

Endovascular Training During Interventional Cardiology Fellowships

Results of the SCAI Training Directors Survey.

BY RICHARD E. STEWART, MD, FSCAI, FACC, AND ROBERT M. BERSIN, MD, FSCAI, FACC

Cardiology is an ever-changing and expanding field. In particular, the practice of interventional cardiology has changed dramatically over the past several years. Technological and procedural advances have contributed to this evolving landscape. New methodologies have burst onto the scene at an increasingly rapid rate. This proves to be challenging for everyone in the field but also presents opportunities to “keep up” with new procedures and technologies. Accordingly, this also dramatically changes the face of the traditional interventional cardiology training experience.

Vascular medicine and peripheral vascular (endovascular) catheter-based interventions is one clinical area in which interventional cardiologists frequently practice. Catheter-based interventions in the noncoronary vascular beds are within the skill sets of many cardiologists and have brought management of vascular disease within the realm of the cardiovascular physician.¹ The changing landscape of cardiovascular medicine has many consequences for specialists in the field.

In an effort to evaluate the impact these changes have on interventional cardiology fellowship training, the Society for Cardiac Angiography and Interventions (SCAI) conducted a survey of interventional cardiology fellowship directors in order to establish a database with regard to program and training formats. This article addresses the issues of endovascular (noncoronary) diagnostic and interventional training offered to interventional cardiology fellows during the standard 1-year fellowship program that follows completion of general cardiology training.

METHODS AND MATERIALS

A 25-question survey form was sent to all interventional cardiology fellowship-training directors as listed in the SCAI directory. A variety of questions were asked

concerning the curricular types of procedures performed by fellows and the procedural numbers. A total of 62 training directors responded, with 41 survey forms totally completed. Twenty-one forms were partially completed. The format for the survey forms included both “yes/no” questions and multiple-choice questions. Open-ended questions were also included. Absolute percentage values were used in Table 1. Statistical analysis was carried out using unpaired tests with $P \leq .05$ indicating significance.

RESULTS

The majority of fellowship program directors reported that endovascular training was offered as part of the standard 1-year interventional cardiology fellowship. Seventy-seven percent (47 out of 61) confirmed that endovascular procedural training was integrated into their curriculum. In the same group of fellowship directors, 64% (39 out of 61) felt that a 2-year program would be eventually needed for optimal training in both endovascular and coronary interventions.

Training activities outside of direct participation in

TABLE 1. INTERVENTIONAL PROGRAMS OFFERING VASCULAR TRAINING

	n	%
Programs offering endovascular training	61	77%
Programs meeting diagnostic procedural training criteria ^{1,2}	61	69%
Programs meeting interventional procedural training criteria ^{1,2}	61	76%

TABLE 2. ENDOVASCULAR TRAINING OFFERED

Vascular Territory	Training (%) (n=47)	
	Diagnostic	Interventional
Carotid	70%	63%
Brachiocephalic	100%	83%
Renal	100%	98%
Celiac/mesenteric	41%	29%
Iliac	96%	94%
SFA	98%	94%
Infrapopliteal	85%	71%

catheterization laboratory-based procedures were addressed. Eighty-three percent of directors (50 out of 60) reported that scheduled didactic lectures addressing topics in endovascular and vascular medicine were offered to their interventional cardiology fellows. When queried about clinic obligations and the preprocedural and postprocedural evaluation of patients with peripheral vascular disease, 51% (30 out of 59) of program directors reported that fellows were required to participate and see patients in a dedicated peripheral vascular clinic setting. All who responded reported that longitudinal follow-up of patients was mandatory.

With regards to the noninvasive vascular lab experience offered to fellows, only 27% (16 out of 60) of program directors reported that formal training in the basic imaging and physiologic methodologies was offered. However, the programs that offered formal noninvasive vascular laboratory training reported a robust experience, including competency in the following procedures: ankle-brachial indices; segmental pressure measurements with exercise; waveform analysis; and duplex ultrasound of the lower extremities, carotid, and renal arteries. CT angiography and magnetic resonance angiography was also part of this experience, although facility in these latter imaging modalities was not guaranteed.

