Supplement to

Sponsored by Terumo Interventional Systems

Endovascular TODAY

April 2026

RADIAL ACCESS REIMAGINED

Leading experts weigh in on why there's never been a better time to optimize the Terumo Radial to Peripheral (R2P) Portfolio.

Ahmad S. Khraisat, MD, FSCAI, FACC

Sameh Sayfo, MD, MBA, FSCAI, FACC

Amit Srivastava, MD, FACC, FABVM

Shailendra Singh, MD, RPVI, FACC, FSCAI

Imraan Ansaarie, MD, FCCP, FSCAI, FSVM

TERUMO INTERVENTIONAL SYSTEMS

R2P®
Radial to Peripheral

New Entry Site Option for EVT

Reducing Patient Burden and Enhancing Mobility

Terumo's radial Entry Site Management portfolio aims to reduce net adverse clinical events, (NACE) which is a combination of non-CABG bleeding (i.e. access site bleeding) with MACE events (death, stroke, MI).

R2P (Radial to Peripheral) is a treatment system that combines Trans Radial Intervention (TRI) with Endovascular Therapies (EVT), offering significant benefits such as:

- Lower complication rates
- Cost savings
- Reduced need for nursing and other labor support

TERUMO
INTERVENTIONAL
SYSTEMS

Radial to Peripheral Portfolio

ACCESS

R2P® Destination Slender®
Guiding Sheath

Glidesheath Slender®
Hydrophilic Coated Introducer Sheath

TARGET

Glidewire®
Hydrophilic Coated Guidewire

R2P® Glidewire Advantage®
Guidewire

Glidecath®
Hydrophilic Coated Catheter

R2P® Navicross®
and Navicross®
Support Catheter

INTERVENE

R2P® Metacross® RX
PTA Balloon Dilation Catheter

R2P® Crosstella® RX
PTA Balloon Dilation Catheter

R2P® Misago®
Self-expanding Peripheral Stent

CLOSE

TR Band®

From **access** to **closure**

First and only portfolio of longer-length devices, including sheaths, wires, catheters, and interventional devices.

RADIAL ACCESS REIMAGINED

Sponsored by Terumo Interventional Systems

Imraan Ansaarie, MD, FCCP, FSCAI, FSVM
Interventional Cardiologist and Endovascular Specialist
Director, Advanced Endovascular Techniques
Ansaarie Cardiac & Endovascular Center of Excellence
East Palatka and St. Augustine, Florida
Disclosures: None.

Ahmad S. Khraisat, MD, FSCAI, FACC
Advocate Health Care
Milwaukee, Wisconsin
Disclosures: Consultant to Terumo Medical Company.

Sameh Sayfo, MD, MBA, FSCAI, FACC
Program Director, Endovascular Fellowship Program
PERT Program Director
Baylor Scott & White The Heart Hospital
Plano, Texas
sameh.sayfo@bswhealth.org
Disclosures: Receives research grant from Terumo; consultant to Terumo, Boston Scientific Corporation, Cordis, Surmodics, AngioDynamics, and Medtronic.

Shailendra Singh, MD, RPVI, FACC, FSCAI
Associate Director of Interventional Cardiology/Cardiac Catheterization Laboratories
Co-Chair, Acute Coronary Syndrome
Director of Interventional Vascular Cardiology
Interventional & Structural Cardiology
Lehigh Valley Heart and Vascular Institute
Allentown, Pennsylvania
Disclosures: Paid consultant to Terumo Interventional Systems.

Amit Srivastava, MD, FACC, FABVM
Director of Cardiology/Vascular Medicine
Florence Wormald Heart & Vascular Institute
St. Elizabeth Healthcare
Edgewood, Kentucky
Disclosures: Paid consultant to Terumo Interventional Systems.

R2P: Precision, Performance, Possibility

A pioneer's perspective on the rise of radial-to-peripheral in PAD and the role of dedicated tools and training.

By Sameh Sayfo, MD, MBA, FSCAI, FACC

Approximately 200 million people worldwide are affected by peripheral artery disease (PAD). As endovascular technology and operator experience have advanced, lower extremity PAD is increasingly treated with minimally invasive approaches, particularly for infrainguinal disease. Despite this evolution, common femoral artery access remains the default strategy for most infrainguinal interventions due to familiarity, device compatibility, and historically reliable support for complex lesion treatment. Over the past decade, transradial access has become the preferred access site for percutaneous coronary intervention, largely because it is associated with lower access site complications and improved patient comfort and satisfaction. Building on this experience, radial-to-peripheral (R2P) access has gained increasing momentum in peripheral interventions, particularly since 2019, when longer, dedicated radial sheaths and platforms became commercially available and enabled more consistent reach to lower extremity targets. Early adoption of R2P was limited by inadequate guide support, restricted availability of long-shaft devices, and uncertainty regarding feasibility for complex multilevel disease. However, early clinical experience demonstrated that R2P interventions could be performed safely and effectively, establishing a foundation for broader use.

More recent multicenter experience has reinforced that a dedicated R2P device ecosystem—including long-shaft balloons, self-expanding stents, specialty guidewires, and atherectomy technologies—can facilitate treatment of complex and multilevel PAD with high technical success and frequent same-day discharge. Importantly, ongoing advancements in R2P technology have expanded the scope of lesions that can be addressed, allowing operators to treat challenging aortoiliac, femoropopliteal, and tibial disease in selected patients. The availability of R2P-specific microcatheters has improved support and trackability for crossing long chronic total occlusions, while dedicated atherectomy platforms, including orbital and laser technologies, have enhanced lesion modification and facilitated more predictable vessel preparation. These advances have been further strengthened by the emergence of drug-coated balloon therapy and dedicated R2P-compatible stents, enabling durable definitive treatment after successful lesion crossing and preparation.

Although progress has been rapid, the next phase of growth in R2P for infrainguinal PAD will benefit from a stronger comparative evidence base. To date, much of the published experience has come from single-center experiences, operator series, and nonrandomized registries, with relatively limited randomized data. Future work should help clarify optimal patient selection, procedural efficiency, device strategy, and durable outcomes across the spectrum of infrainguinal disease. ■

Turn to page 3 to see Terumo's purpose-built **Radial to Peripheral Portfolio**.

