



Dorsal Radial Access: Is the Back Door to the Arterial System Ready to Be the Workhorse Entry?☆☆☆☆



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Arterial access via the dorsal radial artery has been used since the late 1970s [1]. Various isolated reports described its use for arterial lines and later as a possible arterial limb for dialysis access. More recently, starting in 2014, investigators in countries such as Russia and Iran began to use the dorsal radial as a site analogous to the radial artery for cardiac catheterization procedures [2,3]. Due to the vagrancies of modern access to worldly journals and medical education venues, these efforts were underappreciated in many international forums. The internet, specifically social media, turned out to be the conduit that catalyzed the introduction to the dorsal radial artery for many in touch with this technology. Ultimately, in 2017, US and European medical journals published the first reports [4,5], as many operators tried to make sense of this variation to the radial techniques and how it might integrate into their daily catheterization laboratory routines.

One question that frequently comes up is *why bother?* After all, I am happy with the usual radial access. Of course, one needs to remember that Sone's operators said the same to early Judkin's operators, who themselves spoke the same words to the early radial operators. Progress is always on the horizon; on the other hand, not every new idea is going to end up in the mainstream.

The advantages to the dorsal radial approach stem primarily from orthopedic ergonomic considerations, both for the patient and operators. From the patient's viewpoint, the arm can be left in a neutral position, neither pronated nor supinated, and it may be more comfortable when the position needs to be held for an extended period time. Operators who utilize the left radial approach need to reach over

the patient if practicing from the right side of the table. This position places strain on the back from the weight of the protective lead and is the primary disadvantage of the left radial approach. Placing the left arm across the abdomen improves the ergonomics for the operator on the right, and this positioning is more comfortable if the arm does not need to be supinated for radial access but instead can be left in a neutral rotation for dorsal radial access.

The anatomy of the forearm drives most of the potential disadvantages. The dorsal radial is the most distal extension of the radial artery and is smaller in diameter. As it courses from the radial artery up behind the thumb to the region between the thumb and second finger, tortuosity can occur and add a further challenge for the operator. Finally, one needs to consider what the distal radial feeds along its course. Besides providing vascular support to the thumb and its muscles, there are several bones of the wrist that have their blood supply supported by branches of the dorsal radial. Ischemia in this vessel could be problematic although, as of yet, not reported. The anatomy may also provide some advantages. Because the nidus for radial occlusion typically is the puncture site, the dorsal site may limit the extent of radial occlusion if thrombus occurs, preserving the radial artery itself for later use.

With the above pros and cons of a distal radial approach, what is the strength of the evidence? Part of the problem with building evidence is that the new status quo, the use of standard transradial access as an a priori approach for cardiac catheterization, has a very low complication rate. Randomized studies would need to be large to demonstrate enough power to be definitive, and learning curves for dorsal radial need to be surmounted by enough seasoned operators to provide a fair comparison between techniques. Today, this type of evidence is not available, but we can learn from the reports of those who have had some experience with dorsal radial. In this light, the experience of several USA operators is presented in this issue.

☆ Editorial Comment on The Left Distal Trans-Radial Artery Access For Coronary Angiography And Intervention: A US Experience, by Kasrim Al-Azizi, et al.

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Al-Azizi and colleagues describe their experience with dorsal radial, in particular, the left dorsal radial approach, to improve ergonomics of distal arterial access for left arm procedures [6]. This was an experience by early learners. The 5 cardiologists involved were reported as experienced in the radial artery but had a training set of 22 patients [7], just over 4 dorsal radial procedures per physician on average, to learn. This experience is less than the reported learning curve of 50 cases [8]. Despite this, they had a failure to complete the procedure via the left dorsal radial in only 2 out of 61 patients. The success rate should be tempered by acknowledging the selectivity of the patient population. This present study was not an all-comers study, but only those who had what appeared to be good dorsal radial pulses. We don't know how many were excluded. Other reports suggest that upwards of 30% in all-comers experiences are typically not considered appropriate for dorsal radial access [4,9]. Despite this being an early experience from a group on the learning curve, the success rates and procedural metrics were quite acceptable, and in line with typical radial procedures.

The authors have also provided a pictorial guide for the readers that outline the steps. The hand is positioned with the dorsal radial in a neutral position. In our experience [10], having a sterile gauze pad or towel for the patient to hold helps spread open the junction between the thumb and finger to improve access by stretching the redundant tissue away from the entry point. Alternatively, using a special arm board with a plastic obturator to clasp such as found on the DRAWS arm board (Davies Precision Machining, Lebanon, Pennsylvania) can be very helpful. This arm board can also be used to anchor a band to secure the arm across the body. Finally, hemostasis is still a work in progress. The dorsal radial tends to lie in a bony groove so that it is already somewhat stabilized, but the present hemostasis devices were never designed for use in this location and often need user modification to prevent early slippage off the site. Hemostatic devices to specifically use on the dorsal radial are now entering the market, and their ability to hold their geographic position over the dorsal radial should improve the hemostatic phase of the procedure.

Al-Azizi and colleagues [6] have demonstrated that in the hands of experienced radial operators, patients can be identified, primarily by the presence of a good dorsal radial pulse, who can successfully undergo left dorsal radial access with respectable results. The procedure is

feasible, but randomization was not done, so comparability to the standard radial procedure remains a question. One persistent problem is that selectivity is required to obtain a high success rate. Dorsal radial does not appear to have the workhorse characteristic of the standard radial approach, and as such, routine use without prescreening is not supported. The dorsal radial remains an interesting back-door approach into the vascular system in selected patients for specific procedures by operators familiar with entry into small arterial vessels. For now, the standard transradial approach continues to have the evidence to support its use as the front-line, go-to approach for cardiac catheterization.

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