

## CASE PRESENTATION #2

### Patient Presentation

A 65-year-old man presented with symptoms of intermittent rest pain in the left foot. His medical history consisted of diabetes, hypertension, hyperlipidemia, coronary artery disease, and peripheral artery disease in the left lower extremity. He had undergone previous endovascular therapy including atherectomy, balloon angioplasty, and stenting in the femoral artery, distal PA, and tibioperoneal trunk. Approximately 1 year before presentation to our institution, he underwent additional treatment of a left PA obstructive lesion with thrombus burden, which was treated with aspiration thrombectomy and PTA with a 4- X 60-mm Lutonix DCB (BD Interventional). Upon presentation to our lab, he underwent repeat duplex examination, which revealed a patent left femoral artery, but an isolated critical lesion of the left PA (Figure 3).

### Course of Treatment and Results

For repeat endovascular therapy, debulking with photoablative technology and reapplication of optimally sized DCB angioplasty was chosen.

Photoablation debulking was performed with the DABRA Excimer Laser followed by PTA with a 5- X 40-mm Stellarex DCB. A final stent-like result was achieved (Figure 4).

## DISCUSSION

The PA remains a challenging vessel for optimizing long-term outcomes after endovascular revascularization. Restenosis, stent fractures, and thrombus formation remain common due to the complex interplay of atherosclerotic disease, inflammation, and biomechanical forces of repetitive motion. Currently, maximal debulking with adjunctive balloon angioplasty remains the preferred alternative. Paclitaxel-coated devices have shown modest benefit; however, their safety has been questioned in recent analysis.<sup>2</sup> Other adjunctive balloons such as PolarCath (NuCryo Vascular, LLC), AngioSculpt (Philips), Chocolate PTA dilatation catheter (Medtronic), or other plaque-modifying technologies may offer an advantage in reducing large dissections necessitating stent implantation.

The DABRA Excimer Laser catheter provides concentrated photoablative energy at the tip without increasing the catheter size due to its unique 5-F design. DABRA



Figure 3. Critical lesion of the left PA.



Figure 4. Final angiogram showing a “stent-like” result after treatment with DABRA and DCB.

allows conduction of the laser light through a fluid-filled system without wire placement, allowing direct lesion access and maximal surface area delivery of energy at the catheter tip. The delivered photoablative energy reduces plaque burden, addresses thrombus, and reduces embolization in runoff vessels. ■

1. Cui C, Huang X, Liu X, et al. Endovascular treatment of atherosclerotic popliteal artery disease based on dynamic angiography findings. *J Vasc Surg.* 2017;65:82-90.

2. Katsanos K, Spiliopoulos S, Kitrou P, et al. Risk of death following application of paclitaxel-coated balloons and stents in the femoropopliteal artery of the leg: a systematic review and meta-analysis of randomized controlled trials. *J Am Heart Assoc.* 2018;7:e011245.

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