Why Access Matters: The Case for Going Radial

Reducing complications, expanding options, and improving outcomes—the core benefits of a transradial approach for peripheral vascular intervention.

By Ahmad S. Khraisat, MD, FSCAI, FACC

Transfemoral access (TFA) has historically been the default approach for peripheral vascular intervention (PVI). Although familiar and widely practiced, TFA is associated with a meaningful burden of access site complications, including retroperitoneal bleeding, hematoma, pseudoaneurysm, arteriovenous fistula, and arterial thrombosis.[1,2] These complications are not trivial; they contribute to increased morbidity, prolonged hospitalization, and higher resource utilization. Importantly, patients with peripheral artery disease (PAD)—the very population undergoing PVI—are disproportionately affected, experiencing a 2.5-fold higher risk of surgical intervention when TFA complications occur.[3]

Efforts to mitigate TFA risk have yielded only modest gains. Even with routine ultrasound guidance, access site complication rates after TFA remain clinically significant. In one contemporary analysis, the access site complication rate was 3.5%, and notably, 10% of these patients required surgical repair.[4] These findings underscore that technical refinements alone may not fully address the intrinsic risks of TFA, particularly in complex PAD patients.

TABLE 1. COMPARISON OF RADIAL VERSUS FEMORAL ACCESS FOR PVI

	Radial Access	Femoral Access
Complication rates	Lower rates of major bleeding and vascular complications: 2.1%[8]	Higher rates of complications, more common in patients with PAD, and associated with a 2.5-fold increased risk of surgical intervention[6]; even with ultrasound guidance, one study reported a high transfemoral access site complication rate at 3.5%, with 10% requiring surgery[4]
Patient recovery	Faster recovery	Longer recovery time
Comfort level	Generally more comfortable for patients	May cause more discomfort
Technical challenges	Requires specific skills and training	More established technique
Success rates	Comparable success rates, with one study reporting 98.5%[8]	Comparable success rates (82%-100% reported)
Patient selection	Suitable for most patients	Contraindicated or inappropriate in patients with previous femoral surgery, a prosthetic endograft, tortuous iliac arteries, or morbid obesity
Length of stay/discharge	Reduced length of stay; same-day discharge in 96.5%[8]	Same-day discharge rates of 80% to 92%[10]
Bilateral lower extremity interventions	Enables interventions on bilateral lower extremity lesions without additional access site or second procedure	Often not feasible; may be inappropriate or contraindicated
Anticoagulated patients	Feasible in fully anticoagulated patients without significant added bleeding risk	Not feasible; may be inappropriate or contraindicated

Abbreviations: PAD, peripheral artery disease; PVI, peripheral vascular intervention.

Beyond complication rates, TFA is frequently inappropriate or contraindicated. Patients with prior femoral surgery, prosthetic endografts, severe iliac tortuosity, or morbid obesity may face technical challenges or unacceptable risk with TFA. Additionally, transfemoral PVI does not readily permit treatment of bilateral lower extremity disease without obtaining a second access site or staging procedures, increasing cumulative risk and patient inconvenience.[5,6] TFA is also problematic in fully anticoagulated patients, where the bleeding risk is substantially amplified.[7]

In contrast, transradial access (TRA) has emerged as a compelling alternative for PVI (Table 1),[4,6,8-10] mirroring the paradigm shift already established in coronary intervention. Accumulating evidence demonstrates that TRA is associated with significantly lower rates of major bleeding and vascular complications, reported as low as 2.1% in contemporary series.[8] Procedural success rates with TRA are high and comparable to femoral approaches, reaching 98.5% in experienced centers.[8] These data challenge the notion that TRA is merely an adjunct or niche technique.

From a patient-centered perspective, the advantages of TRA are substantial. TRA allows for faster ambulation, greater comfort, and reduced postprocedural immobility. These benefits translate directly into operational efficiencies, including shorter length of stay and high rates of same-day discharge—reported at 96.5% in radial PVI cohorts compared with 80% to 92% for femoral approaches.[8,10] Moreover, TRA enables treatment of bilateral lower extremity lesions through a single access site, avoiding additional punctures or repeat procedures.[5,6] This capability is particularly valuable in patients with multilevel or bilateral disease.

TRA also expands treatment eligibility. Patients who are fully anticoagulated can safely undergo PVI via TRA without the same magnitude of bleeding risk observed with TFA.[7] Although radial interventions require dedicated training, familiarity with longer devices, and thoughtful procedural planning, these technical considerations are increasingly addressed through growing operator experience and device innovation.

Ultimately, radial-to-peripheral intervention represents more than a technical trend—it reflects a patient-centered evolution in vascular therapy. By reducing access-related complications, improving comfort, enabling outpatient care, and expanding treatment options for complex and high-risk patients, TRA is redefining the standard approach to PAD intervention. As evidence continues to mature, access choice should be viewed not as a matter of convenience but as a critical determinant of patient outcomes. ■

