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Debate: Does the distal radial approach offer added value over the conventional radial approach? Yes, it does

A debate: Abordaje radial distal. ¿Aporta valor adicional respecto al abordaje radial convencional? Sí

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Question: What is the rationale for proposing distal radial access (DRA)?

Answer: DRA, first described in coronary intervention by Kiemeneij in 2017,[1] has been proposed as an alternative to conventional radial access (CRA) to reduce postoperative radial occlusion (PRO), a complication occurring in 2%–10% of cases. Although PRO is usually asymptomatic due to collateral circulation through the palmar arch, it can limit future use of the artery for repeat procedures, arteriovenous fistula creation, or even as an aortocoronary graft. Puncture in the anatomic snuffbox is distal to the superficial palmar arch, thereby preserving perfusion of the proximal radial artery and minimizing the risk of occlusion. Previously, in 2011, Babunashvili and Dundua[2] used DRA in patients with prior radial thrombosis after CRA to reestablish vascular access.

In general, DRA is more comfortable for both patient and operator. In CRA, prolonged arm supination—especially with right-sided access—can cause discomfort, particularly in obese patients, those with arthritic deformities, or during long procedures. DRA allows a more natural arm position (pronation or neutral), and improves ergonomics. Furthermore, it facilitates left DRA for operators used to right radial access, since cannulation can be performed from the patient's right side. Its smaller vessel diameter shortens hemostasis times, thereby reducing recovery and the length of stay, which is especially valuable in outpatient procedures.

Therefore, DRA is proposed as an evolution of CRA, maintaining its advantages while improving vascular preservation, ergonomics, and recovery efficiency, making it an attractive alternative in contemporary coronary intervention.

Q.: What evidence supports DRA?

A.: Although scientific evidence supporting DRA has grown significantly, it remains less extensive than that for CRA. Key sources include:

- Initial series: in 2017, Kiemeneij[1] reported the first DRA results, with a cannulation success rate of 89% and local complication rates, such as hematoma or spasm < 1%.
- Randomized clinical trials:
  - Tsigkas et al[3] studied a total of 1042 patients, comparing DRA and CRA, and found that DRA was associated with a lower rate of PRO (3.7% vs 7.9%; $P = .014$) and shorter hemostasis times, but higher crossover rates (9.3% vs 3.2%; $P < .001$), higher radiation dose, and longer procedures (44 vs 40 minutes; $P = .02$). Local complications were similar (4.8% vs 5.3%; $P = .71$). More puncture attempts were required with DRA (2.1 vs 1.6; $P = .01$).
  - The DISCO RADIAL trial[4] compared DRA and CRA, showing similar PRO rates (0.31% vs 0.91%; $P = .29$). DRA had higher crossover (7.4% vs 3.5%; $P = .002$) and spasm rates (5.4% vs 2.7%; $P = .015$) but shorter hemostasis times (153 vs 180 minutes; $P < .001$). PRO rates were very low in the 2 groups because of a strict patent hemostasis protocol that favored CRA. This protocol differs from routine clinical practice in most centers, although it demonstrates that meticulous hemostasis with CRA can equalize the 2 techniques in terms of PRO.
  - The multicenter TENDERA trial[5] (1162 patients) showed reduced PRO with DRA at 30 days (1.2% vs 4.8%; $P = .003$) and 6 months (2.1% vs 5.5%; $P = .007$). DRA exhibited fewer local complications such as hematoma (3.1% vs 6.7%; $P = .01$), pain (5.2% vs 9.8%; $P = .004$), and minor hemorrhage (2.4% vs 5.3%; $P = .02$). Procedural efficacy (97.8% vs 98.1%; $P = .72$), and procedural times (42 vs 43 minutes; $P = .58$) were comparable.
- Meta-analyses: Ferrante et al[6] analyzed 14 studies with > 6000 patients, confirming lower PRO with DRA (0.7% vs 3.0%; $P < .001$), shorter hemostasis times (120 vs 180 minutes; $P < .01$), and fewer hematomas (0.4% vs 1.7%; $P = .02$).

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- Multicenter registries: the KODRA registry[7] included a total of 4977 patients in 14 hospitals, with reported success rates of 100% for angiography, 98.8% for percutaneous coronary intervention, 94.4% for vascular access, and a 1-month PRO rate of 0.8%.

- Spanish studies: in Spain, several groups have been active in DRA. The registry of Rivera et al.[8] included a total of 1000 DRA procedures, with a cannulation success rate of 97.4% and a PRO rate of 0.5%. After years of implementation, it would be desirable to include DRA-specific data in the annual activity report of the Interventional Cardiology Association of the Spanish Society of Cardiology to obtain a more precise picture of its impact in Spain.

Q.: What advantages has this vascular access demonstrated?

A.: DRA offers several important benefits over CRA, particularly in specific settings:

- Reduction in PRO: as previously noted, rates vary and are difficult to compare because of the different hemostasis protocols used across various studies. However, the reported rates of PRO are very low, ranging from 0.3% to 3.7%.

