Follow-on angioplasty via the radial artery – a personal view

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The benefits of transradial coronary intervention (TRI) over transfemoral (TFI) are becoming increasingly recognised. In the United Kingdom, an increasing number of interventions are being performed by the radial approach and courses supporting this approach are now well developed (see pages AIC 42–AIC 43). The established benefits of TRI include early patient mobilisation,[1-3] the elimination of haemorrhagic access site complications,[1,4] reduced hospital costs[5,6] and increased patient satisfaction.[1,6] These benefits are observed particularly in the elderly, the obese, the hypertensive and during aggressive antithrombotic therapy.[7]

There is a definite learning curve, however, for radial procedures that is individual to the operator.[8] Furthermore, radial access may be complicated by arterial spasm and anatomical abnormalities, and the operator is restricted to the use of 6F guiding catheters. Finally, the radial approach traditionally requires a positive Allen's test and, in my opinion, this is sensibly performed prior to TRI. Some high-volume radial centres, however, now do not routinely perform an Allen's test prior to TRI. This is because a positive or negative test has never been shown to affect outcome and rates of ischaemic complications are very low following radial procedures.

In most interventional catheter laboratories, the day is shared in various proportions between elective percutaneous coronary intervention (PCI) cases and procedures in patients transferred from other hospitals as in-patients. The elective patients, by definition, are clinically stable. The operator can plan an interventional strategy knowing the coronary lesion morphology. In most centres performing TRI, these elective patients form the majority of radial cases, enabling their early mobilisation and the consideration of a day-case PCI programme.

Benefits

So should we perform TRI as a follow-on procedure following radial angiography for in-patients transferred to an interventional centre for the management of acute coronary syndromes (ACS) and acute myocardial infarction (AMI)? The benefits of TRI are clearly greatest in these two groups. The aggressive antithrombotic regimens required for current management of ACS include aspirin, clopidogrel, low molecular weight heparin and, increasingly, 'up-front' glycoprotein IIb/IIIa antagonists.[9] The rate of femoral access site complications in this group after PCI is high and remains significant with the use of femoral closure devices.[10] Patients treated for AMI, whether as a primary procedure or for failed thrombolysis, have even greater femoral haemorrhagic complications after the combination of thrombolysis pre-procedure and glycoprotein IIb/IIIa antagonist peri-procedure.[11] These haemorrhagic complications and consequent increased hospital stay and cost can be eliminated by the use of TRI.

The case for use of 6F guide catheters

Certain issues, however, are preventing the uptake of follow-on TRI by more operators. The first is the requirement to use 6F guide catheters when performing TRI. The majority of interventional equipment is now compatible with the modern 0.071" lumen 6F guide catheters. The key is whether the use of the remainder of equipment, which is not 6F compatible, represents a relevant proportion of workload. If the workload requiring catheters greater than 6F is small, does it make clinical sense to deny the overall patient population the benefits of reduced access site complications with TRI? When considering general interventional practice, the 0.071" 6F guide catheters allow the use of intravascular ultrasound, distal vein graft protection (Boston Filterwire, 3 mm, 4 mm and 5 mm eV3 Spider), 1.5 mm X-Sizer Thrombectomy, XMI 135 cm Possis Angiojet and rotablation (1.5 mm and 1.75 mm burrs).

For the management of bifurcation stenoses, the final kissing balloon inflation, which correlates with improved outcome, is adequately performed with the 0.071" lumen guide catheter and two low profile balloons (Boston Scientific Maverick).

What will be denied to the patient if we are confined to 6F catheters? Placing two stents simultaneously when treating bifurcation stenoses is not possible with 6F catheters. Although it is not within the remit of this article to discuss bifurcation procedures, current outcome data support the use of a single stent in the main vessel followed by a kissing balloon inflation.[12] Currently, the elective use of two stents appears to go against previously well-documented high restenosis rates when stents have been used to cover both outlet orifices of a bifurcation.[13,14] By contrast, the 'bail-out' need for a second stent to rescue the side branch if absolutely necessary using 'culotte' or 'T' technique is easily performed with 6F catheters and can be completed with 'kissing balloons'. Some operators are moving towards the 'crush' technique using two drug-eluting stents for the treatment of bifurcation disease even though there are no medium or long-term follow-up data on this approach. If this technique is adopted it requires the use of 8F guides and can not easily be performed via the radial approach.

The use of large rotational atherectomy burrs (> 1.75 mm) or directional atherectomy are currently not possible with 6F catheters. The overall use of directional atherectomy and large rotational atherectomy burrs is low in the United Kingdom. Furthermore, in the majority of cases selected, the use of atherectomy is in the planned setting when a specific lesion has been selected. Certainly, the practice in my institution where there are more than 2,200 PCIs performed per year, is that atherectomy is used with such low frequency that it makes no sense to deny patients the benefit of a 6F procedure. Some operators question whether 6F guides used during TRI provide adequate support for stent delivery. This is clearly a question of interventional taste. If, as an operator, you favour an 8F guide sitting at the coronary ostium rather than a 6F guide supported into the coronary on a supportive wire, then the wrist will not be favoured over the groin.

Many operators perform follow-on PCI from the femoral artery using 6F catheters. The ability to manage complex coronary anatomy using 6F catheters is well established and the need to 'up-size' is rare. In order to prepare for a programme of follow-on TRI, it is useful to audit your own practice with 6F follow-on femoral PCI. In the very rare and emergency circumstance when 'up-sizing' may be mandatory on clinically urgent grounds, it is, of course, possible to change to the femoral route. With compression devices over the wrist there is no additional haemorrhagic risk consequent to the original radial procedure. Finally, although not my practice, selected patients with large radial pulses can have 7F or 8F catheters inserted via the radial approach, allowing the potential for more specialised techniques.

The wrist versus femoral route

The second discussion point concerns the management of acute unstable patients using the wrist route. Published evidence suggests, once again, that these patients benefit most from a TRI.[4] Mann *et al.* originally demonstrated, in a randomised study of ACS patients, that complications, cost and hospital stay were reduced when using access from the wrist compared to the femoral route. Furthermore this benefit was achieved at the same primary procedural success rate and X-ray exposure time as the femoral procedures. Subsequently, multiple registries[15,16] and one randomised study[17] have confirmed the safety and efficacy of TRI for the primary treatment of AMI. Of course, it is clear that with haemodynamically unstable patients, femoral use of an intra-aortic balloon pump (IABP) may be necessary. In these circumstances, the management post-procedure of a radial artery with a compression device and a femoral IABP is easier than the management of two punctured femoral arteries.

Summary

Finally, when considering the differences between follow-on TRI and follow-on TFI, it is not valid to include experience during the learning curve of radial PCI.[8] It is sensible to become competent at radial PCI during elective cases where the lesion morphology is known pre-procedure. After completing the learning curve for straightforward cases, it is reasonable to approach more complex disease in elective cases. At that point, when everyone in the lab is comfortable with the procedure and when there are no inherent additional time delays, it is reasonable to move on to follow-on TRI. Overall, I consider the benefits obtained from TRI for the acute coronary population to outweigh the limitations. For others, perhaps more devoted to atherectomy, the groin route may be preferable.

Conflict of interest

None declared.

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