1. Doyle BJ, Rihal CS, Gastineau DA, Holmes DR Jr. Bleeding, blood transfusion, and increased mortality after percutaneous coronary intervention: implications for contemporary practice. J Am Coll Cardiol. 2009;53:2019-2027. doi: 10.1016/j.jacc.2008.12.073
2. Seto AH, Abu-Fadel MS, Sparling JM, et al. Real-time ultrasound guidance facilitates femoral arterial access and reduces vascular complications: FAUST (femoral arterial access with ultrasound trial). JACC Cardiovasc Interv. 2010;3:751-758. doi: 10.1016/j.jcin.2010.04.015
3. Dencker D, Pedersen F, Engstrøm T, et al. Major femoral vascular access complications after coronary diagnostic and interventional procedures: a Danish register study. Int J Cardiol. 2016;202:604-608. doi: 10.1016/j.ijcard.2015.09.018
4. Ortiz D, Jahangir A, Singh M, et al. Access site complications after peripheral vascular interventions: incidence, predictors, and outcomes. Circ Cardiovasc Interv. 2014;7:821-828. doi: 10.1161/CIRCINTERVENTIONS.114.001306
5. Sher A, Posham R, Vouyouka A, et al. Safety and feasibility of transradial infrainguinal peripheral arterial disease interventions. J Vasc Surg. 2020;72:1237-1246.e1. doi: 10.1016/j.jvs.2020.02.016
6. Castro-Dominguez Y, Li J, Lodha A, et al. Prospective, multicenter registry to assess safety and efficacy of radial access for peripheral artery interventions. J Soc Cardiovasc Angiogr Interv. 2023;2:101107. doi: 10.1016/j.jscai.2023.101107
7. Posham R, Young LB, Lookstein RA, et al. Radial access for lower extremity peripheral arterial interventions: do we have the tools? Semin Intervent Radiol. 2018;35:427-434. doi: 10.1055/s-0038-1676341
8. Khraisat A, Abood Z, Mewissen MW, et al. Procedural utility, reliability, and success of endovascular intervention for peripheral arterial disease utilizing transradial access. J Soc Cardiovasc Angiogr Interv. 2025;4:103992. doi: 10.1016/j.jscai.2025.103992
9. Hanna L, Rodway AD, Garcha P, et al. Safety and procedural success of daycase-based endovascular procedures in lower extremity arteries of patients with peripheral artery disease: a systematic review and meta-analysis. EClinicalMedicine. 2024;75:102788. doi: 10.1016/j.eclinm.2024.102788
10. Akopian G, Katz SG. Peripheral angioplasty with same-day discharge in patients with intermittent claudication. J Vasc Surg. 2006;44:115-118. doi: 10.1016/j.jvs.2006.03.025

My Radial-to-Peripheral Evolution: Physician Success Story

How R2P transitioned from a last-resort strategy to a foundational component of modern peripheral intervention.

By Shailendra Singh, MD, RPVI, FACC, FSCAI

My evolution to radial-to-peripheral (R2P) access began not as a planned strategy but as a necessity. The very first complex peripheral intervention I performed via radial access was in 2018, in a patient who had no other viable access options remaining. At the time, R2P was not part of my routine peripheral workflow, but that single case fundamentally reshaped how I approached access selection.

CASE REPORT: R2P AFTER FAILED ANTEGRADE AND UP-AND-OVER APPROACHES

PATIENT PRESENTATION

A woman in her late 60s with an extensive cardiovascular history, including more than eight prior coronary and endovascular procedures, presented with severe rest pain in the right leg. Noninvasive testing revealed a chronic total occlusion of the distal superficial femoral artery (SFA) extending into the P1 segment of the popliteal artery, with distal reconstitution. Her anatomy posed significant challenges: morbid obesity, prior kissing stents in the common iliac artery, and a failed prior antegrade SFA attempt that resulted in a major access site bleed due to the inability to achieve safe closure. She also had single-vessel runoff to the foot, making tibial or pedal access undesirable.

PROCEDURAL OVERVIEW

We initially attempted a traditional contralateral "up-and-over" approach from the left common femoral artery but were unable to generate sufficient support to deliver a long sheath across the aortic bifurcation. With standard options exhausted, radial access became the final remaining strategy. From the wrist, we were able to obtain stable access, deliver the necessary equipment, and successfully treat the lesion without further access site complications. The patient experienced resolution of rest pain and avoided the prolonged bedrest and bleeding risk that had defined her prior procedures.

FROM BAILOUT TO BREAKTHROUGH

What began as a bailout maneuver became a proof of concept. That experience prompted a deliberate reassessment of how peripheral access decisions were being made. Early adoption of R2P focused on carefully selected cases: iliac and femoropopliteal interventions in patients who stood to benefit most from reduced bleeding risk and earlier ambulation. As with coronary radial access years earlier, initial skepticism gave way to growing confidence as procedural efficiency improved and patient experience consistently surpassed expectations.

As case complexity increased, R2P demanded greater intentionality. Preprocedural planning became essential, including careful review of imaging, patient height, vessel tortuosity, and lesion length. Early limitations related to reach and support were real, but iterative advances in sheath technology, catheter design, and radial-compatible peripheral devices steadily expanded what could be accomplished from the wrist. Lesions once considered impractical via radial access became routine in experienced hands.

PATIENT AND SYSTEM IMPACT

Patient impact has been one of the most compelling drivers of sustained adoption. Many peripheral patients are elderly, frail, or on anticoagulation, precisely those at highest risk for femoral access complications. R2P has consistently translated into fewer access site issues, faster mobilization, and improved overall patient satisfaction. From a practical standpoint, nursing demands after procedures have decreased, and recovery flow has become more efficient.

Incorporating R2P at the institutional level required more than individual operator enthusiasm. Nursing education, cath lab workflows, inventory planning, and postprocedure protocols all evolved in parallel. Importantly, R2P was framed as a complementary strategy—not a replacement for femoral access. Certain anatomies and device requirements still favor femoral approaches, but R2P expanded our options and allowed access strategy to be tailored to the patient rather than dictated by habit.

Training and standardization were critical to scalability. Radial-first algorithms, proctoring during early adoption, and consistent case review helped ensure safety and reproducibility. The development of purpose-built R2P platforms—rather than repurposed coronary tools—has been instrumental in making radial access a durable and scalable component of modern peripheral intervention.

FULL CIRCLE: R2P TODAY

Today, R2P is an integral component of my peripheral practice and an increasingly common default for appropriately selected cases. The evolution mirrors the coronary radial journey: initial necessity, followed by selective adoption, and ultimately cultural normalization. What began as a last-resort option has become a foundational approach, reshaping not only how we perform procedures, but how patients experience peripheral care. ■

R2P in Action: Real Case, Real Impact

A case example highlights the utility of Terumo's R2P System for complex peripheral artery disease.

