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ORIGINAL ARTICLE

Comparison of Safety and Effectiveness Between Right Versus Left Radial Arterial Access in Primary Percutaneous Coronary Intervention for Acute ST Segment Elevation Myocardial Infarction

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Background Transradial approach (TRA) is now considered the standard of care in many centres for elective and primary percutaneous intervention (PCI). The use of the radial approach in ST segment elevation myocardial infarction (STEMI) patients has been associated with a significant reduction in major adverse cardiac events. However, it is still unclear if the side of radial access (right vs. left) has impact on safety and effectiveness of TRA in primary PCI. So this study was conducted to compare the safety, feasibility, and outcomes of right radial access (RRA) vs. left radial access (LRA) in the setting of primary PCI.

Methods We retrospectively analysed the data of 400 consecutive patients presenting to our institution with STEMI for whom primary PCIs were performed via RRA and LRA.

Results Mean age of the whole studied population was 57 ± 12.8 years, with male predominance (77.2%). There were 202 cases in the RRA group and 198 in the LRA group, with no significant difference in demographics and clinical characteristics for patients included in both groups. There was no significant difference in procedure success rate (97.5% for RRA vs. 98.4% for LRA; P=0.77). In addition, no significant difference between both approaches was observed in the contrast volume, number of catheters, fluoroscopy time (FT), needle-to-balloon time, post-procedure vascular complications, in hospital reinfarction, stroke/transient ischaemic attack (TIA) or death.

Conclusion Right radial access and LRA are equally safe and effective in the setting of primary PCI. Both approaches have a high success rate and comparable needle-to-balloon time.

Keywords Primary PCI • Radial access • STEMI

Abbreviations: Transradial approach, TRA; Right radial access, RRA; Left radial access, LRA; ST segment elevation myocardial infarction, STEMI; Percutaneous coronary intervention, PCI; Coronary artery bypass graft, CABG; Myocardial infarction, MI; Left ventricular ejection fraction, LVEF; Fluoroscopy time, FT; Transient ischaemic attack, TIA; Transfemoral approach, TFA; Thrombolysis in myocardial infarction, TIMI

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Introduction

Q3 ST segment elevation myocardial infarction (STEMI) patients treated with primary percutaneous coronary intervention (PCI) are particularly likely to benefit from the bleed reduction of the radial approach as these patients have a greater risk of access site bleeding and other access-related complications given the emergent nature of the procedure and the need for aggressive antiplatelet and antithrombotic therapies [1]. Another potential benefit of the radial approach is that it may allow higher doses of anticoagulants to be used for further ischaemic reduction while minimising the penalty of increased bleeding [2]. In addition, the use of the radial approach in STEMI patients has been associated with a significant reduction in major adverse cardiac events during follow-up [3].

Data from published studies addressing the best transradial approach (TRA) (right vs. left) in the setting of primary PCI is scarce, while data in the setting of elective PCI is controversial. Although the right radial artery approach (RRA) is usually the first point of access, tortuosity within the brachial and subclavian arteries may result in more radiation exposure, lengthy procedure or even procedural failure [4–6]. Alternatively, the left radial artery approach (LRA), although unfavoured and less extensively studied, may offer an advantage from the point-of-view of vascular anatomy [7–9].

So, this study was conducted to compare the safety, feasibility, and outcomes of RRA vs. LRA in the setting of primary PCI for patients presenting with STEMI.

Study Population

From January 2012 to March 2015, a total of 850 primary PCI procedures were done in our institution for patients presenting with STEMI. Of these, 400 were performed with radial approach. Right radial access was used in 202 PCI; while 198 PCI were done through LRA. These procedures (RRA and LRA) represent the sample of this study.

For all included patients, the following data were collected (retrospectively) from the hospital medical records: demographics; traditional risk factors for atherosclerosis (smoking, hypertension, hyperlipidaemia, diabetes mellitus, obesity, and family history of coronary artery disease); prior history of – myocardial infarction (MI) or PCI, patient's Killip class, creatinine level (mg/dl) and left ventricular ejection fraction (LVEF) on presentation. Procedural data including: procedural success; infarcted artery; number and type of catheters used; needle-to-balloon time; number of stents used; fluoroscopy time (FT); and volume of contrast agent were collected from catheter laboratory records. In-hospital (post-procedure): death, reinfarction, revascularisation, stroke/transient ischaemic attacks (TIA) and vascular complications were collected for the entire population. Procedures missing any of the previous data were not included in the analysis.

Procedure

Transradial primary PCI was performed by three experienced operators in both TRAs, right and left, who (independently) completed more than 150 elective transradial PCI procedures before performing transradial primary PCI in the setting of STEMI.

Institutional protocol for TRA in STEMI was as follows: patients with previous coronary artery bypass graft (CABG), arteriovenous fistula for haemodialysis, non-palpable radial pulse, or cardiogenic shock were not candidates for TRA. The choice of RRA or LRA was at the discretion of the operator, the specific reason for choosing right vs. left access in each case was not recorded in the database. Regardless of the site, all coronary procedures were performed on the right side of the patient. Before the coronary procedure, all patients were given 300 mg of aspirin and a loading dose of clopidogrel (600 mg). For patients assigned to RRA, the patient's right arm was secured to an arm board on the same side of the operator. For patients assigned to LRA, the left arm was elevated with appropriate support and rotated in order to be supine. After local anaesthesia by 1% lidocaine, access was obtained using the Seldinger technique with a 20-gauge needle, and a 6-F 16 cm hydrophilic radial sheath (Terumo, Somerset, NJ) was inserted. Antispasm medications (100–200 μg of nitroglycerine and/or 2.5 mg of verapamil) were routinely administrated in the sheath. A bolus dose of unfractionated heparin (70 U/kg of body weight) was given in the sheath, then additional heparin was administered during PCI to maintain an activated clotting time between 250 and 300 sec. Bail-out to transfemoral approach (TFA) was recommended if the time to obtain radial access was more than 3 min, or the time from introducer sheath placement in the radial artery to engaging the infarct related artery with the guide catheter was more than 10 min (including the time to inject the non-infarct artery), or the total time from radial artery introducer sheath placement to dilating the infarct lesion was more than 20 min.

The choices of guiding catheters, guidewires, usage of thrombus extraction catheter or glycoprotein (GP) IIb/IIIa platelet receptor antagonists were at the discretion of the operator. Needle-to-balloon time was recorded and after the end of the procedure, fluoroscopy time, and contrast volume were measured. The arterial sheath was removed immediately after the completion of the intervention, and a compression device was applied for haemostasis.

Definitions

Transradial access failure was considered the impossibility of completely carrying out the PCI using the access point of choice and the need to shift to the femoral approach. Needle-to-balloon time was defined as the time from local anaesthesia infiltration to the first balloon inflation. If a manual thrombectomy was conducted before balloon inflation, the needle-to-balloon time was also considered as the time from

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