

From the Society for Vascular Surgery

Comparison of the integrated vascular surgery resident operative experience and the traditional vascular surgery fellowship

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ABSTRACT

Objective: After almost 10 years since its approval, residents in integrated vascular surgery training programs now outnumber traditional vascular fellows. We examined the Accreditation Council for Graduate Medical Education (ACGME) case log data to assess whether there is a difference in operative experience between the graduating integrated residents and vascular fellows.

Methods: We analyzed the total clinical experience of vascular surgery trainees during the academic years between 2012 and 2014 for the 30 graduated integrated vascular surgery residents (VSRs) and the 243 graduated vascular surgery fellows (VSFs). Data were compared on the basis of reported categories defined by the ACGME operation reporting system. VSR case totals were calculated by combining "surgeon chief," "surgeon junior," and "secondary procedures" categories. VSF "surgeon fellow" and "secondary procedures" case totals were combined with all vascular cases done in general surgery residency (using averages of general surgery resident ACGME case log data from the same years) to reflect their total vascular experience.

Results: The average total vascular experience reported by VSRs was 1446.0 compared with 1421.8 for VSFs ($P = .2086$). VSRs performed 694.7 major vascular procedures on average compared with 616.3 major cases for VSFs ($P = .0106$). Highlighted comparisons include the following: open aortic aneurysm cases, VSRs 20.6 and VSFs 22.2 ($P = .320$); endovascular aortic aneurysm cases, VSRs 80.0 and VSFs 80.6 ($P = .945$); cerebrovascular cases, VSRs 78.8 and VSFs 85.0 ($P = .1132$); and peripheral obstructive cases, VSRs 343.6 and VSFs 293.4 ($P = .0032$).

Conclusions: Integrated VSRs and traditional VSFs graduate with comparable overall vascular surgery clinical experience. VSRs reported, on average, a significantly higher number of major vascular procedures during their tenure as trainees as well as a significantly increased number of cases in six of the other ACGME categories. (*J Vasc Surg* 2017;■:1-4.)

With the approval and initiation of the integrated vascular residency programs in 2006, there was a marked paradigm shift in vascular surgery training.¹ The change in resident training resulted in an attractive, possibly truncated alternative pathway to reaching certification for future trainees but without the experience gained as a general surgery resident. A concern regarding this new paradigm is whether those trained in a truncated fashion will have the same case volume, the same overall operative exposure during training, and the same skills when graduating.² These concerns are especially relevant with respect to open vascular

surgery and especially open abdominal and aortic surgery. In response to overall concerns for all vascular trainees, case requirements were increased to ensure adequate exposure to developing endovascular techniques.^{1,3} In addition, adjuncts such as simulation have been used to potentially address issues of skill in junior residents or experience with endovascular techniques at any level.⁴

After almost a decade since approval, the main question among trainers and trainees alike is whether a distinction exists in the educational experiences of 5+2 fellows and 0+5 residents.⁵ It is our belief that both programs offer a robust operative experience but that reported case volume and clinical experience will be higher in the integrated pathway because of the extended length of training.

METHODS

National case log data reported by the Accreditation Council for Graduate Medical Education (ACGME) were analyzed for vascular surgery procedures between the academic years of 2012 and 2014 for the 30 graduated integrated vascular surgery residents (VSRs) and the 243 graduated vascular surgery fellows (VSFs). Data were

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made publicly available by the ACGME through the following website: www.acgme.org. Data were compared on the basis of reported categories defined by the ACGME operation reporting system, including vascular laboratory studies. To ensure that the total experience of both training paradigms was analyzed, VSR case totals were calculated by combining “surgeon chief,” “surgeon junior,” and “secondary procedures” categories. VSF “surgeon fellow” and “secondary procedures” case totals were combined with all vascular cases done in general surgery residency (using averages of general surgery resident ACGME case log data), again to reflect the total vascular experience.