By Sameh Sayfo, MD, MBA, FSCAI, FACC

PATIENT PRESENTATION

A woman in her mid 60s with a past medical history of coronary artery disease, type 2 diabetes mellitus, and peripheral artery disease with previous left superficial femoral artery (SFA) stenting presented to the outpatient clinic with progressive life-limiting claudication (Rutherford class 3/4). Outpatient workup including ankle-brachial index (ABI) and arterial ultrasound revealed an ABI of 0.35 and an occluded SFA stent with reconstitution at the popliteal level. The patient failed medical therapy and walking exercise; due to progression to Rutherford class 4, peripheral angiography was performed.

Ultrasound-guided right radial artery access was achieved using a short 5/6-F Glidesheath Slender® (Terumo Interventional Systems). The aortic arch was navigated using a 5-F, 125-cm JR4 catheter, which was advanced to the left external iliac artery (EIA), where a selective angiogram was obtained. Angiography

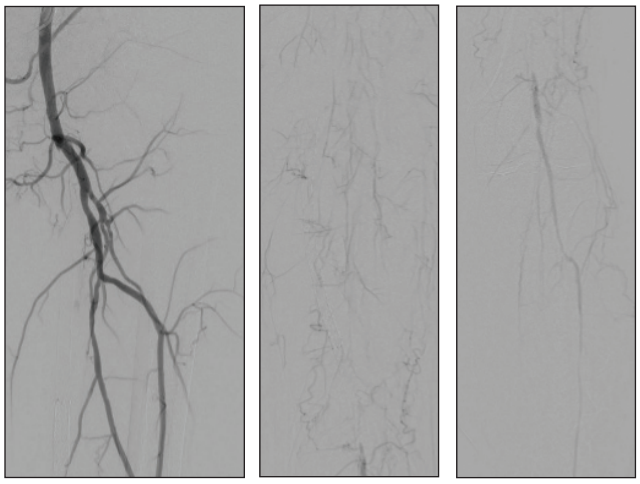


Figure 1. Diagnostic angiograms showing the long chronic total occlusion in the SFA, with in-stent restenosis that reconstituted at the distal SFA with single-vessel runoff.

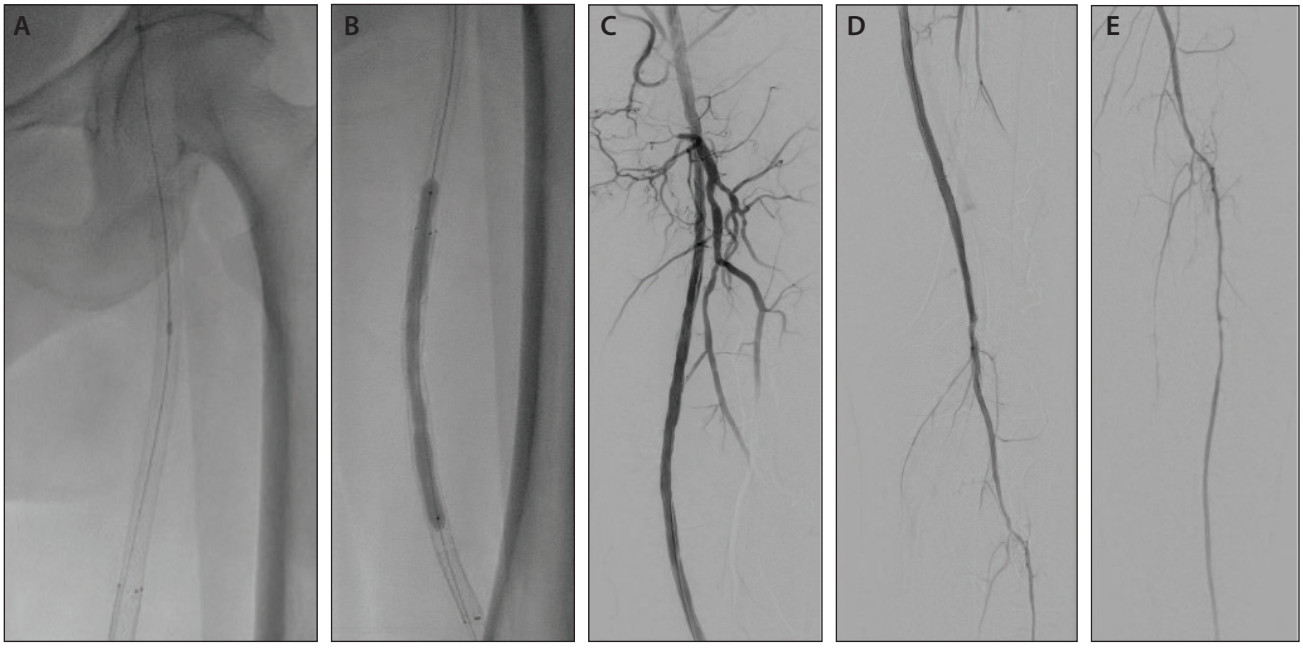


Figure 2. Laser atherectomy using a 1.5-mm Auryon laser followed by balloon percutaneous transluminal angioplasty using the 5- X 100-mm R2P® Crosstella® balloon (A) followed by inflation of a 5- X 150-mm In.Pact Admiral DCB (B). Final angiography showed 0% residual stenosis, with a patent SFA and popliteal artery, single-vessel runoff, and no complications (dissection or distal embolization) (C-E).

revealed an occluded SFA from the ostium, as well as reconstitution at the adductor canal (Figure 1).

PROCEDURAL OVERVIEW

Using a long, stiff Hi-Torque Supra Core guidewire (Abbott), a long 6-F, 119-cm R2P® Destination Slender® sheath (Terumo Interventional Systems) was advanced to the left EIA. The lesion was navigated by a 200-cm R2P® NaviCross® microcatheter (Terumo Interventional Systems) and an 0.018-inch Glidewire® Advantage® (Terumo Interventional Systems), which was swapped with a 475-cm ViperWire (Abbott) upon crossing the distal cap. Laser atherectomy using a 1.5-mm Auryon XL laser (AngioDynamics) was performed, with excellent results (Figure 2). Next, balloon angioplasty was performed using a 5- X 100-mm R2P® Crosstella® balloon (Terumo Interventional Systems), followed by 3-minute inflation of a 5- X 150-mm In.Pact Admiral drug-coated balloon (DCB). The final angiogram revealed 0% residual stenosis, with single-vessel runoff. ■

We Don't Just Hand You the Tools—We Train You to Master Them

How Terumo's educational offerings equip physicians with the necessary skills and aptitude to master contemporary endovascular techniques.

