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EDITORIAL COMMENT

Radial access in cardiac catheterization: Can we do even better?☆

Acesso radial no cateterismo cardíaco: podemos ainda fazer melhor

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Radial access for cardiac catheterization was first described by Radner in 1948,[1] but it was not until 1989 that Campeau published the first series of 100 patients who underwent coronary angiography by a radial approach,[2] while in 1993 Kiemeneij and Laarman reported the first three cases in which stents were placed by this route.[3] At that time there was little confidence in the radial approach, due to the high failure rate and frequent need for crossover to femoral access, and so the femoral approach continued to be preferred in most centers. One of the main reasons for the poor results of radial access was the inappropriate way in which operators accustomed to the femoral approach handled radial puncture and catheterization. Another important factor was the lack of material such as puncture needles, hydrophilic introducers and diagnostic and interventional catheters designed specifically for radial access, which only came on to the market some years later.[4]

In the last 10 years there has been a considerable increase in the volume of percutaneous interventions using the transradial route, and it is now the first choice for coronary angiography and percutaneous coronary interventions in Europe and in many other countries. In Portugal, radial access went from 4.1% of procedures in 2004 to 57.9% in 2013,[5] and according to the National Registry of Interventional Cardiology (RNCI) the figure was 75.5% in 2016.[6]

The main advantage of the radial route is its safety, particularly in frail patients and those under aggressive antithrombotic therapy, such as in acute coronary syndromes.[7,8] An additional benefit is shorter hospital stay and early mobilization, raising the possibility of performing interventions on an outpatient basis.

Several studies have shown the advantages of radial access in ST-elevation myocardial infarction, reporting fewer bleeding complications and lower mortality, and this approach is therefore recommended in the current European Society of Cardiology guidelines.[9]

However, catheterization by the radial route presents certain challenges, even for experienced operators, including the tortuosity of the right subclavian artery (which can lead to excessive manipulation and even twisting of the catheter), poor support in the right coronary artery for conventional catheters designed for femoral access, and radial artery spasm during puncture or the procedure.

The recent development of ''7-in-6'' sheaths (a 6F sheath with an internal lumen equivalent to 7F) enables more complex angioplasties to be performed, including use of the Rotablator, treatment of chronic occlusions, and simultaneous implantation of two stents to treat bifurcations.

The success rate of radial puncture is directly related to the experience of the operator and of the center, but is also affected by the type of patient and clinical presentation. All these factors can help increase the number of patients who can be treated by the radial approach and thereby potentially reduce the number of adverse events.

The article by Ünal et al.[10] published in this issue of the *Journal* reports a randomized trial comparing two strategies

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for reducing radial artery spasm during arterial puncture for catheterization via this artery. A total of 90 patients referred for radial artery catheterization were randomized to low-dose subcutaneous nitroglycerin plus diltiazem or to manual heating, in which the temperature of the puncture site was raised by direct contact with the operator's hand for 3 min. The study endpoint was puncture score (between 1 and 4, corresponding to ease of puncture), which was lower in the patients undergoing local heating before puncture. Although this was not an objective of the study, it would be interesting to know whether this strategy helped prevent arterial spasm after puncture, during catheterization.

Low temperatures stimulate the adrenergic nervous system, leading to vasoconstriction, which is exacerbated by the administration of lidocaine. It is logical to assume that this process could be counteracted by increasing local temperature. Improving the effectiveness of the initial puncture shortens the procedure and is less traumatic for the patient, as well as probably reducing arterial spasm during the rest of the exam or intervention. No direct relation has yet been proven between arterial spasm and radial occlusion, but it is plausible that an artery whose caliber has been reduced by spasm should be more liable to damage by sheaths and catheters than one without spasm and that has been easily punctured at the first attempt. The administration of heparin, the use of smaller sheaths, and shorter compression time have been shown to be associated with a reduction in radial occlusion in follow-up.[11] This would be an important endpoint in future studies, since a significant number of patients could benefit from a range of procedures using radial access.

Finally, it should be noted that this is the first trial on the Balbay maneuver, which should ideally be validated in a larger sample, preferably in multiple centers.

Conflicts of interest

The author has no conflicts of interest to declare.

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