EDUCATION CORNER

From the Eastern Vascular Society

The first assessment of operative logs for traditional vascular fellowship track versus integrated vascular training programs

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Objective: **As vascular surgery training paradigms evolve, one measure of success is operative experience. This study assessed the initial operative experience of those graduating from new integrated programs (0+5) vs those from the traditional programs (5+2).**

Methods: **National operative case log data supplied by the Accreditation Council for Graduate Medical Education was compiled for vascular surgical residents graduating between 2010 and 2013. Mean case numbers for the 0+5 residents were compared with those for the 5+2 residents (experience from their general surgery residency plus vascular fellowship) for total vascular operations, open vascular operations, endovascular procedures, and total operative experience.**

Results: **The 5+2 trainees performed significantly more procedures than the 0+5 trainees (mean, 1605 vs 1015); however, they performed 12% less vascular procedures (mean, 758 vs 851). No significant differences in total number of open vascular operations (mean, 404 vs 411) or specific open operations for cerebral vascular disease, aneurysm, peripheral obstruction, and access were found. The increase in vascular procedures logged by 0+5 trainees was realized by a 24% increase in endovascular procedures, mainly involving diagnostic arteriography, caval filter placement, and balloon angioplasty. No significant differences were seen in endovascular aneurysm repair (mean, 63 vs 60) and stent placement (mean, 59 vs 60).**

Conclusions: **This report summarizes the first data available for the 0+5 trainee operative experience. Compared with the traditional 5+2 trainees, the 0+5 trainees have (1) equivalent open vascular training and (2) overall superior endovascular training, although this was accounted via an increase in minor procedures. The overall operative experience remains greater for the 5+2 trainees secondary to 2 extra years of training. Further longitudinal studies will be needed to fully characterize the effect of the new 0+5 training paradigm. (J Vasc Surg 2015;62:1076-82.)**

Vascular surgery has traditionally been strongly rooted in general surgery. Initially, it was seen as core component of the general surgeon's armamentarium, although in 1982 vascular surgery evolved into its own subspecialty.[1,2] Maintaining its ties to general surgery, training consisted of 5 to 7 years of general surgery training, followed by an intensive 2-year fellowship, making it one of the lengthiest in medicine.[3] With an increasing prevalence of vascular disease, there has been higher demand for well-trained vascular surgeons.[4,5] Unfortunately, the number of applicants to the traditional fellowship process has not increased during this period to meet this demand.[6] The cause of this stagnation appears multifactorial, including a decline in general surgery trainees, high attrition rates secondary to lifestyle desires, overwhelming debt, excessive work hours, and overall poor satisfaction.[7-10]

Responding to these issues, the vascular community sought to condense training into a more comprehensive and focused model. In 2006 the Accreditation Council for Graduate Medical Education (ACGME) approved the establishment of the "0+5" integrated vascular residency.[11] Three institutions initiated programs in 2007, with the basis of training consisting of 24 months of nonvascular surgical rotations, followed by 36 months of focused vascular surgery training.[12] By 2013, 39 programs had been established, with 46 positions being offered.[6] Applicants entering these programs tend to be top-tier medical students with similar interests and aspirations as vascular fellows due to an early exposure or mentorship in vascular surgery leading them to seek condensed and supportive environments for their training.[13-15]

This paradigm shift has sparked a great deal of interest, but concern has been raised regarding the readiness of the 0+5 trainee to practice vascular surgery upon graduation. According to a survey of 347 Society for Vascular Surgery

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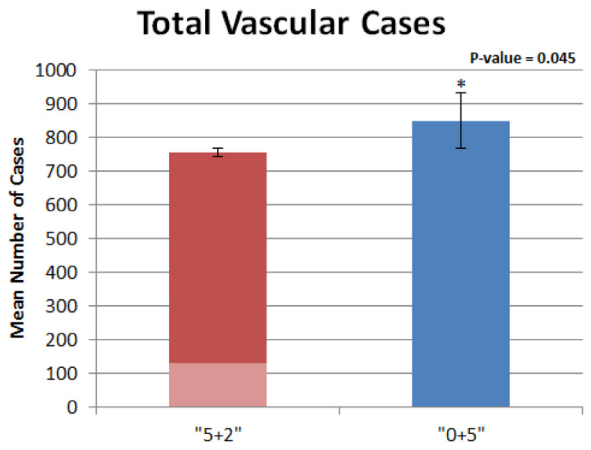

Fig 1. Total vascular cases reported by graduating vascular trainees in 2013. The 11 0+5 trainees (*blue bar*) performed 12% more vascular cases than the 121 5+2 trainees (*red bar*). The lighter portion of the 5+2 bar represents the vascular cases logged by these trainees during their general surgical training. The *range bars* show the standard error.