By Amit Srivastava, MD, FACC, FABVM

The endovascular landscape has changed dramatically in the past decade. Endovascular procedures have proliferated to address the rising tide of complex peripheral artery disease, and alternative access strategies including tibial/pedal and radial access have come to the forefront as part of novel treatments for these disease processes. The training pathways for these endovascular procedures are certainly not standardized, leading to a heterogeneity in experience and skill. Moreover, the number of physicians in practice who are seeking advanced training in these unique aspects of endovascular intervention is expanding. This has led to a need for procedural education that is both effective and conducive to the pressures of clinical practice.

Terumo Interventional Systems has created educational programs to address these real-life needs. Through physician proctorships, operators can gain first-hand training in a functional environment. Training labs at major conferences provide focused educational opportunities. Finally, simulators provide hands-on directed education in a pressure-free environment.

THE VALUE OF PHYSICIAN PROCTORSHIP

Terumo's physician proctorships are extremely valuable to any physician seeking to expand their endovascular practice. These proctorship events occur at sites with operators who are well-versed in procedural techniques such as transradial or tibial/pedal access. The night before the course typically involves a thorough didactic and the opportunity to ask questions to solidify the basics of the procedure. On the day of the course, physicians closely observe various aspects of complex endovascular procedures, including procedural indications, access site considerations, intraprocedural considerations, vascular access site management, and postprocedural care.

These proctorships also offer the unique ability to build personal relationships with skilled operators who

can become resources for those looking to integrate these learned skills into their clinical practice going forward. This offers the rare opportunity to run cases by more experienced operators prior to pursuing an endovascular procedure that would otherwise be performed without such thorough periprocedural planning. Physician proctorship offered by Terumo creates an endovascular community that helps its members flourish and progress.

HANDS-ON EDUCATION

Training labs and simulators at major educational events provide additional experiences that the learning operator can take advantage of. Simulators can replicate tortuous anatomy, approximate ultrasound-guided access, and provide the physical memory that is often needed to be successful in endovascular procedures. Tips and tricks by experienced operators can give valuable insight into alternative access techniques, radial-to-peripheral procedural considerations, and access site management. These teaching tools are highly effective for introducing novel technologies and techniques in a short period of dedicated time.

TERUMO'S COMPREHENSIVE TRAINING PATHWAY

Whether you participate in a course, a training lab, or a simulator, these experiences have long-lasting impacts on clinical practice. Prior attendees have reported both improved fundamental understanding and improved procedural outcomes after course attendance. With the expansion of endovascular techniques and technology, obtaining this higher level of training while in clinical practice provides a framework for creating an advancing endovascular community.

Terumo Interventional Systems provides both the technology as well as the tools to improve endovascular practice. They truly hand you not only the tools to be successful but also, and more importantly, they train you to master them. ■

Radial and the ASC Opportunity: The Future of PAD Treatment

How radial-to-peripheral procedures in the ambulatory surgical setting align safety, patient satisfaction, and cost-efficiency.

By Amit Srivastava, MD, FACC, FABVM

The procedural environment for endovascular cases in the United States has changed significantly. Due to cost containment strategies for the ever-burgeoning rise in peripheral vascular cases, both the Centers for Medicare & Medicaid Services and private payors are encouraging outpatient-based intervention for peripheral artery disease. This can look like same-day discharge from hospital-based procedures or performance of endovascular cases in an office-based lab or ambulatory surgical center (ASC).

WHY R2P IN THE AMBULATORY SETTING?

Radial-to-peripheral (R2P) cases are ideal for ASCs for many reasons: (1) access site risk is minimized; (2) patient satisfaction is higher, with less need for nursing; and (3) patient recovery is done in a dignified manner in radial lounges. As a result, outpatient R2P cases provide a lower overall cost to the system in their entirety.

For experienced radial operators, the inherent procedural risk of access site complications is essentially negated with transradial access (TRA). It has been well-established in contemporary interventional literature that significant bleeding complications have a direct relationship with mortality. By pursuing TRA for endovascular procedures, the risk of a major bleeding complication is minimized as much as possible, making it ideal for an ASC.

Importantly, patient satisfaction is tied to metrics for reimbursement, and patient satisfaction with TRA procedures is consistently higher than with transfemoral (TFA) procedures. For those who have had cases done via both TFA and TRA, patients invariably prefer TRA due to both the reduced access-related pain and the less taxing

CASE REPORT: R2P LIMB SALVAGE IN AN ASC

Figure 1 represents a sample R2P case performed in an ASC setting. The patient presented with a right pedal wound after prior aortic endograft repair of an abdominal aortic aneurysm. His right superficial femoral artery (SFA) and profunda femoris were noted to have significant disease. Transradial endovascular intervention was successful for limb salvage via the right radial approach, with excellent outcomes in less than 1 hour of procedure time. This showcases what is possible today and what is achievable in the future as a standard of care in the ambulatory setting.

