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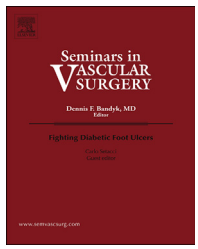

Vascular surgery: taking the next steps toward autonomy

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ABSTRACT

The recognition of vascular surgery as an independent surgical specialty is inevitable, but the pathway to full autonomy remains uncertain. Vascular surgery emerged from general surgery in the mid-1950s with the advent of synthetic grafts and microvascular techniques. By the early 1980s, Accreditation Council for Graduate Medical Education–approved fellowships were established in most large academic medical centers. The American Board of Surgery recognized this additional specialty training by awarding vascular graduates a Certificate of Special Qualifications distinguishing them from general surgeons. The emergence of endovascular surgery radically changed the face of vascular surgery from a general surgery subspecialty to a unique surgical specialty with a growing array of minimally invasive tools. With the establishment of a primary Certificate in Vascular Surgery and the subsequent development of integrated residencies, vascular surgery moved ever closer to recognition as an independent surgical specialty. Despite the remarkable progress that has been observed over the past 50 years, there is a desire in the vascular community for formal recognition of the unique body of knowledge and surgical skills that serve as the foundation of contemporary vascular care.

The recognition of vascular surgery as an independent surgical specialty is inevitable, but the pathway to full autonomy remains uncertain. It is the purpose of this article to review the evolution of vascular surgery as a surgical specialty and identify critical steps that will ultimately lead to full recognition of vascular autonomy.

Vascular surgery emerged as a sub-specialty of general surgery in the mid-1950s. The development of synthetic vascular grafts and microvascular techniques opened the door to complex vascular reconstructions involving the aorta and major branches. The first vascular fellowship was offered by the Division of Vascular Surgery at the University of California at San Francisco in 1962 under the direction of Dr Jack Wylie [1]. Over the next few years, a number of informal vascular apprenticeships were offered at select high-volume institutions. It soon became clear that establishment of standards for vascular education and development of organizational oversight would be essential to the continued growth of vascular surgery. The Joint Council of the Society for Vascular Surgery (SVS) and International Society of Cardiovascular Surgery–North America, chaired by Dr Wiley, established the Program Evaluation and Endorsement Committee to inspect and approve the first formal vascular fellowships in 1980 [2]. By 1982, the Program Evaluation and Endorsement Committee had approved 52 vascular fellowships. At about the same time, the American Board of Surgery (ABS) agreed to offer a Certificate of Special Qualifications in General Vascular Surgery in recognition of the additional training in advanced vascular surgery. The first vascular certificate was issued, fittingly, to Dr Wylie in 1982. In 1983, the Surgery Residency Review Committee (RC-Surgery) of the Accreditation Council of Graduate Medical Education (ACGME) assumed the oversight activities of

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the Program Evaluation and Endorsement Committee, thus ushering in the modern era of vascular surgery training.

The ACGME is an independent, not-for-profit, physician-led organization that sets the educational standards for graduate medical education in the United States [3]. The ACGME was founded in 1981 as the restructured offspring of the Liaison Committee for Graduate Medical Education. The Liaison Committee for Graduate Medical Education, initially established in 1972 by the American Medical Association, American Board of Medical Specialties (ABMS), American Hospital Association, Association of American Medical Colleges, and Council of Medical Specialty Societies, was somewhat dysfunctional, owing to complex reporting and approval processes. Since 1981, the ACGME has assumed the administrative responsibility for assuring the quality of graduate medical education in the United States. In 2001, while retaining the same name, the ACGME underwent substantial internal remodeling and became a separately incorporated organization with entirely new bylaws.

In the 2016–2017 academic year, there were 130,000 residents and fellows in approximately 10,700 training programs. Program compliance with ACGME requirements resides with specialty-specific RCs. There are currently 28 RCs that largely reflect the specialties of the member boards of the ABMS. In most cases, there is a one-to-one relationship between the ABMS specialty board and the corresponding ACGME RCs, but there are 2 boards with more than one corresponding RC. For example, there are two RCs that relate to the American Board of Radiology (Radiology RC and Radiation Oncology RC) and 2 RCs that relate to the American Board of Psychiatry and Neurology (Psychiatry RC and Neurology RC). In addition, there is an RC for the Transitional Year and a separate RC for Osteopathic Neuromusculoskeletal Medicine.

