Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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index event in symptomatic patients. However, this was a limitation of the available data, not of our meta-analysis.2

In addition to the 2110 TCAR procedures included in our meta-analysis,1 newer studies (which were reported after the date that the literature search in our systematic review was completed; ie, after November 11, 2019) have reported outcomes after >4000 TCAR procedures.3,4 A recent study compared in-hospital outcomes of 1182 patients undergoing TCAR vs 10,797 patients undergoing carotid endarterectomy (CEA).3 Although the patients undergoing TCAR were older and had more comorbidities, TCAR had resulted in similar rates of in-hospital stroke/death (1.6% vs 1.4%; P = .33) and stroke/death/myocardial infarction (2.5% vs 1.9%; P = .16) compared with CEA.3 No difference was found in the rates of stroke (1.4% vs 1.2%; P = .68), in-hospital death (0.3% vs 0.3%; P = .88), myocardial infarction (1.1% vs 0.6%; P = .11), or 30-day death (0.9% vs 0.4%; P = .06) between the two procedures.3

In a propensity score-matched analysis of data from 3286 matched pairs of patients undergoing TCAR or transfemoral carotid artery stenting (TF-CAS), in-hospital risk of stroke/death was 1.6% for TCAR vs 3.1% for TF-CAS (relative risk [RR], 0.51; 95% confidence interval [CI], 0.37-0.72; P < .001).3 TCAR was associated with a significantly lower risk of in-hospital stroke (1.3% vs 2.4%; RR, 0.54; 95% CI, 0.38-0.73; P = .001), in-hospital death (0.4% vs 1.0%; RR, 0.44; 95% CI, 0.23-0.82; P = .008), and 30-day stroke/death (1.9% vs 3.7%; RR, 0.53; 95% CI, 0.39-0.72; P < .001) compared with TF-CAS.4

Although these two studies were not randomized controlled trials (RCTs),3,5 they included prospectively collected data from large, independent registries or databases, such as the Society for Vascular Surgery (SVS) Vascular Quality Initiative or the Centers for Medicare and Medicaid Services-approved Transfemoral Carotid Artery Stent Registry.3,4 These studies were either designed through a collaborative effort by the SVS, U.S. Food and Drug Administration, and the Centers for Medicare and Medicaid Services,3 or initiated by the SVS patient safety organization.5 Their aim was to assess independently the real-world outcomes of TCAR compared with CEA5 or TF-CAS.4 As one of the authors supported, RCTs sometimes or often do not reflect real-world clinical practice and the results are potentially misleading.3,6 It is, therefore, quite strange to see that Coelho and de Borst7 are calling for an RCT comparing TCAR with either CEA or TF-CAS.

The SVS has recently released a clinical competence statement that includes recommendations regarding the knowledge, technical skills, resources, and infrastructure required to obtain and maintain privileges for the safe and effective performance of TCAR.7 Unlike CEA, which can be performed with good results in most vascular centers worldwide, TCAR should not yet be offered outside of centers with the necessary physician expertise and documented low stroke/death rates. The early results for TCAR sound promising2-4; nevertheless, cautious optimism is warranted.

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https://doi.org/10.1016/j.jvs.2020.10.015

Exploring the benefits of virtual education for medical students

As medical students in the United Kingdom, we found the article “Efficacy of vascular virtual medical student education during the coronavirus disease 2019 pandemic” to be of great interest. The study performed a pilot project exploring the effectiveness of remote vascular surgery education for medical students. The main limitations identified within this program regard the design of the study. We would, therefore, like to provide our perspective on the issue.

The author stated that “students completed a nonvalidated, objective, 25-question pre- and postcourse assessment,” in which all students demonstrated an
improvement in performance. However, their article did not disclose the exact assessment the students had undertaken. We believe great benefit would occur if the authors released the assessment for public view, because this would allow for further analysis and critiquing of the study and could clarify the domains in which the students had improved and help guide future research.

Furthermore, we are skeptical regarding the conclusion that “this pilot project demonstrates the successful remote delivery of vascular surgery curriculum to medical students.” It is important to recognize the limitations within the study. First, the sample size was only seven, making any definitive conclusions difficult. Second, we are not aware of the circumstances in which the students undertook the assessment. If the students had accessed textbooks or electronic devices, the assessment results would be invalid. Finally, the assessment was not validated, making any improvements in the students’ scores an internal measure of performance.

We propose that measurements of student performance should be performed using examination conditions and a recognized and validated assessment. This would help identify the benefits of conducting a remote curriculum much more clearly.

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https://doi.org/10.1016/j.jvs.2020.10.033

Reply

We would first like to thank the students from the University of Manchester for their response to our letter and would also like to thank you for the opportunity to respond to their comments.1 We will address as many of their concerns as possible.

In response to the concern raised regarding the assessment, we acknowledge the inherent limitations of using an unvalidated assessment and agree that a recognized, validated, assessment would have been preferred. However, the circumstances rendered any alternative impossible at the time. The course had been assembled within a matter of weeks in response to the COVID-19 (coronavirus disease 2019) crisis in which U.S. medical students were temporarily, albeit immediately, barred from clinical duties. However, validating a formal assessment within that period was simply not feasible. In addition, we are unaware of any recognized, validated vascular surgery objective assessments (or multiple-choice question examination) we could have used as an alternative. Regarding their questions about the circumstances under which the students had completed the assessment, we trusted our students to adhere to the university honor code, which prohibits the use of study materials during any formal examination.

Regarding the inquiry about the assessment content, we have attempted to include as much detail as is reasonable. The assessment consisted of 25 multiple-choice, board-style questions. The vast majority were accompanied by clinical vignettes and covered board-eligible material. The questions were written and approved by senior vascular surgery faculty to cover an appropriate breadth of content at an appropriate difficulty level for third-year medical students. The topics covered included the diagnosis and management of aortic dissection, acute limb ischemia, peripheral arterial disease, venous insufficiency, abdominal aortic aneurysm, and carotid atherosclerosis. In addition, several questions without clinical vignettes were included purely to assess the students’ knowledge of vascular anatomy.

In conclusion, our pilot project resulted from necessity and was not intended to provide any broad, definitive conclusions but, rather, to contribute the findings from a small cross-sectional study to the increasing reported data examining the efficacy of virtual medical education. Despite the limitations, we believe our experience in conducting virtual vascular surgery education has demonstrated feasibility, the aim of pilot projects, and is a useful starting point for other institutions requiring feasible, accessible, and creative solutions for continuing surgical education. Because this challenge is not unique to our institution, we would be more than happy to collaborate with students and faculty around the world to ensure virtual surgical education is implemented as effectively as possible in these times of global crisis.

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