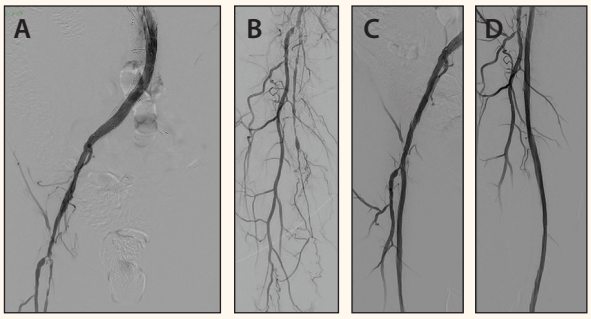


Figure 1. Preprocedure peripheral angiography via the right radial approach with selective right aortic engograft limb angiography demonstrating severe complex distal right common femoral artery (CFA) stenosis involving the origins of the profunda femoris and SFA (A). Preprocedure peripheral angiography demonstrating long-segment right SFA occlusion (B). Angiography post-TRA peripheral intervention with Auryon laser atherectomy (AngioDynamics) and balloon angioplasty, demonstrating a markedly improved right CFA, profunda femoris, and proximal SFA stenosis (C), as well as a widely patent right SFA (D).

recovery. When recovery is performed in radial lounges, there is significantly less intense postprocedural nursing necessary, thereby optimizing recovery while minimizing nursing use. This translates consistently to less overhead and improved procedural cost-efficiency.

CONSIDERATIONS FOR SUCCESS

When considering performing these procedures in an ASC, being facile with TRA and R2P procedures is a strong asset. One should be able to manage the nuances of TRA, including addressing spasm, navigating the aortic arch, and delivering equipment. The endovascular space continues to evolve with more equipment and tools coming to market with intended radial use. As this field continues to progress, obtaining training and familiarity with TRA procedures is certainly a key to success in the ASC setting. ■

R2P and the OBL Opportunity: Radial-First Hybrid Access for Lower Extremity Intervention

Advancing outpatient endovascular therapy beyond the groin.

By Imraan Ansaarie, MD, FCCP, FSCAI, FSVM

Lower extremity intervention via the radial approach became part of our routine outpatient practice in 2016. At that time, the availability of dedicated long radial platforms for peripheral intervention remained limited, and femoral access for lower extremity procedures continued to dominate. As ambulatory facilities increasingly emphasized rapid ambulation and predictable recovery profiles, select patients appeared

CASE REPORT 1: RADIAL-ONLY INFRAPOPLITEAL REVASCULARIZATION AFTER PRIOR GROIN COMPLICATIONS

A man in his early 80s with CLTI of the right lower extremity presented with anatomy unfavorable for femoral access. His history was notable for a left below-knee amputation performed in 1998 and prior groin access complications, prompting avoidance of femoral puncture. Radial access was therefore selected as the sole viable access strategy.

Baseline angiography demonstrated limited distal runoff to the right foot (Figure 1). The intervention was performed entirely via right radial access, with successful traversal and treatment of infrapopliteal disease. Completion angiography demonstrated restoration of inline flow with two-vessel runoff to the foot. Hemostasis was achieved with manual compression at the radial access site. The patient was discharged back to a nursing facility within 2 hours, without functional limitation.

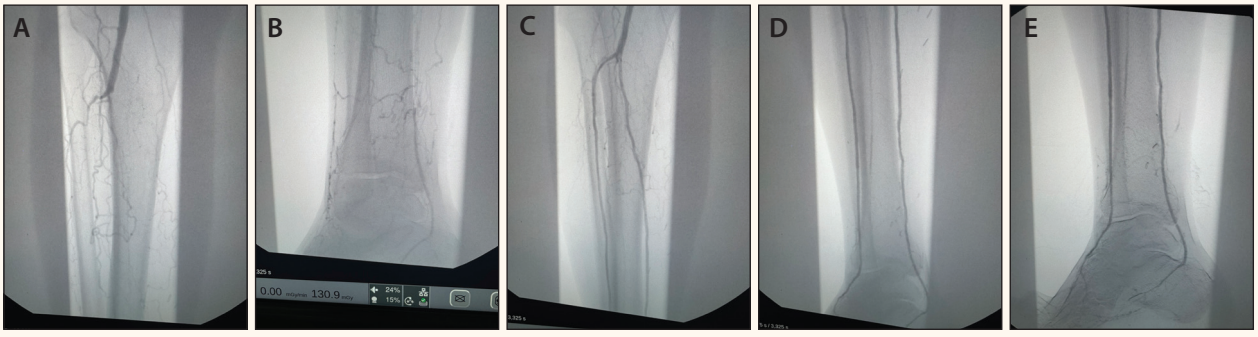


Figure 1. Radial-only infrapopliteal revascularization after prior groin complications. Baseline angiography demonstrating infrapopliteal occlusive disease with limited distal runoff (A, B), images obtained via right radial access after traversal and treatment of the tibial circulation. Completion angiography showing restoration of inline flow (C, D). Final angiographic frame confirming two-vessel runoff to the foot after radial-only intervention (E).

well suited to benefit from the safety and efficiency gains already established in coronary radial practice.

Early experience relied primarily on standard coronary tools to access inflow, femoropopliteal, and tibial segments. The radial approach served as a stable, atraumatic conduit, whereas selective pedal access was incorporated to provide distal control when antegrade traversal proved ineffective or anatomically challenging. With accumulated experience, this approach evolved into a more organized combined radial-pedal strategy, wherein forearm access provides inflow support and pedal access is employed selectively to facilitate retrograde lesion traversal when indicated.

Importantly, this strategy has not replaced femoral access. Instead, it has expanded access options for patients at increased risk of bleeding complications, those with renal disease requiring contrast minimization, individuals with unfavorable access site anatomy, or patients whose recovery needs favor nongroin approaches. Conversely, patients with radial anatomy not amenable to access, severe ostial disease, hemodynamic instability, or anticipated need for large-bore therapy continue to undergo femoral access. Throughout this experience, access selection has been guided by patient anatomy and clinical context rather than operator preference.

RATIONALE FOR AVOIDING THE GROIN IN THE OUTPATIENT SETTING

An integrated radial-pedal laboratory workflow aligns well with outpatient procedural goals, including early mobilization and predictable discharge. Radial access minimizes postprocedural immobility and obviates the need for prolonged groin compression. With contemporary 119- to 150-cm platforms, treatment from the wrist can reliably extend beyond inflow to include the superficial femoral and popliteal arteries and, in many cases, the infrapopliteal circulation. In my experience, below-the-knee intervention via radial access is feasible even in patients with single-vessel or peroneal-only runoff. Pedal access is incorporated selectively when lesion morphology, calcific burden, vessel course, or anticipated crossing complexity suggests that a retrograde strategy

CASE REPORT 2: DISTAL TIBIAL INTERVENTION VIA RADIAL ACCESS

A 6-ft 3-in man with symptomatic posterior tibial artery disease underwent laser atherectomy and balloon angioplasty entirely via left radial access (Figure 2). Using a 150-cm platform and long balloon catheters, adequate torque control was maintained within the distal tibial circulation. No additional access was required, and the patient ambulated immediately postprocedure.