Cases were totaled by combining surgeon chief, surgeon junior, and secondary cases for VSRs. Case totals of VSFs were calculated using their surgeon fellow cases, secondary cases, and average vascular surgery cases completed by a general surgery resident for each respective year analyzed. Mean total case volumes as well as case volumes in all ACGME vascular categories were compared between both groups. Three new categories regarding aortic surgery were created. One category created was for vascular-related open abdominal surgery, which combined open aortic cases involving the following disease: aneurysm, obstructive, trauma, renovisceral revascularization, and spine exposure cases requiring a vascular surgeon. The second category created was for open aortic aneurysm cases (which included open infrarenal, open suprarenal, open thoracic, and open thoracoabdominal aortic aneurysm cases). The third category created was for endovascular aortic aneurysm repair (which included endovascular repair of aortic/iliac aneurysm and endovascular repair of thoracic aortic aneurysm). VSR case logs reported national averages with minimum and maximum values for each category. Standard deviation was calculated using the range rule of four. VSF case logs reported national averages with standard deviations of each case category, and variances were calculated to derive overall standard deviations. Statistical significance comparing averages in case categories were calculated by Student *t*-tests using the program SAS 9.4 software (SAS Institute, Cary, NC).

We assessed for any statistically significant differences in averages in all ACGME-defined case categories as well as aortic-specific case volume. We used data from 2012 to 2013 as the earliest set of data, giving us 2 years of graduate data from the integrated residency training paradigm.

RESULTS

Overall vascular operative experience. The average total number of vascular clinical experiences reported by VSRs was 1446.0 compared with 1421.8 for VSFs ($P = .2086$). VSRs did perform a significantly higher number of major vascular cases compared with VSFs, with 694.7 average cases compared with 616.3, respectively ($P = .0106$).

Table I. Average operative cases logged by vascular surgery residents (VSRs) and vascular surgery fellows (VSFs)

Case category	VSRs (n = 30)	VSFs (n = 243)	P value
Total open aortic aneurysm	20.6	22.2	.320
Total endovascular aortic aneurysm	80.0	80.6	.954
Total aortic aneurysm	100.6	102.8	.888
Total aneurysm—major	114.0	114.6	.9217
Total cerebrovascular—major	78.8	85.0	.1132
Total peripheral obstructive—major	343.6	293.4	.0032 ^a
Total abdominal obstructive—major	34.0	32.3	.6162
Total upper extremity—major	21.7	22.4	.7241
Total extra-anatomic—major	21.4	14.4	<.0001 ^a
Total thrombolysis/thrombectomy—major	24.6	14.1	<.0001 ^a
Total vascular trauma—major	30.0	22.5	.0172 ^a
Total major vascular	694.7	616.3	.0106 ^a
Total venous	120.8	75.0	<.0001 ^a
Total endovascular diagnostic	437.3	395.2	.1557
Total miscellaneous vascular	42.5	47.0	.3102
Total arteriovenous access	89.3	85.5	.5642
Total amputations	54.8	44.8	.0008 ^a
Total duplex ultrasound	137.0	190.2	.0912
Total vascular clinical experience	1446.0	1421.8	.2086

^aDenotes significant *P* value < .05.

Experience based on ACGME case categories. Case category comparison is shown in Table I with associated significance values. VSRs reported high average case volumes in seven of the defined categories: peripheral obstructive, extra-anatomic, thrombolysis/thrombectomy, vascular trauma, major vascular, venous, and amputations.

Major vascular cases completed during a general surgery residency accounted for 7% of the major vascular cases reported by VSFs.

Aortic surgical experience. There was no significant difference in overall aortic case volumes between the groups. Table I shows the two new categories created representing total open aortic aneurysm and total endovascular aortic aneurysm cases completed (both showing no significant differences between the two groups). Table II shows the breakdown of vascular-related open abdominal surgery for both groups (again without any significant differences between both groups in primary or total cases).

DISCUSSION

This is the second look at operative case log data for graduating VSRs. The previous report by Batista et al⁶ looked at the case logs for 11 graduating residents. With

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