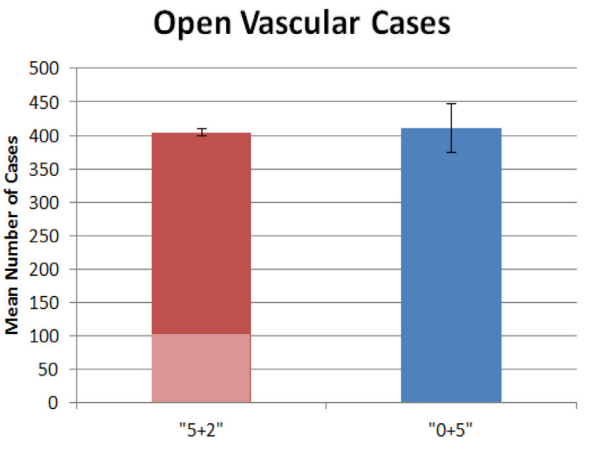

Fig 2. Total open vascular surgical cases reported by graduating vascular trainees in 2013. The operative experience of both groups in this category was not significantly different. The *range bars* show the standard error.

members and surgical chairpersons, only 32% felt that a 0+5 graduate would have the same degree of surgical maturity as those from 5+2 programs.[16] Most also felt that 0+5 trainees would not have equal skills in open procedures, although their endovascular skill set would possibly be better.

The aim of this study was to determine if these initial concerns of the 0+5 training paradigm are supported by the initial operative log data. We compared the 0+5 vs 5+2 trainees in total operative experience along with specific open and endovascular cases.

METHODS

We obtained operative case log data from the ACGME. Reports are published annually and made available to the public via www.acgme.org under "Case Log Statistical Reports" within the "Data Collection Systems" archives.

The operative logs for the 0+5 group consisted of data obtained for 11 integrated vascular residents (IVRs) who graduated in 2012 to 2013. The operative logs for the 5+2 group consisted of two parts, such that the general surgery and vascular surgery fellowship components of their training were both accounted for. We combined the case logs of general surgery residents (GSRs) who graduated in 2010 to 2011 with those of vascular surgery fellows (VSFs) who graduated in 2013 (n = 121). The GSR operative case logs included all cases logged as "Surgeon Total," representing a combination of "Surgeon Chief" and "Surgeon Junior;" VSF operative logs were included for all cases logged as "Surgeon Fellow;" IVR logs included all cases listed as "Surgeon Chief" and "Surgeon Junior." Secondary and assistant procedures were not included for any group.

Total operative means and standard deviations were collected and tabulated for each group. This was further subdivided to include only vascular cases logged under defined ACGME coding criteria, including aneurysm repair, cerebrovascular, peripheral obstruction, abdominal obstruction, upper extremity, extra-anatomic, trauma, venous, vascular access, amputations, miscellaneous vascular, endovascular, thrombolysis, and miscellaneous endovascular. Cases logged as imaging or diagnostic studies, including ultrasound, were not incorporated.

Case logs were further partitioned into open and endovascular categories. All subcategories of the ACGME coding groups were included. Any endovascular component was moved into the "endovascular" category, and the remaining cases were labeled as "open." These groups were then subdivided into selected common and key procedures. Open procedures included operations performed for cerebral vascular disease, aneurysm, peripheral obstruction, hemodialysis access, and amputation; endovascular procedures consisted of endovascular aneurysm repair (EVAR), balloon angioplasty, stent placement, caval filter placement, and diagnostic arteriogram. Means and standard deviations were recalculated in accordance to these adjustments for each grouping. All graphic images were constructed with red signifying "5+2" cases and blue signifying "0+5" cases. The "5+2" cases were further subdivided by light red and dark red signifying cases from general surgery and fellowship training, respectively.

Statistical analysis. 3Mean case numbers were provided by the ACGME for all categories. Standard deviations were available for all procedures performed by GSRs and VSFs but not for IVRs. The variance for IVR case logs was unknown; therefore, to compare the two groups we conservatively estimated that the IVR variance was no larger than twice that of the VSF variance using the statistical method of imputing.[17-19] Subsequent statistical analysis was done using standard Student *t*-test. Statistical significance was defined as $P < .05$.

RESULTS

Vascular operative experience. Fig 1 reveals that the 0+5 trainees graduating in 2013 performed 12% more