Distal radial access: No pain, no gain

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By 2021, both American and European guidelines aligned, endorsing transradial access (TRA) for all coronary procedures, stable or acute [1, 2]. With this momentum, the surging "radial-first" strategy gained increased attention, particularly on social media, pushing the boundaries of TRA in the anatomical snuffbox or the dorsal hand [3]. The metamorphosed distal radial access (DRA) was quickly adopted by many centers, in the absence of strong evidence, due to its clear advantages: less postprocedural occlusion, faster hemostasis, and better intraprocedural ergonomics [4–6]. Although smaller in diameter than its proximal surrogate, its versatility has been tested even in balloon aortic valvuloplasty, with large sheaths of 7–8 F, keeping its promised low occlusion rate (6%) [7]. However, with a more angled path and a smaller diameter, DRA cannulation may be more difficult and perhaps more painful. During access, vasoconstriction may occur in the vessel, and rupture of the elastic lamina and media layer may occur, resulting in complications such as bleeding, hematoma, and later, radial artery occlusion.

In this issue of *Kardiologia Polska* (*Kardiol Pol*, *Polish Heart Journal*) Momot et al. [8] looked at an interesting aspect of DRA, namely, if it produces more vascular injury than its predecessor and if this is being transmitted subjectively through the pain felt by the patient. On closer inspection, it remains to be seen whether this pain is caused by the operator, or objectively, strictly by the aggression of sheath insertion.

But perhaps, we should see first if the insertion of a sheath into an artery causes so much endothelial injury that we should be concerned about its clinical impact if any. The fact that using radial conduits is not recommended in coronary artery bypass grafting (CABG) after coronary angiography and catheter manipulation shows that this topic is relevant [2]. The quality of the radial artery is accounted for by an inadequate endothelial (vasodilation) response and arterial remodeling, which may restrict its usage as a bypass graft or as a dialysis shunt [2, 9]. Boos et al. [10] observed significant increases in three endothelial markers (circulating endothelial cells [CECs], von Willebrand factor, and soluble E selectin) with elective percutaneous coronary intervention (PCI), but not coronary angiography. On the other hand, Dinat-George et al. [11] noted a significant increase (approximately 13-fold) in CECs following primary coronary angioplasty in 10 patients using larger 7 F femoral catheters. In an older study, Sbarbati et al. [12] noted a threefold to fourfold increase in CEC counts after coronary angiography (no PCI/stenting), but through the femoral approach only and using large 8 F sheaths. It is understood, therefore, that these biomarkers increase even more in the femoral approach or when working on the coronary arteries. In terms of flow-mediated dilatation, the radial artery's function is suppressed immediately after coronary angiography, but it recovers after 2–3 months [13]. In fact, a study by Kis et al. [14], DRA showed significantly less affected vasomotor functions the day after the procedure, compared to the conventional TRA. This was also confirmed by Soydan et al. [15]. The slower decrease in flow-mediated dilation after DRA was assumed to be connected with higher preservation of endothelial functions than the other access sites. The possible explanation for this preservation could lie in the fact

that the distal radial artery is one of the distal branches of the main radial artery and that the insertion of the radial sheath towards the endothelium could be less aggressive than introducing it directly into the main radial artery [3].

TRA remains, therefore, the most harmless procedure as confirmed by the Polish team. In their study, no differences were found between endothelin 1, interleukin 8, and levels of soluble vascular cell adhesion molecule-1 in conventional TRA vs. DRA although accessing the distal radial artery was subjectively more painful [8]. Several comments are worth discussing. First, if the basal venous blood had been collected before the puncture and compared to the levels after the procedure, it would have brought more value to the dispute over how aggressive TRA is in general. Second, DRA, like any technique, involves a learning curve, which can be challenging at first; only after 100 cases, stability in the success rate was observed [4]. Momot et al. [8] did not provide us with details about the experience of operators with DRA, which turns out to be different compared to TRA. Moreover, we do not know the number of puncture attempts while endeavoring DRA. Logically, with the number of attempts, the pain increases exponentially. But we have indirect signs that obtaining DRA was more difficult: longer access time with DRA (81 vs. 50 seconds), more hematomas (12 vs. 5), and a lower success rate (84% vs. 100%) [8]. It is almost clear then why DRA was more painful. As soon as appropriate skills are acquired, such as insertion of a small (5–6 F) sheath into a lumen that can easily accommodate it (a 6 F sheath has an outer diameter of approximately 2.4–2.5 mm while the mean distal radial artery diameter is 2.5–2.6 mm [4, 5]), and the reasonable steps of local anesthesia, nitroglycerin, hand positioning, careful device manipulation, etc., the cannulation should come with low levels of pain perceived by the patient. Third, the relevance of this topic is reflected in the low reactivity of biomarkers for endothelial dysfunction. Even with theoretically higher concentrations, radial access remains the safest of all, and its distal neighbor refines it further, reducing the rate of vascular complications and enhancing both patient and operator's comfort. What concentrations of biomarkers would we have in vascular surgery, where the arteries are sectioned and cauterized? The benefit of using TRA (and DRA) for all types of percutaneous interventions is indisputably greater than the risk of endothelial injury without a clinical impact. As for the pain, both the operator and the patient must go through it, on the way to success.

Article information

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