EDITORIAL COMMENT

Transradial Catheterization’s Grass Roots Epidemic*

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Transradial cardiac catheterization has evolved during the last 20 years without general support from organized medicine or mainstream industry. Multiple randomized clinical trials and reports consistently demonstrate benefits to the patient and outcomes from transradial approaches over that of the traditional transfemoral approach (1). Given the foundation of evidence for efficacy in the literature (2), the lack of support from the rainmakers of medicine has been frankly surprising. Transradial techniques have grown, nevertheless, through a grass roots approach, developed initially by a few dedicated individuals, and then seeded around the globe and supported by local enthusiasts.

In this issue of JACC: Cardiovascular Interventions, Bertrand et al. (3) have provided an interesting snapshot of the state of the transradial pandemic using a survey, disseminated via the Internet, that queried the practice patterns of a worldwide group of cardiologists. A benefit of the Internet is its ability to penetrate to the far ends of the practice community. Countries such as the U.S. and similarly advanced European and Asian countries were well represented, but there are also surprises such as North Korea that are rarely represented in modern dialogue. Clearly, the Internet can provide an interesting avenue for information exchange.

Use of the Internet raises some potential concerns as the vast openness of the system lends itself to potential abuses and gaming of polls. One of the challenges of an Internet survey is how representative and valid are the responses. Radialists probably had a greater interest in responding than femoral operators did, and this would be difficult to control or adjust for. Although not defined in the paper, it appears that this questionnaire was distributed in English and non-Anglophones may have been less likely to respond or may have had difficulty understanding the questions, potentially adding a bias to the sample.

The present data set is notable for the variability in transradial practice that it demonstrates. Perhaps the only thing that most radialists worldwide agree to is that anticoagulation during the procedure is necessary. Diversity to the extent shown by the radialists does not exist in the transfemoral approach where the standard Judkins-type approach rules the market place and is canonized in standard texts of cardiac catheterization. This transradial diversity is most likely the result of a local technique developing in relative isolation. Early radial adapters imported their technique into their local practices through either informal learning or perhaps a brief course with a regional expert. Without a declaration of best practice for the transradial community, the different variants of transradial practice have developed with little biased pressure from the industry or others who might otherwise have sought to influence practice patterns. Although this lack of a dominating oversight or advocating organization may have slowed the spread of transradial techniques, it may have inadvertently had this potentially positive benefit of fostering innovation. Without profit motive or support of the general cardiology community, many of the early developers of radial techniques remained focused on what appeared truly best for their patients. An interesting heterogeneity of successful practice patterns now exists within the radial community that may be a rich source for future evaluation of best practices.

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The data provided by Bertrand et al. (3) provide information that contradicts several of the opinions expressed by traditional femoral artery operators. Early in the transradial experience, multiple innovate catheters were developed in an attempt to find a unifying all-purpose diagnostic/interventional catheter. These efforts have been perceived by some as defining the standard equipment for transradial technique. The fear of needing to learn about a variety of unique catheters has turned some operators away from trying transradial catheterization. The reality appears much different from the perception. Whereas some of the unique catheter curves have clusters of dedicated users, the majority of radial operators are using fairly standard Judkins curves; the same Judkins curves used in the femoral artery. Special purpose radial curves are available for the advanced practitioner, but the workhorse catheters of the transradial world are the same as the femoral. Catheterization laboratory
administrators can also relax; conversion to transradial really can be done without the need to radically restock the inventory of the cardiac catheterization laboratory. One can develop radial skills concentrating on technique rather than worrying about a bevy of novel catheters.