The formation of the RC-Surgery actually predated the establishment of the ACGME by more than 3 decades. In 1937, the American College of Surgeons (ACS), ABS, and American Medical Association formed a Committee on Graduate Training in Surgery to assess the state of surgical training in the United States and Canada [4]. In 1940, the findings of the Committee were published in *The Manual of Graduate Training in Surgery*, which set forth the minimum standards for surgical training. The Committee on Graduate Training in Surgery served as the basis for the establishment of the RC-Surgery in 1950, the first official RC of all medical and surgical specialties [4].

The current RC-Surgery consists of 16 members that have been nominated by one of four organizations: ABS, American College of Surgeons, American Medical Association, and American Osteopathic Association. Each nominating organization submits a list of qualified candidates from which the RC-Surgery elects new members for a 6-year term. The chairman of the RC-Surgery is elected by the members and typically serves a 3-year term. There are currently three vascular surgeons on the RC-Surgery. The RC-Surgery is responsible for reviewing training programs in General Surgery, Complex General Surgical Oncology, Hand Surgery, Pediatric Surgery, and Surgical Critical Care in addition to Vascular Surgery independent (5+2) and integrated (0+5) programs.

The RC-Surgery, in consultation with the program directors, ABS, and others, sets the standards for surgical training in the form of the program requirements, which describe in detail the roles of the faculty, the responsibilities of the sponsoring institution, and the composition of the educational content. The current program requirements in vascular surgery, applicable to both integrated and independent pathways, prescribe 36 months of vascular-specific training, in addition to a variable amount of "core surgery" experience. For independent programs (5+2), it is expected that trainees obtain at least 12 months of vascular training during general surgery residency, in addition to the 24 months of vascular training during fellowship. For integrated programs (0+5), the program requirements include 18–24 months of "core surgery" rotations, in addition to the 36 months of vascular-specific rotations. The core rotations are designed to assure that vascular trainees have broad exposure to the essentials of patient care, including fluid and electrolyte balance, management of shock and resuscitation, critical care, wound care, nutrition, surgical infection, and thrombosis and hemostasis. These core surgical skills may be obtained on a variety of rotations, based on the resources unique to each institution. There are ongoing discussions with the Vascular Surgery Board and the Program Directors in Vascular Surgery regarding the need for specific case minimums and required rotations, and the duration and content of "core" surgery.

Applications for new programs can be submitted to the RC-Surgery throughout the year and are reviewed by the members during three meetings annually. A vascular surgeon is always assigned to the review of vascular programs. Until recently, ACGME policy precluded the approval of new (5+2) vascular surgery programs in institutions that did not have an approved general surgery program. This policy was recently changed by the ACGME Board of Directors to give greater discretion to the RCs in determining specialty-specific needs. At its September 2017 meeting, the RC-Surgery determined that new applications for fellowship programs in institutions without an affiliated surgery program are eligible for accreditation if other standards are met.

While the ACGME and the specialty-specific RCs are responsible for establishing standards and reviewing individual program compliance, the member boards of the ABMS are responsible for the certification of individual physicians. The ABMS is the parent organization for 24 member boards, including the ABS, American Board of Internal Medicine (representing Cardiology), and American Board of Radiology (representing Interventional Radiology). With specific reference to vascular surgery from 1982 to 1987, graduates of ACGME-approved fellowships who successfully completed the examination process were awarded a Certificate of Special Qualifications in Vascular Surgery by the ABS [5]. After 1987, the terminology was altered slightly to a Certificate of Added Qualifications in Vascular Surgery. While the Certificate of Added Qualifications in Vascular Surgery represented a significant step forward in the evolution of vascular surgery, it soon became clear that there was a desire in the vascular surgery community for further recognition as a unique surgical specialty. After a period of extensive and sometimes acrimonious internal debate, the leadership of the SVS incorporated the American Board of Vascular Surgery and applied to the ABMS for formal recognition in 1996 [6]. The application and subsequent appeal were rejected by the ABMS due at least in part to opposition by the ABS, leading to a brief

