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Incidence, Determinants, and Outcomes of Left and Right Radial Access Use in Patients Undergoing Percutaneous Coronary Intervention in the United Kingdom

A National Perspective Using the BCIS Dataset

Muhammad Rashid, MBBS,[a] Claire Lawson, PhD,[a] Jessica Potts, MSc,[a] Evangelos Kontopantelis, PhD,[b] Chun Shing Kwok, MBBS,[a,c] Olivier F. Bertrand, MD, PhD,[d] Ahmad Shoaib, MBBS, MD,[a,c] Peter Ludman, MD,[e] Tim Kinnaird, MBBCh,[f] Mark de Belder, MD,[g] James Nolan, MD,[a,c] Mamas Mamas, BM, BCh, DPhil[a,c]

ABSTRACT

OBJECTIVES The authors sought to determine the relationships between left radial access (LRA) or right radial access (RRA) and clinical outcomes using the British Cardiovascular Intervention Society (BCIS) database.

BACKGROUND LRA has been shown to offer procedural advantages over RRA in percutaneous coronary intervention (PCI) although few data exist from a national perspective around its use and association with clinical outcomes.

METHODS The authors investigated the relationship between use of LRA or RRA and clinical outcomes of in-hospital or 30-day mortality, major adverse cardiovascular events, in-hospital stroke, and major bleeding complications in patients undergoing PCI between 2007 and 2014.

RESULTS Of 342,806 cases identified, 328,495 (96%) were RRA and 14,311 (4%) were LRA. Use of LRA increased from 3.2% to 4.6% from 2007 to 2014. In patients undergoing a repeat PCI procedure, the use of RRA dropped to 72% at the second procedure and was even lower in females (65%) and patients >75 years of age (70%). Use of LRA (compared with RRA) was not associated with significant differences in in-hospital mortality (odds ratio [OR]: 1.19, 95% confidence interval [CI]: 0.90 to 1.57; p = 0.20), 30-day mortality (OR: 1.17, 95% CI: 0.93 to 1.74; p = 0.16), MACE (OR: 1.06, 95% CI: 0.86 to 1.32; p = 0.56), or major bleeding (OR: 1.22, 95% CI: 0.87 to 1.77; p = 0.24). In propensity match analysis, LRA was associated with a significant decrease in in-hospital stroke (OR: 0.52, 95% CI: 0.37 to 0.82; p = 0.005).

CONCLUSIONS In this large PCI database, use of LRA is limited compared with RRA but conveys no increased risk of adverse outcomes, but may be associated with a reduction in PCI-related stroke complications. (J Am Coll Cardiol Intv 2018;■:■–■) © 2018 the American College of Cardiology Foundation. Published by Elsevier. All rights reserved.

From the [a]Keele Cardiovascular Research Group, Centre for Prognosis Research, Institute of Primary Care and Health Sciences, Keele University, Stoke-on-Trent, United Kingdom; [b]Faculty of Biology, Medicine and Health, University of Manchester, Manchester, United Kingdom; [c]Academic Department of Cardiology, Royal Stoke Hospital, University Hospital North Midlands, Stoke-on-Trent, United Kingdom; [d]Quebec Heart-Lung Institute, Laval University, Quebec City, Quebec, Canada; [e]Department of Cardiology, Queen Elizabeth Hospital, Birmingham, United Kingdom; [f]Department of Cardiology, University Hospital of Wales, Cardiff, United Kingdom; and [g]The James Cook University Hospital, Middlesbrough, United Kingdom. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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ABBREVIATIONS AND ACRONYMS

