Canadian Journal of Cardiology 32 (2016) 391–394

Training/Practice
Training in Cardiovascular Medicine and Research

Catheter-Based Educational Experiences: A Canadian Survey of Current Residents and Recent Graduates in Cardiac Surgery

Nadzir Juanda, MD, Vincent Chan, MD, FRCSC, Ryan Chan, BScN, and Fraser D. Rubens, MD, MSc, FACS, FRCSC

Division of Cardiac Surgery, University of Ottawa Heart Institute, Ottawa, Ontario, Canada

See editorial by Lazar, pages 289-290 of this issue.

ABSTRACT

The past decade has witnessed significant developments in the use of catheter-based therapies in cardiovascular medicine. We sought to assess the educational opportunities for cardiac surgery trainees to determine their readiness for participation in these strategies. A web-based survey was distributed to current residents, recent graduates, and program directors in Canadian cardiac surgery residency programs from 2008-2013. The survey was distributed to 110 residents and graduates. Forty-five percent completed the survey. Thirty-five percent expressed that they experienced resistance organizing their rotations because they had to compete with non–cardiac surgery colleagues, and 6 were denied local cardiac catheterization rotations. By the end of the rotation, 56% were comfortable performing a diagnostic cardiac catheterization independently. Exposure to being the operator per-

RÉSUMÉ

Au cours de la dernière décennie, nous avons été témoins d'importants développements dans l'utilisation des traitements par cathéter en médecine cardiovasculaire. Nous avons cherché à évaluer les opportunités éducatives pour les stagiaires en chirurgie cardiaque afin de déterminer leur volonté de participation à ces stratégies. Une enquête en ligne a été distribuée aux résidents actuels, aux récents diplômés et aux directeurs de programmes de résidence en chirurgie cardiaque du Canada de 2008 à 2013. L'enquête a été distribuée à 110 résidents et diplômés. Quarante-cinq pour cent ont rempli l'enquête. Trente-cinq pour cent ont exprimé s'être heurtés à une résistance dans l'organisation de leurs rotations puisqu'ils devaient rivaliser avec leurs collègues qui n'étaient pas en chirurgie cardiaque, et 6 s'étaient vu refuser les rotations locales en cathétérisme cardiaque. À la fin de la

Technological advances and patient expectations are expanding the role of nonsurgical interventional cardiovascular therapies. Strategies that combine these approaches with surgery in a hybrid format, such as coronary stenting and minimally invasive surgical revascularization, have been demonstrated to be cost-effective and may minimize procedural risks.[1,2] Nonsurgical interventional approaches for the treatment of valvular diseases have also become popular with heart teams, and surgeons have been key players in the rollout of this technology. To address the future needs of cardiovascular care, we believe cardiac surgical resident education must include diversification of key clinical skills with the acquisition of innovative techniques, including catheter-based training.

We hypothesized that Canadian cardiac surgery residents may not be receiving the appropriate opportunities to acquire catheter-based interventional skills; hence, this survey was conducted to identify the experiences and expectations of trainees and their program directors. The results could then be used as a benchmark to improve the training curriculum in Canada.

Methods

This project was reviewed by the Research Ethics Committee of the Ottawa Hospital and consent was waived. The survey consisted of 40 questions in 5 subcategories: demographics, cardiac catheterization, transcatheter aortic valve replacement (TAVR) and percutaneous mitral valve procedures, interventional vascular surgery, and future directions and comments (Supplemental Survey).

The survey was generated using a web-based tool. Each individual was sent an electronic invitation containing the link to the survey. The survey was distributed over a 7-month period from July 2013 until February 2014. Program

Received for publication April 14, 2015. Accepted July 7, 2015.

Corresponding author: Dr Fraser D. Rubens, Division of Cardiac Surgery, University of Ottawa Heart Institute, 40 Ruskin St, Ottawa, Ontario K1Y 4W7, Canada. Tel.: +1-613-761-4720; fax: +1-613-761-4713.
E-mail: frubens@ottawaheart.ca

See page 394 for disclosure information.

http://dx.doi.org/10.1016/j.cjca.2015.07.007

forming diagnostic catheterization was significantly associated with the positive perception of being able to perform a diagnostic catheterization independently (odds ratio [OR], 5.14; 95% confidence interval [CI], 1.33-19.81; $P = 0.017$). Eighty-eight percent of respondents expressed the need for more exposure in catheter-based rotations. Seven of 11 program directors completed the survey. All believed such rotations should be mandatory and foresaw a bigger role for hybrid catheter-based/cardiac surgery procedures in the future. Trainees and program directors perceive that increased exposure to catheter-based therapies is important to career development as a cardiac surgeon. This survey will contribute to the development of a cardiac surgery training curriculum as we foresee more hybrid and team procedures.