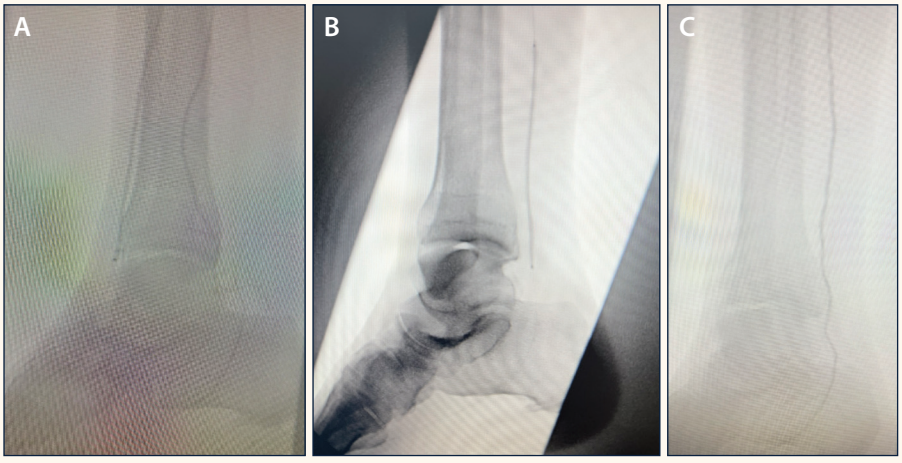


Figure 2. Distal posterior tibial intervention performed entirely via left radial access. Advancement of a long-shaft catheter and guidewire from the left radial artery into the distal posterior tibial artery (A). Maintained wire control and catheter support at the ankle level (B). Completion angiography demonstrating restored inline flow without femoral or pedal access (C).

may improve efficiency or safety. This access flexibility has proven particularly valuable in the treatment of chronic limb-threatening ischemia (CLTI), where achieving durable outflow often requires adaptive and anatomically driven access planning.

PROCEDURAL WORKFLOW

Radial Access and Arterial Assessment

Preprocedural ultrasound is used routinely to characterize radial artery diameter and wall morphology. Vessels measuring ≥ 2.2 mm are generally preferred. Circumferential calcification is documented, as it may affect sheath advancement and withdrawal.

Antihypertensive medications are typically held the evening before the procedure. This practice has minimized spasm-related resistance during sheath manipulation without routine reliance on intra-arterial vasodilators.

Radial Hemostasis

Hemostasis is achieved using a two-person technique based on patent hemostasis principles with continuous Doppler monitoring. In arteries with greater circumferential calcium or increased reactivity, brief adjunctive manual compression is applied during decompression to maintain antegrade flow and prevent sheath withdrawal difficulties. Using this approach, radial sheath removal complications have remained < 1% in our experience.

EXPERIENCE AND SAFETY PROFILE

Drawing on experience from nearly 1,000 combined radial and pedal procedures performed by a single operator across outpatient and hospital-based settings, access-related complications have remained infrequent and consistent with rates reported in the published radial and pedal literature. Observed access site events have included radial artery occlusion, radial spasm requiring access conversion, isolated instances requiring surgical retrieval of a trapped catheter, and pedal hematoma.

Conversion to femoral access was undertaken when dictated by anatomic constraints, device limitations, or procedural complexity. A 100-patient analysis from the early phase of this experience has been published previously[1] and provides detailed outcome reporting. A formal statistical analysis of a larger cohort exceeding 750 cases is currently underway, with planned reporting of procedural success, access-related events, conversion rates, and real-world outcomes.

DISCUSSION

In this experience, the combined radial-pedal technique has proven to be a safe and versatile access strategy in carefully selected patients. Key factors contributing to its integration into practice include bleeding avoidance, early patient mobilization, renal

preservation through low-contrast strategies, and anatomic flexibility in cases where antegrade approaches are inefficient or higher risk.

Importantly, this approach is complementary rather than a substitute for femoral access. Access planning remains patient-based, anatomy-driven, and procedure-dependent.

LIMITATIONS AND FUTURE DIRECTIONS

These results reflect experience from a single institution with a predominantly solo-operator practice, which may introduce selection bias. Comparative outcome data relative to femoral access are not available. Additionally, proficiency with radial techniques developed over time may limit generalizability to centers earlier in their learning curve.

Ongoing efforts focus on complication stratification, radiation exposure, procedural efficiency analysis, learning curve assessment, and comparative evaluation relative to femoral access.

CONCLUSION

In experienced hands, hybrid radial-pedal access techniques represent a practical alternative to femoral access for selected lower extremity interventions in the outpatient setting. This approach expands access options and procedural flexibility without supplanting conventional techniques for infrapopliteal revascularization. ■

1. Ansaarie I, Goldfaden RF, Hardy J, et al. A Retrospective cohort study to evaluate the efficacy, safety, and cost of MáLEI via transradial vs transfemoral peripheral revascularizations. Vasc Dis Manage. 2021;18:E178-E183.

Disclosure of Artificial Intelligence (AI) Use: *AI tools were used to refine language and organize the manuscript. All clinical content reflects the author's original experience and interpretation.*

What's Next for R2P?

Reflections on unmet clinical needs and persistent challenges in radial-to-peripheral intervention, and how device innovation, including Terumo's R2P Portfolio, is evolving to close these gaps.

With Amit Srivastava, MD, FACC, FABVM, and Shailendra Singh, MD, RPVI, FACC, FSCAI

What unmet clinical needs or procedural challenges should the next generation of radial tools address, and how can radial-to-peripheral (R2P) offerings like Terumo's R2P Portfolio evolve to meet them?

