EDITORIAL

Distal radial access: A better way to the heart?

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In both the European [1] and the American [2] coronary revascularization guidelines, radial access is given a class I recommendation for coronary angiography and percutaneous coronary intervention (PCI) because it reduces the risk of vascular access complications and bleeding. Increasing evidence shows favorable outcomes with radial access even for highly complex PCI [3], such as chronic total occlusion PCI [4] or PCI in patients with prior coronary artery bypass graft surgery (CABG) [5]. However, radial access also has limitations, such as the risk of compartment syndrome and radial artery occlusion. Radial access can cause radial artery injury, potentially preventing the use of the radial artery as a conduit for CABG. Moreover, left radial access can be uncomfortable for both the patient and the operator.

Radial access has traditionally been obtained in the proximal radial artery above the styloid process of the radius. To improve the safety of radial access, distal radial access was developed at the anatomic snuffbox or more distally in the first intermetacarpal space [6, 7]. The use of distal radial access has been increasing [8], but the comparative efficacy and safety of distal vs. proximal radial access remains controversial [9].

In this issue of the *Kardiologia Polska* (*Polish Heart Journal*), Momot et al. [10] report the findings of a randomized controlled trial that assigned 200 patients scheduled for elective coronary angiography or PCI to either distal or proximal radial access in a 3:2 ratio. Twenty-two of the 120 patients assigned to distal radial access were converted to proximal radial access because of no palpable distal radial pulse (n = 4) or because of failure to cannulate the distal radial artery (n = 18). Blood was collected from the cephalic vein after removal of the pressure dressing in 40 random patients (20 from the distal and 20 from the proximal radial group), and several markers of endothelial injury (endothelin 1 [ET-1], interleukin 8 [IL-8], soluble vascular cell adhesion molecule-1 [sVCAM-1]) were measured. The time to obtain access was longer in the distal radial group. Moreover, patients in the distal radial access group had more discomfort. There was no difference in hematoma or radial artery occlusion, although the study was not powered for clinical endpoints. There was no difference in radiation dose and contrast volume. Finally, there was no difference in the plasma levels of ET-1, IL-8, sVCAM-1.

The authors should be congratulated for advancing our understanding of distal radial access. How do the study findings affect our current understanding of this field and what are the practical implications (Table 1)?

First, the present study confirms that distal radial access is more difficult and less predictable than proximal radial access: it required a longer time (111 vs. 50 seconds) and was associated with higher crossover to another access point (18% vs. 0%). These findings are very similar to the findings of the largest randomized controlled trial performed to date (n = 1042) comparing distal and proximal radial access [11] that reported 78.7% vs. 94.8% successful sheath insertion (P <0.001) and 120 vs. 75 seconds to insert the sheath (P <0.001) [11]. To what extent the higher failure and longer time required to obtain access via the distal radial artery is related to operator experience and access technique remains to be seen. Increasing experience and

Table 1. Comparison of distal vs. proximal radial access for cardiac catheterization

<table>
<tr><th></th><th></th><th>Distal radial</th><th>Proximal radial</th></tr>
<tr><td>Success</td><td>Obtaining access</td><td></td><td>Better</td></tr>
<tr><td></td><td>Crossover to femoral</td><td></td><td>Better</td></tr>
<tr><td>Efficiency</td><td>Time to obtain access</td><td></td><td>Better</td></tr>
<tr><td></td><td>Difficulty in obtaining access</td><td></td><td>Better</td></tr>
<tr><td></td><td>Able to insert a larger sheath</td><td></td><td>Better</td></tr>
<tr><td></td><td>Time to hemostasis</td><td>Better</td><td></td></tr>
<tr><td></td><td>Ease of coronary engagement</td><td colspan="2">No difference</td></tr>
<tr><td>Comfort</td><td>Operator comfort — right radial</td><td colspan="2">No difference</td></tr>
<tr><td></td><td>Operator comfort — left radial</td><td>Better</td><td></td></tr>
<tr><td></td><td>Patient comfort — right radial</td><td colspan="2">No difference</td></tr>
<tr><td></td><td>Patient comfort — left radial</td><td>Better</td><td></td></tr>
<tr><td>Complications</td><td>Compartment syndrome</td><td>Better</td><td></td></tr>
<tr><td></td><td>Hand ischemia</td><td>Better</td><td></td></tr>
<tr><td></td><td>Bleeding</td><td colspan="2">No difference</td></tr>
<tr><td></td><td>Radial artery occlusion</td><td>Better</td><td></td></tr>
<tr><td></td><td>Radial artery injury</td><td colspan="2">No difference</td></tr>
</table>

consistent use of ultrasound [12] could help improve the success rate and reduce the time required for obtaining distal radial access.

Second, distal radial access was less comfortable for the patient, likely due to the longer time required to obtain access and multiple needle passes. Higher success and efficiency in obtaining radial access with increasing operator experience could improve the patient's experience. The right radial artery was used in the present study, but distal radial access may be particularly useful for left radial access, as it allows a more natural position for the patient's hand and easier operator access to the radial artery.

Third, the current study did not examine the impact of distal radial access on the time required to achieve hemostasis, as all patients received a pressure dressing for 120 minutes. This was required to prevent confounding of the endothelial damage markers. In the study by Tsigkas et al. [11], time to hemostasis was shorter with distal radial access (60 vs. 120 minutes; P <0.001). Shorter hemostasis time could increase patient comfort and potentially "counterbalance" some of the discomfort experienced while obtaining access.

Fourth, the risk of complications was similar with distal and proximal radial access, but the study was underpowered for clinical endpoints. Three randomized controlled trials have demonstrated lower rates of radial artery occlusion with distal radial access [11, 13, 14]. The distal radial artery may decrease the risk of compartment syndrome that could be a catastrophic complication. Moreover, maintaining radial artery patency would allow its repeat use for cardiac catheterization and possibly as a conduit for CABG.

Fifth, endothelial injury markers were similar with distal and proximal radial access, suggesting similar radial artery injury with the two approaches. Therefore, distal radial access does not alleviate concerns for radial artery injury in case the patient requires CABG using radial grafts. According to the 2022 American revascularization guidelines [2], "the decision to use the transradial approach should be tempered with the possibility that the radial artery may be needed for bypass grafting in the future. In patients for whom there is a high likelihood of future CABG, the choice of vascular access may require discussion with the patient and the cardiac surgeon".

Sixth, the feasibility/safety of large (7 or 8 F) catheter insertion via distal radial access requires further study. In the present study, only 6 F sheaths and catheters were used, but larger sheaths and guide catheters may facilitate treatment of highly complex coronary lesions. Several studies have shown encouraging results with the use of low-profile 7 F sheaths *via* distal radial access [15]. Alternatively, sheathless guide catheters could be used.

In summary, distal radial access is here to stay and should become part of the armamentarium of all interventional cardiologists, but it is not a panacea. Increasing clinical experience and additional well-powered clinical studies will help further clarify the optimal application of distal radial access in contemporary cardiac catheterization.

Article information

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