The topic next addressed by the survey pertained to specific vascular territories where diagnostic and interventional training was offered. According to the survey, fellows participated as either first or second operators in the following diagnostic studies: carotid angiography, 70%; aortic arch angiography including subclavian vertebral studies, 100%; renal angiography, 100%; celiac and mesenteric arteriography, 41%; abdominal aorta and iliac

arteries, 96%; superficial femoral arteries, 98%; and infrapopliteal arteriographic imaging, 85%. Interventional training as either first or second operators in the vascular territories included the following: carotid artery stenting, 63%; aortic arch vessels including the subclavian vertebral arteries, 83%; renal artery stenting, 98%; celiac and mesenteric artery interventions, 29%; and iliac artery stenting, 94%. Interventions (including atherectomy, angioplasty, and stenting) of the superficial femoral arteries were performed by 94% of fellows, and infrapopliteal interventions were performed by 71% of trainees (Table 2).

The mean number of first operator diagnostic peripheral vascular studies completed by fellows was 40 ± 18 during the fellowship year. As second operators, fellows performed a mean number of 55 ± 20 procedures. Thus, the average number of diagnostic arteriograms completed by fellows as either first or second operator was 100 during a 1-year fellowship program. The majority of programs satisfied the Task Force II criteria.¹ In a similar fashion, the average number of first-operator peripheral vascular interventions completed by fellows during this time period was 35 ± 22 . As second operator, the mean number was 50 interventions ± 12 . Thus, fellows usually performed between 50 to 90 total interventions as either first or second operators during interventional cardiology fellowship training (Table 1). Most programs attained Task Force II procedural numbers.¹

Finally, interest levels in endovascular training expressed by interventional cardiology fellows appears high. Eighty-seven percent of program directors reported that the majority of their fellows wished to pursue peripheral vascular/endovascular training.

DISCUSSION

The practice of interventional cardiology has changed significantly over the years—not only in technologies utilized but also in vascular beds treated. Traditional interventional cardiology fellowships have not offered training in endovascular (noncoronary) medicine and procedures until recently. Many position papers²⁻⁴ have outlined training requirements and guidelines for competency in endovascular medicine. However, achieving this goal has often been problematic for interventional cardiologists, both during training and early in their practice careers. The usual routes by which coronary interventionists in practice could acquire endovascular skills would include additional training with experienced operators or attending 2- or 3-day hands-on courses. This practice could potentially lead to discrepancies and nonuniformity in the level of skills and expertise pos-

(Continued on page 69)

(Continued from page 68)

sessed by coronary interventionists practicing endovascular medicine. Thus, incorporating training in endovascular skills during fellowship would seem like an optimal solution.

The present survey results point out the following. First, it is possible to train fellows in the basics of endovascular medicine and procedures during the 1-year interventional cardiology fellowship. A well thought out schedule and timetable to accomplish this goal would facilitate this effort. Second, integrating endovascular training needs to emphasize procedural-based teaching, both in the catheterization laboratory and noninvasive vascular laboratory. Most training programs do not offer sufficient exposure to noninvasive vascular imaging, and thus, this aspect of training would need the most attention and development. This may come at the expense of scheduled didactic lectures. Development of a standardized core didactic peripheral vascular curriculum for all interventional cardiology fellowship programs, preferably in an online or modular format, therefore seems necessary to ensure that the cognitive content is provided. The effect on coronary interventional training remains to be seen. With this format, it would be possible to provide interventional cardiology fellows with the endovascular foundation to build on for the rest of their careers.

LIMITATIONS

The main limitation to this study was that not all program directors completed the survey. Generalization of results may be difficult in view of self-selection bias toward programs with endovascular curriculums. ■

Richard E. Stewart, MD, FSCAI, FACC, is Clinical Associate Professor of Medicine, Division of Cardiology, St. Louis University in St. Louis, Missouri. Dr. Stewart may be reached at restewart1@hotmail.com.

Robert M. Bersin, MD, FSCAI, FACC, is Director, Endovascular Services and Clinical Research, Seattle Cardiology and Swedish Medical Center in Seattle, Washington.

1. Creager MA, Cooke JP, Olin JW, et al. Task Force 11: Training in Vascular Medicine and Peripheral Vascular Catheter-Based Interventions. *Cathet Cardiovasc Interv*. 2008;71:454-460.
2. Creager MA, Hirsch AT, Cooke JP, et al. Postgraduate training in vascular medicine. Proposed requirements and standards. *Vasc Med*. 2003;8:47-52.
3. Hirsch AT, Haskal ZJ, Hertzner NR, et al. ACC/AHA Guidelines for the Management of Patients with Peripheral/Arterial Disease. 2005. Available at <http://www.americanheart.org>.
4. Babb JD, Collins TJ, White CJ, et al. Revised Guidelines for the Performance of Peripheral Vascular Intervention. *Cathet Cardiovasc Int*. 1999;46:21-23.