Vascular sheath sizes that are used in radial catheterization are likewise similar to femoral procedures. Worldwide, 6-F sheaths are used in the radial just as they are in the femoral arteries. I hear from my U.S. colleagues that their patients do not have radial arteries substantial enough for their percutaneous coronary intervention needs. This claim appears difficult to substantiate when populations from countries with body mass indexes in the lowest quartile compared to U.S. patients undergo transradial procedures with far greater frequency. In addition, some the radial percutaneous coronary intervention procedures reportedly done in the far eastern Asian countries with cultural aversion to coronary artery surgery are highly complex and demonstrate a broad potential for transradial intervention. Either radial arteries are inversely proportional in size to body mass index or perhaps non-U.S. cardiologists know something U.S. cardiologists do not.

Although this survey does not provide an exact measure of the worldwide radial market, it does provide some interesting insights. In all regions surveyed, future expansion in the volume of radial procedures was expected. This included countries such as India and China, and some European countries, such as Norway, France, Italy, and Spain, with a robust volume already present and low volume countries such as the U.S. A very small minority stated they expected volume to decrease. This is consistent with the observation that once operators or medical centers dedicate themselves to learning radial techniques, they do not return to their prior transfemoral habits. Rapid conversion rates can be seen with rates exceeding 80% transradial readily obtainable (4) and superior percutaneous coronary intervention results even in the acute myocardial infarction setting shortly after transradial conversion (5). Whether this 1-way shift toward transradial catheterization is due to patient demand or benefits experienced by the operators, or both, is unclear. In either case, this observation speaks to an expanding radial market that is not yet saturated even in some of the most proradial markets.

This present survey is only a first snapshot of the transradial world. One would presume further snapshots will be forthcoming and illustrate the direction of the transradial technique. Although this survey has no comparison, it is important because it shows the extent of the transradial community and its robustness. Its grass roots heritage has made definition of this community difficult. Potential industry partners have been hesitant to commit resources to this field without evidence of staying power and an available market. This report should add some definition and legitimacy to the transradial market.

Similar to private industry, many of the major cardiovascular organizations have been reluctant to show support for this technique. Until recently, if transradial techniques were represented at all in interventional meetings, they were usually relegated to the least favorable time slots and often attended primarily by the speakers and their friends. At least in the U.S., there appeared to be a significant upswing of interest that started in 2009 at the Transcatheter Cardiovascular Therapeutics meeting when attendance surpassed both the assigned room, and an accompanying room with video feed, with overflow of interested participants into the hallway. The Society for Cardiac Angiography and Interventions has recently started a series on transradial training that represents the first noncommercial support of the technique. Given the potential for the prevention of significant periprocedural morbidity and mortality by transitioning the practice community from a transfemoral to transradial mode of operation, it would seem to be a public health concern that the nonprofit cardiovascular organizations would embrace as part of their mission to enhance health care. Even the U.S. Food and Drug Administration has shown some interest in the application of transradial techniques and how to integrate them into product labeling with a recent think tank meeting held in June 2010 in collaboration with the Cardiac Safety Research Consortium.

Whereas present guidelines related to cardiac catheterizations either do not mention or only transiently discuss transradial techniques, the diversity in techniques is ripe for some consolidation and development of best practices. Once again, professional organizations offer the potential as the least biased overseers and perhaps best arbitrators of this effort. These groups also would have the greatest influence on credibility of any published guidelines. If professional organizations continue in a passive role, the vacuum that presently exists will be filled by private industry and the profit motive that is increasingly raising concerns about conflicts of interest and legitimacy from government regulators and society in general.

The growing role of transradial catheterization, even in markets with relatively high penetration, suggests that for standard coronary procedures this technique will probably become the preferred route. Though some might bemoan the need to learn a slightly different technique, it will preserve the femoral artery integrity for the growing potential need for access with large devices used in valve implantation or aortic stent grafts. With transradial procedures being done for coronary disease, one may see the day when patients survive longer only to get vascular and valvular disease that requires healthy femoral arteries to be treated percutaneously. Not a bad legacy for the early grass root transradialists who were at one time viewed with suspicion or otherwise just ignored.

Key Words: catheterization ■ percutaneous coronary intervention ■ transfemoral ■ transradial.