period of subtle hostility between the leadership of the ABS and SVS. After a series of interchanges with the leadership of the SVS, the ABS formed the Vascular Surgery Sub-Board in 1998 to assume the responsibility of administering the vascular surgery qualifying and certifying examinations. In 2005, the ABS received approval by the ABMS to award a Primary Certificate in Vascular Surgery. This decision also allowed vascular surgeons to maintain certification in vascular surgery without simultaneously maintaining general surgery certification, the only surgical specialty so allowed. In addition to primary certificates in general surgery and vascular surgery, the ABS offers secondary certificates in surgical critical care, complex surgical oncology, pediatric surgery, hand surgery, and palliative care. The approval of the Primary Certificate in Vascular Surgery opened the door for program directors to submit applications to the ACGME for integrated (0+5) vascular surgery residencies that were open to graduating senior medical students. At the present time, there are approximately 60 integrated (0+5) programs and 100 independent (5+2) fellowships, with about 250 trainees in each pathway.

Currently, the Vascular Surgery Board (VSB) of the ABS sets the requirements for initial certification as well as maintenance of lifelong certification, and develops the Vascular In-Training Examination, the Qualifying Examination (written), the Recertification Examination (written), and the Certifying Examination (so-called oral exam). The VSB functions largely autonomously within the framework of the ABS. Technically, the Primary Certificate in Vascular Surgery is awarded by the ABS rather than the VSB, though the requirements for certification are independently determined by the VSB. The chairman of the VSB also serves as a Director of the ABS, must be currently certified in General Surgery, participate in the committee activities of the ABS, and serve as an examiner for the General Surgery Certifying (oral) Examination. At the present time, approximately 70% of certified vascular surgeons maintain simultaneous certification in general surgery, a proportion that will decrease with the influx of trainees from integrated (0+5) programs. The members of the VSB are nominated by the major national and regional vascular societies and elected by the VSB, independent from the ABS.

So where is vascular surgery now and what does the future hold? There are active national and regional vascular societies, two successful training paradigms in the integrated and independent pathways, textbooks, journals, a national quality registry, and innovative research initiatives. There is ample evidence that specialization in vascular surgery is associated with improved outcomes. Board certification has been linked to superior outcomes after carotid endarterectomy, abdominal aneurysm repair, and lower extremity bypass [7–9].

So what are the next steps on the pathway to full recognition as an autonomous surgical specialty? The next steps toward vascular autonomy will require actions by the ABS and ACGME. It is my opinion that the current board structure has largely served the interests of the vascular surgery community, as evidenced by the functional independence of the VSB to set the standards for vascular certification. In addition, the vascular surgery community benefits by not having to duplicate the administrative activities of the ABS staff. The chief drawback of the current arrangement is that vascular surgery does not have a seat at the ABMS and relies on the ABS to represent the interests of vascular surgery in this important forum. Currently, there is substantial enthusiasm for modifications to the structure and function of the committee organization of the ABS that may result in a greater voice for the needs of the vascular surgery community. The most critical step is recognition of equality between vascular and general surgery and realignment of the executive committee to assure equal representation for vascular and general surgery at the highest levels of leadership in the ABS. Additional changes at ABS would include eliminating the requirement for the chairman of the VSB to be certified in general surgery and to serve as an examiner for the General Surgery Certifying (oral) Examination. As has been suggested in the past, general surgery could develop a pool of general surgery examiners analogous to the pool that is used by vascular surgery to administer the certifying (oral) exam. These changes in the organization of the ABS would have a beneficial effect on stabilizing the role of the ABS as the de facto voice of surgery, but would also assure appropriate representation of the needs of the vascular surgery community. It should be recalled that neither cardiology or interventional radiology has autonomous board representation at ABMS because they are represented by the American Board of Internal Medicine and the American Board of Radiology. None of these suggested modifications at ABS would require action by any other governing body and could be enacted immediately.