BCIS = British Cardiovascular Intervention Society

CABG = coronary artery bypass grafting

CI = confidence interval

LRA = left radial access

MACE = major adverse cardiovascular events

MLR = multivariable logistic regression

OR = odds ratio

PCI = percutaneous coronary intervention

RRA = right radial access

TFA = transfemoral access

TRA = transradial access

The radial artery is now the most common vascular access site utilized for percutaneous coronary interventions (PCI) across many European (1), Canadian, and South Asian countries (2,3) and continues to gain popularity in the United States (4,5). The main advantages of transradial access (TRA) over transfemoral access (TFA) include a lower incidence of vascular complications, significant reductions in major bleeding, a lower rate of MACE and, in some settings, death (6-8), as well as earlier ambulation, shorter hospital stay, and greater patient satisfaction (9,10). Most radial operators use the right radial access (RRA) as their initial access site due to ease of working on the right-hand side of the patients and catheter lab setup (11). However, radial operators may need to switch to the left side in the event of radial artery spasm (12), radial artery occlusion (13), the presence of arteriovenous shunt in the right arm, or presence of extreme tortuosity in the right forearm or right subclavian artery (14,15). Left radial access (LRA) also offers much more favorable vascular anatomy, particularly in short-stature patients or those with previous coronary artery bypass grafts resulting in lesser catheter manipulation, shorter procedure time, and a theoretically smaller risk of procedure-related stroke (16-19).

Data from published studies comparing the RRA versus LRA have only compared the procedural efficacy, such as procedure time, contrast use, fluoroscopy time, and crossover to femoral access, reporting conflicting results (18,20). The TALENT (Transradial Approach (Left vs Right) and Procedural Times During Percutaneous Coronary Procedures) study investigators randomized 1,540 patients in 2 hospitals to RRA or LRA for either diagnostic coronary angiography or PCI. In the diagnostic group, LRA was associated with lower fluoroscopy time and lower dose-area product; however, there were no differences in either of these primary endpoints in patients undergoing PCI (21). Another study comparing RRA versus LRA for primary endpoints of radiation exposure and operator discomfort reported decreased radiation exposure to the operators in the LRA group albeit at the expense of increased operator discomfort (17). The majority of these studies were limited to single centers and small sample sizes; therefore, one cannot determine whether there are any clinically relevant differences between either access site.

As the population requiring PCI grows and ages, it is likely that LRA will become more commonplace. There are few data that describe the differences in patient and clinical characteristics relating to the use of LRA compared with RRA, whether this practice is changing over time nationally, how multiple successive procedures influence the use of LRA, or importantly whether the use of LRA is associated with different risks to patients. This study used a large national registry of all PCI procedures to answer these questions.

METHODS

STUDY POPULATION. We used data from the British Cardiovascular Intervention Society (BCIS) registry to define the patient cohort and study variables. The BCIS registry is a national registry that prospectively collects data around the clinical, procedural, and outcome of almost all PCIs undertaken in the United Kingdom and is managed by the National Institute for Cardiovascular Outcomes Research (22-24). Mortality outcomes are robustly tracked via a linkage to the Office of National Statistics using the unique national health system number of all patients in England and Wales only. All data collected in the BCIS registry are a part of a national audit initiative by the National Institute for Cardiovascular Outcomes Research and were anonymized; therefore, ethical approval was not required for this study. The initial cohort selection was made by including all patients undergoing at least 1 PCI via either RRA or LRA in the United Kingdom; however, because the out-of-hospital mortality data are not available for patients in Scotland, they were excluded from the outcome analyses. Patients with femoral, brachial, multiple, unknown, or missing access site information were excluded.

CLINICAL CHARACTERISTICS. We collected data on each patient's baseline demographics, clinical and cardiovascular risk profile, indication for PCI, and all other aspects of interventional and pharmacological treatment administered. In order to explore the access site practice in patients undergoing repeat PCI, we undertook a subgroup analysis of patients with the RRA procedure as their first procedure and tracked the access site at each subsequent procedure because RRA is the most widely practiced radial access.

OUTCOMES. The primary endpoints were in-hospital and 30-day mortality, in-hospital major bleeding (defined as a composite of blood or platelet transfusion, intracerebral hemorrhage, retroperitoneal hemorrhage, bleed resulting in cardiac tamponade, or an arterial access site bleeding requiring surgery or intervention), in-hospital major adverse cardiovascular events (MACE) (defined as a composite of