- Shorter hemostasis times: because of the smaller diameter of the distal radial artery (1.5–2.5 mm) and its ease of compression in the anatomic snuffbox, DRA requires significantly shorter hemostasis times. Studies establish 120–150 minutes for DRA compared with 180–240 minutes for CRA. In my routine clinical practice, for diagnostic procedures with 50 U/kg of unfractionated heparin, compression times are approximately 20 minutes for 5-in-4 Fr introducer sheaths and 45 minutes for 6-in-5 Fr introducer sheaths. For interventional procedures with 100 U/kg of heparin, compression times are 120 minutes for 6-in-5 Fr and 150 minutes for 7-in-6 Fr introducer sheaths. This reduction, which may reach 50%, decreases the length of stay and improves efficiency in outpatient procedures, a particularly relevant aspect during the COVID-19 pandemic to minimize hospital contact.

- Greater patient comfort: the natural arm position (pronation or neutral) in DRA reduces discomfort compared with the prolonged supination required in CRA, especially for right-sided access and in bilateral procedures for chronic occlusions. The lower compression pressure required minimizes postoperative pain too.

- Greater operator comfort: puncture from the right side for left DRA, with the hand in a neutral midline position, improves ergonomics.

- Improved introducer sheath control: in CRA, patient hand pronation after cannulation may hinder visualization of the introducer sheath; by contrast, DRA allows uninterrupted control throughout the procedure.

- Lower rate of local complications: with DRA, the rate of hematoma is generally lower due to the smaller arterial caliber and easier compression against the bony plane.

- Preferred access for recanalization after prior PRO: DRA is particularly useful in patients with proximal radial thrombosis following previous CRA procedures, allowing effective restoration of vascular access.

- Preservation of the proximal radial artery: especially relevant for repeat procedures, creation of arteriovenous fistulas, or use as an aortocoronary graft.

- Ease of crossover to CRA: in the event of distal cannulation failure, DRA allows rapid conversion to CRA without the need for substantial changes to the approach, providing greater operator flexibility.

Q.: Are there technical aspects worth noting?

A.: DRA requires precise technique and specific considerations. Several aspects are important:

- Anatomic location: the anatomic snuffbox is bordered laterally by the tendons of the abductor pollicis longus and extensor pollicis brevis, medially by the extensor pollicis longus, and basally by the radial styloid process. The floor is formed by the scaphoid, trapezium, and the carpometacarpal joint of the thumb. Vascular ultrasound is essential to evaluate the patency and diameter of the distal radial artery before the procedure and to guide puncture, which is ideally performed over the scaphoid plateau to ensure effective compression against a bony plane. Very distal (over the thenar eminence) or proximal punctures (near the styloid process) may compromise compression efficacy or the benefits of DRA.

- Puncture technique: the use of 20–22 G needles (preferably 21–22 G) is recommended, with a puncture angle close to 90° under ultrasound guidance. Tilting or rotating the needle horizontally is usually required to facilitate passage of the metallic microwire. Puncture with an Abbocath is not recommended because of the superficiality of the bony structures.

- Adjacent structures: the superficial branch of the radial nerve crosses the snuffbox, requiring caution to avoid injury. Tendons and bony structures must also be considered.

- Spasm prevention: a standard antispasmodic cocktail (nitroglycerin 100–200 µg or verapamil 2.5–5 mg, plus heparin 50–100 U/kg) is recommended to prevent spasm and thrombosis.

- Hemostasis: selective hemostasis using wristband-type compression devices is essential to precisely control pressure and minimize the risk of PRO. These devices allow adjustment of compression to the minimum level required to prevent bleeding. Either dedicated devices (eg, PreludeSYNC DISTAL, Merit Medical, United States) or those commonly used for CRA (e.g, TR Band, Terumo, Japan, with the inner plastic splint removed) may be employed.

- Learning curve: proficiency in DRA requires 50–100 procedures, with adequate training in vascular ultrasound and detailed knowledge of local anatomy.

- Catheter selection: the greater distance to the aortic arch (approximately, 4 cm longer) may require longer catheters (110 cm) in tall patients or those with complex anatomy. When limited, catheters with longer-than-usual curves or sheathless systems (which provide a few extra centimeters) can be used.

- Type of introducer sheath: slender, hydrophilic introducer sheaths are recommended to facilitate cannulation. In diagnostic procedures, slender 5-in-4-Fr introducer sheaths are particularly useful.

Q.: Are there situations where DRA may not be indicated?

A.: Yes, and these contraindications include:

- Insufficient arterial diameter: < 1.5 mm-arteries increase the risk of spasm and failure.

- Complex radial anatomies: absence of a functional palmar arch, hypoplastic distal arteries, and anatomic variations may contraindicate DRA. These conditions are uncommon and difficult to predict without detailed prior ultrasound evaluation.

- Procedures requiring catheters > 7-Fr: although rare, they are limited by arterial size.

- Operator inexperience: the learning curve for DRA is longer than for CRA.

- ST-segment elevation acute coronary syndrome: although DRA is safe in experienced hands, longer cannulation times in novice operators may delay revascularization.

- Ipsilateral repeat procedures: there is a risk of prior thrombosis; careful assessment of the anterior radial pulse is required, as inadvertent thrombectomy may occur.

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STATEMENT ON THE USE OF ARTIFICIAL INTELLIGENCE

None used.

CONFLICTS OF INTEREST

None declared.

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