Another step in the pathway toward autonomy would be the establishment of an independent RC for Vascular Surgery. The goal of establishing an autonomous RC for Vascular Surgery does not imply any lack of good faith or adverse action by the RC-Surgery. The current program requirements for vascular surgery were developed in a collaborative manner with input from both general surgery and vascular surgery. A vascular surgeon is always assigned to review vascular programs. In addition, it can be argued that cross pollination between surgery, surgical oncology, pediatric surgery, surgical critical care, and vascular surgery may allow for the rapid adoption of best practices. But for the future of vascular surgery training, it is appropriate to begin a dialogue with the ACGME to consider the merits (and drawbacks) of an independent RC for Vascular Surgery. It seems apparent that general surgery, surgical oncology, pediatric surgery, and surgical critical care have more in common with each other than with vascular surgery, especially since the advent of endovascular surgery. There is remarkably little overlap between laparoscopic/robotic general surgery procedures and the broad range of contemporary vascular surgery practice. There is some evidence that surgical training is largely specialty-specific with limited transferability. For example, there is no evidence that competence in the performance of laparoscopic cholecystectomy significantly improves the ability to perform vascular procedures. Rotations on cardiology, thoracic surgery, transplantation, interventional radiology, and hematology may have more relevance to eventual vascular practice than rotations on breast, gastrointestinal, and burn services.

Vascular surgery is the only medical or surgical specialty with a primary certificate that does not have an independent RC (Table 1). It is obvious that vascular surgeons have the

Table 1 – Surgical specialities.

Specialty	Professional organization	Journal	Training program	Primary certificate	SAP/ MOC	Exam	ABMS Board	RRC	Independent
Colon/rectal	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Neurosurgery	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Orthopedics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ENT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ophthalmology	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plastics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OB-Gyn	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Thoracic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Urology	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surgery	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vascular	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No

Abbreviations: ABMS, American Board of Medical Specialties; ENT, Otorhinolaryngology; MOC, Maintenance of Certification; OB-Gyn, Obstetrics and Gynecology; SAP, Self Assessment Program; RRC, Residency Review Committee.

greatest stake in determining the optimal methods for training the next generation of vascular surgeons. In addition, the proportion of certified vascular surgeons with certification in surgery will inevitably decrease as the graduates of integrated training programs enter the workforce. Curiously, there is a separate RC for colorectal surgery, despite the fact that certification by the American Board of Colorectal Surgery requires prior certification in Surgery by the ABS, an anomaly arising from the fact that the Colorectal Board predated the establishment of the ABS by more than 12 years.

The question is who should be responsible for making critical decisions about the content of vascular surgery training: an RC composed entirely of vascular surgeons or an RC dominated by >80% non-vascular surgeons. It is axiomatic that vascular surgeons are in the best position to determine the optimal methods to train vascular surgeons, just as surgical specialists in orthopedics; ear, nose, and throat; neurosurgery; urology; ophthalmology; plastics; and thoracic surgery determine their optimal training paradigms. The success or demise of the future of vascular surgery should be in the hands of those with the most skin in the game: vascular surgeons.

In conclusion, it is apparent that specialization in surgical disciplines has resulted in improved care. As in other countries around the globe, vascular surgery continues to evolve as a unique surgical specialty with a defined body of knowledge, procedures, and skill sets. Relatively modest actions by the ABS and ACGME have the potential to improve the training of vascular surgeons and ultimately the care of vascular patients. There is little doubt that vascular surgery will continue to evolve as an autonomous specialty and now is the time for taking the next steps in this process.

REFERENCES

[1] Ernst C, Rutkow I, Cleveland R, et al. Vascular surgery in the United States. J Vasc Surg 1987;6:611–21.

[2] Mills J. Vascular surgery training in the United States: a half-century of evolution. J Vasc Surg 2008;48(suppl):90S–7S.

[3] Britt L. Graduate medical education and the residency review committee: history and challenges. Am Surg 2007;73:136–9.

[4] Polavarapu H, Kulaylat A, Sun S, et al. 100 years of surgical education: the past, present and future. Bull Am Surg 2013;98:22–7.

[5] Cronenwett J. Vascular surgery training in the United States. J Vasc Surg 2004;40:660–9.

[6] Veith F. Presidential address: Charles Darwin and vascular surgery. J Vasc Surg 1997;25:8–18.

[7] Dimick JB, Cowan JA Jr, Stanley JC, et al. Surgeon specialty and provider volumes are related to outcome of intact abdominal aortic aneurysm repair in the United States. J Vasc Surg 2003;38:739–44.

[8] Pearce WH, Parker MA, Feinglass J, et al. The importance of surgeon volume and training in outcomes for vascular surgical procedures. J Vasc Surg 1999;29:768–78.

[9] Karthikesalingam A, Hinchliffe R, Loftus I, et al. Volume-outcome relationships in vascular surgery: the current status. J Endovasc Ther 2010;17:356–65.