SCIENTIFIC LETTER

Transradial rescue angioplasty for failed thrombolysis in acute myocardial infarction: reperfusion with reduced vascular risk

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Intravenous thrombolysis remains the preferred treatment for many patients presenting with ST elevation myocardial infarction. Reperfusion fails in 30–50% of patients, which is associated with an adverse prognosis. For these patients with reperfusion failure, rescue percutaneous coronary intervention (PCI) can be used, but major access site bleeding is a risk with the femoral approach. Transradial PCI has been shown to reduce access site complications in stable patients and may therefore offer a solution to the access site complications associated with rescue PCI.¹ We assessed the value of this approach in 105 consecutive patients treated with transradial rescue PCI for failed thrombolysis.

METHODS

Transradial programs for PCI began at the University Hospital of North Staffordshire in September 1998 and at the Sussex Cardiac Centre in December 2001. Patients presenting with a large myocardial infarction within 12 h of the onset of chest pain and evidence of failed reperfusion have routinely been treated with rescue PCI by two experienced radial operators (JN, DHS). Failure to reperfuse was diagnosed by the presence of persistent ST segment elevation at 90 min after thrombolysis. Transradial PCI was performed as previously described.¹ Patients received 5000–10 000 U of intravenous heparin at the start of the procedure. Clopidogrel was given to patients after successful stent implantation and all patients received aspirin before thrombolytic treatment. Use of abciximab was at the discretion of the operator. Femoral access was reserved for intra-aortic balloon pump (IABP) insertion. Patient and procedural data were prospectively collected over a mean follow up of 11 (SD 8) months. Procedural duration was defined as the time elapsed from entering to leaving the catheterisation laboratory.

RESULTS

Table 1 lists patients' characteristics and clinical outcomes. Ten patients (9.5%) were in cardiogenic shock. Radial artery cannulation failed in only one patient, who had the procedure completed through a puncture of the right brachial artery (femoral access precluded because of peripheral vascular disease). At the initial coronary angiography, 91 patients (86.7%) had absent or reduced flow in the infarct-related artery. Procedural success (TIMI 3 flow and < 30% residual stenosis) was achieved in 93 patients (88.6%). The mean procedural duration was 60 (SD 22) min (range 23–133) and mean fluoroscopy time was 12 (SD 7) min (range 3–32). Five patients died in hospital, all related to cardiogenic shock. Three patients died during postdischarge follow up. Two of the late deaths were non-cardiac; the other was a sudden death in a patient who had presented in cardiogenic shock. There were no radial vascular access complications. Significant gastrointestinal bleeding requiring transfusion occurred in three patients (2.9%). There were four (3.8%)

Table 1 Patients' characteristics and clinical outcomes

Baseline characteristics	
Men	90 (85.7%)
Women	15 (14.3%)
Age (years)	60.7 (11)
Range	37–85
History of angina/MI	36 (34.3%)
History of PVD	8 (7.6%)
Pain to lysis time (min)	155 (134)
Lysis to PTCA time (min)	221 (139)
AMI location	
Anterior	49 (47.0)
Inferior	56 (53.0)
Peak creatine kinase	3105 (1536)
Cardiogenic shock	10 (9.5%)
Stents	99 (94.3%)
Gp IIb/IIIa inhibitor use	37 (35.2%)
IABP	14 (13.3%)
Procedural success	93 (88.6%)
Length of stay (days)	7 (2)

Data are mean (SD) or number (%).

Gp, glycoprotein; IABP, intra-aortic balloon pump; MI, myocardial infarction; PTCA, percutaneous transluminal coronary angioplasty; PVD, peripheral vascular disease.

non-radial vascular access site haematomas (one was a haematoma in the patient who required brachial access and the others were femoral haematomas after IABP insertion), which did not require transfusion.

DISCUSSION

An overview of the available data from early randomised trials and registries suggests that rescue PCI reduces the rate of adverse cardiac events after failed thrombolysis particularly in patients with a large infarction.² The most recently published and reported large randomised trials of rescue PCI (MERLIN (Middlesbrough Early Revascularization to Limit Infarction) and REACT (Rescue Angioplasty versus Conservative management of Thrombolysis)) also show some beneficial effects on cardiac events.³ This benefit is partially offset by a high rate of vascular complications when the access is femoral. The reported rate of major femoral vascular complications ranges from 4–36%, with most studies reporting rates of around 10%.^{2–3} Co-administration of abciximab increases the femoral complication rate further. These major femoral complications often required transfusion or vascular intervention, which increases the patient's duration of

Abbreviations: IABP, intra-aortic balloon pump; MERLIN, Middlesbrough Early Revascularization to Limit Infarction; PCI, percutaneous coronary intervention; REACT, Rescue Angioplasty versus Conservative management of Thrombolysis; TIMI, Thrombolysis In Myocardial Infarction

hospitalisation, costs and mortality. This high rate of femoral complications is therefore a major drawback of transfemoral rescue PCI and offsets much of the beneficial effect on reduction of adverse cardiac events. We have previously reported that transradial access is highly effective in reducing vascular complications in stable patients undergoing cardiac catheterisation electively.¹ We have also studied transradial access in patients treated with anticoagulants, reporting a similar low rate of vascular complications in patients with an international normalised ratio > 2 .⁴ In this study of patients undergoing transradial rescue PCI we encountered no radial access site complications, despite one third of the patients having received an additional glycoprotein IIb/IIIa inhibitor. Although important vascular complications such as compartment syndrome complicating a large forearm haematoma can occur as a result of radial access, these are very rare and did not occur in our series despite the intensive antithrombotic regimen used. These results extend our previous investigations into this high risk subgroup and indicate that transradial access is a safe and effective means of preventing vascular access complications in patients undergoing rescue PCI.

Rescue PCI can be technically challenging and is often performed in unstable haemodynamically compromised patients. If the use of transradial access further increases procedural complexity, the PCI outcome will be adversely affected. The patients in this study had large infarctions, with almost 10% presenting in cardiogenic shock, and therefore constitute a high risk unstable subgroup. Despite this, our technical success rate and survival to discharge were comparable with those reported in femoral rescue PCI series.^{2,3} The procedural duration and fluoroscopy time recorded in this study are very similar to those we have previously achieved in more stable patients. The use of concomitant radial and femoral access for severely compromised patients (to allow simultaneous PCI with IABP support) limits the number of groin punctures and potential complications that need to be managed in these severely ill patients. These data suggest that experienced operators can achieve excellent rescue PCI results though a radial access site with no increase in procedural duration.

The data from this study are compatible with results of the only other published small study of transradial rescue PCI.

Kassam *et al*⁵ reported similar outcomes in their 45 patients undergoing transradial rescue PCI, with a 95% rate of successful radial cannulation and a 0% radial access site complication rate despite 100% usage of glycoprotein IIb/IIIa inhibitors. They also reported no increase in procedural duration, radiation exposure or equipment use for radial procedures when compared with a transfemoral group.

This study confirms that, for experienced operators, a transradial approach substantially reduces the major access site complications associated with rescue PCI, allowing reperfusion with minimal vascular risk. Our data also suggest that using a transradial approach does not compromise procedural outcomes in infarct PCI. Experienced operators can therefore use radial access in a primary PCI programme.

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