rotation, 56 % se sentaient à l'aise de réaliser de manière indépendante un cathétérisme cardiaque diagnostique. L'exposition au rôle d'opérateur qui réalise le cathétérisme diagnostique était significativement associée à la perception positive d'être capable de réaliser de manière indépendante un cathétérisme diagnostique (ratio d'incidence approché [RIA], 5,14; intervalle de confiance [IC] à 95 %, 1,33-19,81; $P = 0,017$). Quatre-vingt-huit pour cent des répondants exprimaient le besoin d'avoir plus d'expositions aux rotations en cathétérisme. Sept des 11 directeurs de programmes avaient rempli l'enquête. Tous croyaient que ces rotations devraient être obligatoires et anticipaient un plus grand rôle dans les interventions hybrides combinant le cathétérisme et la chirurgie cardiaque dans le futur. Les stagiaires et les directeurs de programmes perçoivent qu'augmenter l'exposition aux traitements par cathéter est important pour le développement de carrière en tant que chirurgien cardiaque. Cette enquête contribuera au développement du cursus de formation en chirurgie cardiaque puisque nous prévoyons plus d'interventions hybrides et en équipe.

directors from all Canadian cardiac surgery residency programs were contacted to provide contact information for current and past trainees. A separate survey for program directors was also prepared and consisted of 7 questions. They were invited to participate through e-mails containing a link to the online survey from August 2013-February 2014.

All respondents were tracked and subsequent reminders were sent to nonresponders. For trainees, a total of 9 e-mail reminders were sent, and 8 e-mail reminders were sent to program directors. Each program was also contacted by phone to facilitate responses. Only responses from those who completed the survey were analyzed. Candidates only answered questions regarding their rotation experience if they had completed the pertinent rotation at the time of the survey.

Continuous normally distributed variables are reported as mean ± standard deviation. For categorical variables, differences between groups were examined using the χ^2 test. Logistic regression was used to test factors associated with the trainees' comfort in performing diagnostic angiography independently as well as if they planned to seek further fellowships in interventional cardiology. Univariate factors included performing as the operator in diagnostic angiography, weeks of training, training level, and age category. The multivariate model was constructed using univariate factors with a P value < 0.1. A P value < 0.05 was considered significant in the final multivariate model. All statistical analyses and plots were performed with STATA, version 13.1 (StataCorp LP, College Station, TX).

Results

Of the 110 trainees and recent graduates, 50 (45%) completed the survey. All respondents were enrolled in 6-year programs. Most respondents were men (86%) in the age category 30-34 years (44%). Recent graduates composed 30% of respondents.

Figure 1 illustrates the distribution of the locations at which candidates completed their interventional cardiology rotations. Details of the rotations in cardiac catheterization, TAVR, and interventional peripheral angiography, including the duration of the training and whether it was mandatory or elective, are presented in Supplemental Table S1. Thirty-nine (78%) of the trainees had completed interventional cardiology rotations and thus responded to these questions. Most trainees (72%) experienced no difficulty in arranging their cardiac catheterization rotation. Challenges reported included competition with cardiology trainee colleagues (18%), request for rotation denied by the cardiology department (10%), and lack of space to accommodate cardiac surgery trainees (8%). The 6 candidates who were refused access to their local institutional laboratories for training were able to complete their rotations at other sites.

Fifty-six percent of respondents felt comfortable in their ability to perform diagnostic catheterization independently by the end of their rotation. The number of cases each trainee experienced as observer, assistant, and operator in the various components of diagnostic and interventional coronary catheterization skills are illustrated in Supplemental Figure S1. The relationship of univariate factors tested to the positive perception of their comfort in performing diagnostic angiography independently is shown in Supplemental Table S2. Exposure to being the operator performing diagnostic

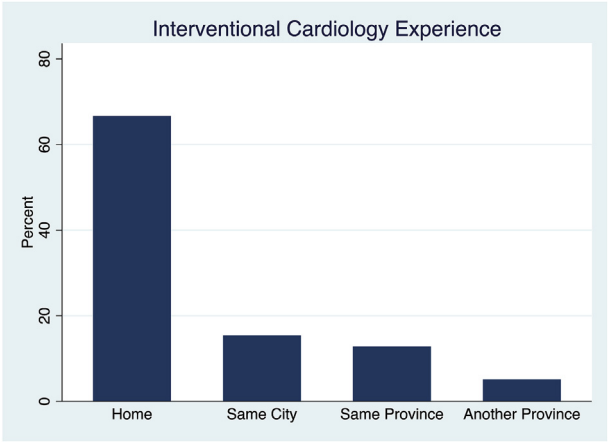

Figure 1. Sites at which respondents spent their interventional cardiology rotations.