Zero Contrast Peripheral Vascular Interventions: A New Frontier

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Purpose

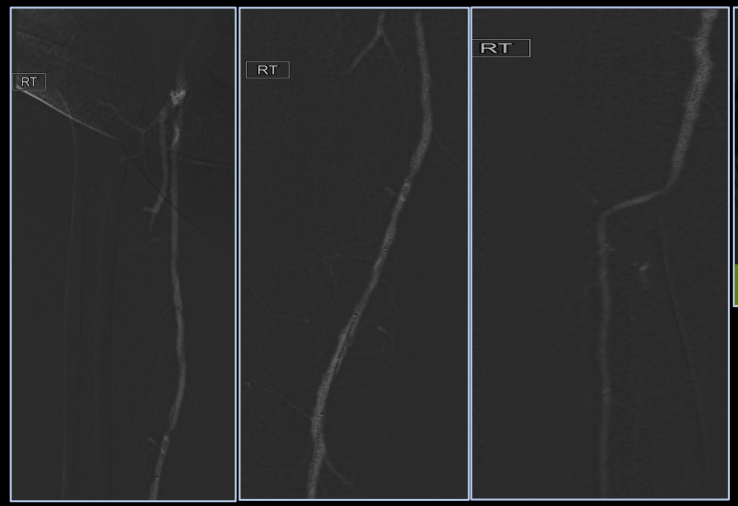
Chronic kidney disease (CKD) is associated with a significantly higher incidence of peripheral vascular disease (PVD). Peripheral vascular interventions (PVI) that require the use of contrast media are an important part of therapy. Contrast-induced acute kidney injury is a complication of PVI responsible for serious adverse outcomes such as deterioration of renal function, necessity of dialysis, prolonged hospitalization and increased mortality. We present a case of Zero Contrast Peripheral Vascular Intervention utilizing multiple innovative techniques.

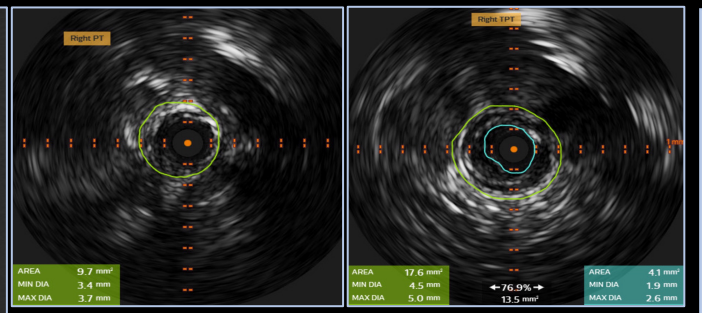
Materials and Methods

A 69 year-old female with a history of diabetes mellitus type II, hypertension, hyperlipidemia, and CKD stage V presented with a non-healing ulcer to the dorsal aspect of the right foot. She underwent an angiogram 8 months prior with therapy to the right superficial femoral, popliteal and anterior tibial arteries. She had a known occlusion of the proximal posterior tibial artery (PT) which was not treated due to advanced CKD.

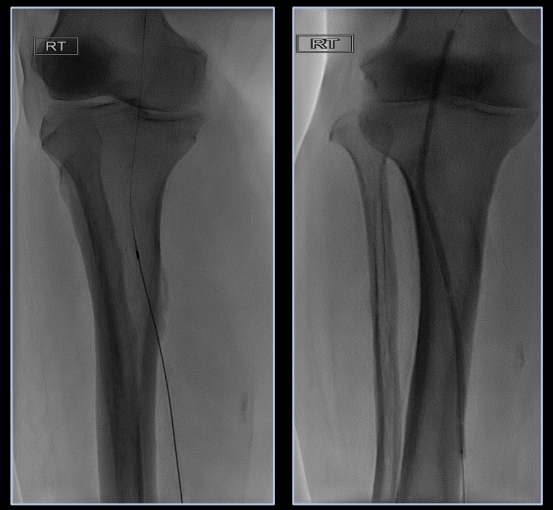
Due to the lack of meaningful healing in the foot ulcer and the patient's reluctance to initiate dialysis, the podiatry team recommended amputation. The decision was made to attempt revascularization of the PT utilizing intravascular ultrasound (IVUS) guidance, CO2 angiography and extra vascular ultrasound (EVUS) with the goal of zero contrast use.

Pre-Intervention



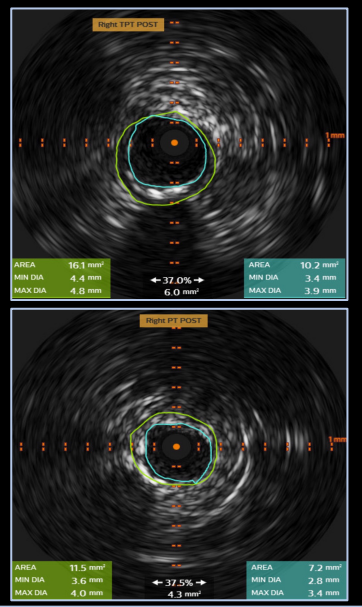


Primary Intervention



Atherectomy followed by sequential 3.0 and 3.5 balloon inflations.

Post-Intervention



Results

US-guided PT access was obtained and followed by placement of a 4/5 slender sheath. A 0.018 in. wire was advanced using the JENALI technique and crossed the occlusion of the PT. A combination of EVUS and CO2 angiography was used to confirm crossing of the PT occlusion. IVUS was used to assess wire position, plaque morphology, severity and size of the vessels.

Atherectomy and balloon angioplasty therapy were used to treat the PT occlusion. IVUS confirmed excellent luminal gain without dissections and a final run of CO2 angiography confirmed flow. EVUS was then completed, showing biphasic flow in the PT.

On follow-up, the patient demonstrated excellent clinical improvement and she remained dialysis-free.

Conclusion

This case demonstrates successful revascularization for PVD in the setting of CKD utilizing a novel method of Zero Contrast PVI. Our approach combines multiple innovative solutions including IVUS, CO2 angiography and EVUS. The rising prevalence of peripheral vascular disease and CKD obliges vascular operators to continue finding innovative solutions for the treatment of advanced PVD while prioritizing the preservation of limited residual kidney function.