Dr. Srivastava: Challenges remain regarding transradial procedures. Imaging is the biggest need currently, with a lack of catheters longer than 150 cm and an inability to consistently perform imaging past the proximal superficial femoral artery in most patients. As intervention is becoming more imaging-guided, development of intravascular ultrasound or optical coherence tomography catheters with working lengths > 200 cm will further improve transradial procedures. Intravascular lithotripsy with catheters with working lengths > 200 cm are also needed as indications and reimbursement continue to evolve for this technology.

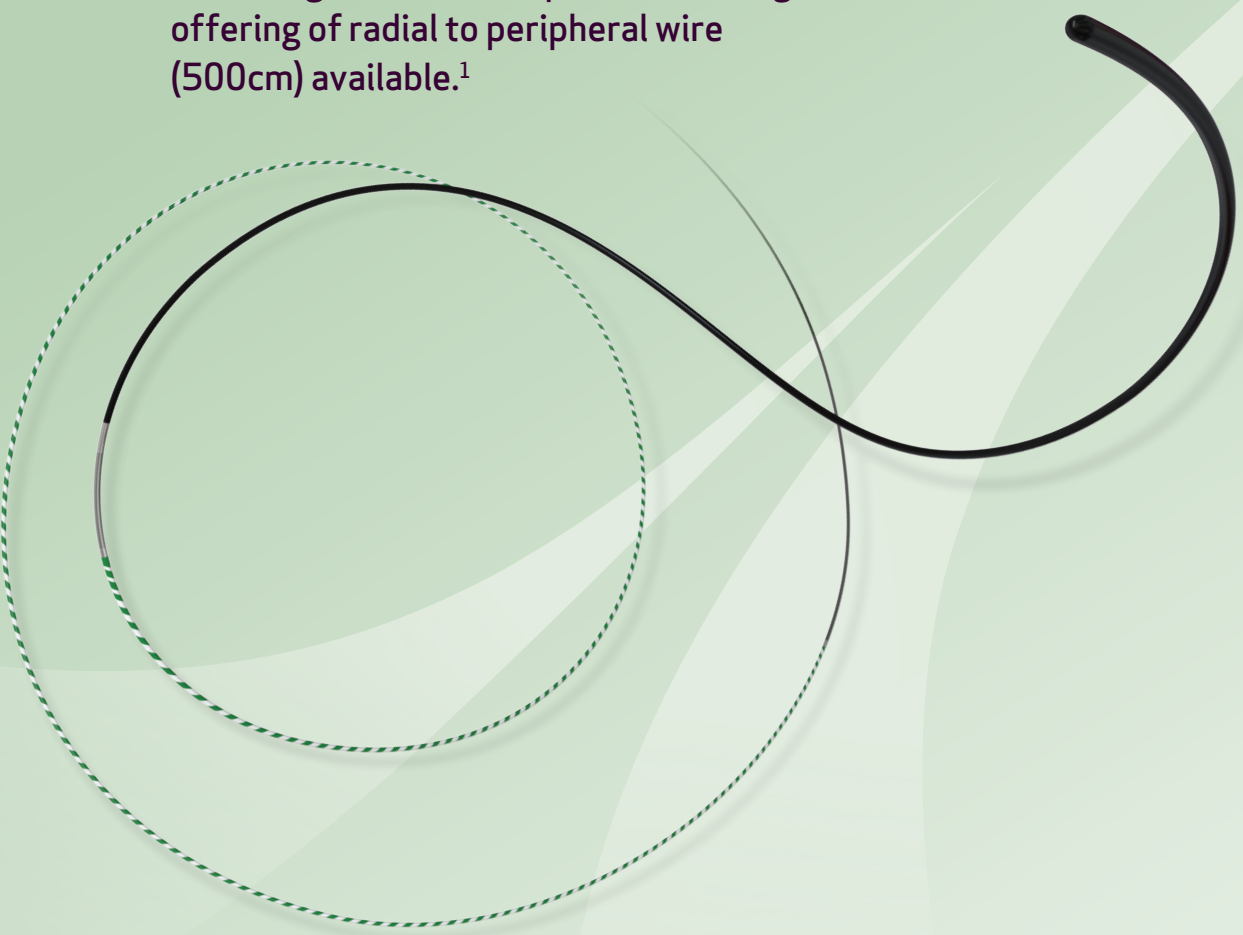
Dr. Singh: As R2P continues to evolve, what's become increasingly clear is that access, delivery, and therapy can't be treated as separate pieces; they must work together seamlessly. From a procedural standpoint, the primary limitations of R2P continue to relate to reach, support, and stability when treating complex iliac, femoropopliteal, and infrapopliteal disease, particularly in taller patients or those with significant tortuosity or calcification. Low-profile but supportive sheath platforms, better coatings to reduce friction over long distances, and catheters that maintain torque and control without losing trackability are all critical to expanding what we can reliably treat from the wrist.

Equally important is expansion of the radial-compatible peripheral therapy ecosystem itself. A wider sizing matrix of balloons and stents capable of treating larger-caliber vessels from a radial platform remains an unmet need and would further reduce the need to default to femoral access purely for device compatibility. In addition, longer-shaft intravascular imaging catheters would meaningfully enhance procedural planning, lesion assessment, and optimization when performing complex interventions from the wrist. Continued development of these purpose-built tools—spanning access, therapy, and imaging—will be essential to allowing operators to treat increasingly complex peripheral disease via R2P without compromise. Terumo has played a leading role in advancing dedicated R2P platforms, and ongoing innovation in this space will be key to improving procedural efficiency, operator control, and consistency of patient outcomes. ■

R2P® Glidewire Advantage®
Guidewire

RADIAL READY
PERIPHERAL PROVEN

Featuring the most comprehensive length offering of radial to peripheral wire (500cm) available.[1]



FIND OUT MORE

800.888.3786 | terumois.com

TERUMO
INTERVENTIONAL SYSTEMS

References: 1. Endovascular Today Device guide, 2025.