

SHORT REPORT

The Impact of the First COVID-19 Wave on European Vascular Education

António Pereira-Neves^{a,b,c,*}, Liliana Fidalgo Domingos^d, Stefano Ancetti^e^a Department of Biomedicine – Unit of Anatomy, Faculty of Medicine, University of Porto, Portugal^b Department of Surgery and Physiology, Faculty of Medicine, University of Porto, Portugal^c Department of Angiology and Vascular Surgery, Centro Hospitalar Universitário São João, EPE, Porto, Portugal^d Department of Angiology and Vascular Surgery, Hospital Clínico Universitario de Valladolid, Spain^e Vascular Surgery Unit – Department of Experimental, Diagnostic and Specialty Medicine (DIMES) – University of Bologna “Alma Mater Studiorum”, Bologna, Italy

Introduction: Public health was severely affected by the first wave of the COVID-19 pandemic, imposing major daily life changes across the world, including health services that had to restructure significantly.

Report: Considering the potential side effects on the quality of vascular training, a digital survey (Survey Monkey®) was developed and submitted to vascular trainees from 7 July to 20 September 2020 through European mailing lists and social media platforms. The aim was to evaluate the standpoint of vascular education across Europe during the first wave of the COVID-19 pandemic and to identify possible measures to mitigate the negative effects on vascular trainees. A total of 104 answers across 27 European countries were received. The mean age of the responders was 31.2 ± 3.58 years, of whom 60.6% were male. Forty-four (42.3%) of the vascular trainees actively participated on the COVID-19 front line; 76.9% of them reported a decrease in surgical procedures performed and/or assisted, with 60% reporting a reduction $>50\%$. Emergency procedures were the only surgical activities for 7.5% of the trainees. Annual or final examinations were re-scheduled or cancelled for 16.3% and 10.6% of the participants, respectively. According to the survey, 73.5% of the responders claimed that the first wave of the COVID-19 pandemic had a negative impact on vascular education and 73.4% agreed the need for “compensation measures” to be taken.

Discussion: The first wave of the COVID-19 pandemic brought a significant negative impact on vascular education. Considering an extended pandemic situation, it is believed that compensatory measures should be addressed to maintain the high standards of vascular education and develop new educational tools for future trainees.

© 2022 The Authors. Published by Elsevier Ltd on behalf of European Society for Vascular Surgery. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Article history: Received 15 February 2021, Revised 31 October 2021, Accepted 13 January 2022,

Keywords: COVID-19, Education, Trainees, Vascular residency, Vascular surgery

The COVID-19 pandemic has been pushing health service resources to their limits, which were unprepared for the size of the pandemic. Elective procedures had to be reduced, not only to increase critical care capacity for patients with COVID-19 but also to release the surgical team to support other medical areas in need, including intensive care.¹ Considering the potential burden of this pandemic on the quality of vascular training, a survey was conducted to evaluate the standpoint of vascular education across Europe and to identify possible measures to mitigate the negative effects on vascular trainees.

REPORT

A digital survey (Survey Monkey®, www.surveymonkey.com) was developed and submitted to vascular trainees from 7 July to 20 September 2020 through European mailing lists and social media platforms. The survey was designed to assess relocations, elective activity reduction, medical staff COVID infections, scientific activity, impact on final examination and internships, and the need for educational compensatory measures (see [Supplementary appendix 1](#)). Responder anonymity was guaranteed. The raw questionnaire data were initially analysed in order to exclude duplicate responses and those with no meaningful data. Descriptive statistical analysis was performed using SPSS (IBM SPSS Statistics v.26.0, NY, USA).

A total of 104 answers across 27 European countries were included, from which 56.7% of participants were from Italy ($n = 32$; 30.8%), Portugal ($n = 15$; 14.4%), and Spain ($n = 12$; 11.5%) ([Table 1](#)). The mean age of the responders was 31.2 ± 3.58 years, of whom 63 (60.6%) were male. The

* Corresponding author. Alameda Professor Hernâni Monteiro, 4200 – 319 Porto, Portugal.

E-mail address: antonio.hpneves@gmail.com (António Pereira-Neves).

2666-688X/© 2022 The Authors. Published by Elsevier Ltd on behalf of European Society for Vascular Surgery. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.ejvsf.2022.01.007>

Table 1. Distribution of participants by country

Country	Participants		COVID-19 front line		Decrease in vascular activities		Decrease in elective procedures		Decrease in first operator procedures		Surgery of COVID-19 patients		Quarantined		Adequate protection from the start	
	<i>n</i>	%	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%
Italy	32	30.80	20	62.5	23	74.2	18	56.3	27	87.1	25	80.6	5	16.1	4	13.3
Portugal	15	14.40	7	46.7	12	85.7	14	93.3	14	93.3	7	50.0	3	21.4	7	50.0
Spain	12	11.50	2	16.7	8	66.7	12	100.0	9	75.0	9	75.0	3	25.0	1	8.3
UK	6	5.80	1	16.7	4	80.0	6	100.0	6	100.0	4	80.0	1	20.0	0	0.0
The Netherlands	5	4.80	1	20.0	5	100.0	5	100.0	3	60.0	3	60.0	1	20.0	3	60.0
Denmark	4	3.80	0	0.0	2	66.7	2	50.0	2	66.7	0	0.0	1	33.3	2	66.7
Greece	3	2.90	0	0.0	3	100.0	3	100.0	3	100.0	0	0.0	0	0.0	0	0.0
Romania	3	2.90	1	33.3	2	66.7	3	100.0	2	66.7	1	33.3	0	0.0	0	0.0
Sweden	3	2.90	2	66.7	2	100.0	1	33.3	2	100.0	1	50.0	0	0.0	2	100.0
Austria	2	1.90	0	0.0	1	100.0	1	50.0	1	100.0	0	0.0	1	100.0	0	0.0
Egypt	2	1.90	2	100.0	1	100.0	1	50.0	1	100.0	0	0.0	0	0.0	0	0.0
Finland	2	1.90	1	50.0	2	100.0	2	100.0	2	100.0	1	50.0	0	0.0	1	50.0
Belarus	1	1	1	100.0	1	100.0	1	100.0	1	100.0	1	100.0	1	100.0	0	0.0
Belgium	1	1	0	0.0	1	100.0	1	100.0	1	100.0	1	100.0	0	0.0	1	100.0
Croatia	1	1	0	0.0	0	0.0	1	100.0	1	100.0	0	0.0	0	0.0	1	100.0
France	1	1	1	100.0	1	100.0	1	100.0	1	100.0	1	100.0	0	0.0	1	100.0
Hungary	1	1	0	0.0	1	100.0	1	100.0	1	100.0	0	0.0	0	0.0	0	0.0
Ireland	1	1	1	100.0	1	100.0	1	100.0	1	100.0	1	100.0	1	100.0	0	0.0
Israel	1	1	0	0.0	1	100.0	1	100.0	1	100.0	0	0.0	1	100.0	1	100.0
Mexico	1	1	0	0.0	0	0.0	1	100.0	1	100.0	1	100.0	1	100.0	0	0.0
Norway	1	1	0	0.0	1	100.0	1	100.0	1	100.0	0	0.0	1	100.0	1	100.0
Poland	1	1	1	100.0	1	100.0	1	100.0	1	100.0	1	100.0	1	100.0	0	0.0
Russia	1	1	1	100.0	-	-	0	0.0	-	-	-	-	-	-	-	-
Serbia	1	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0	1	100.0
Slovakia	1	1	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0
Switzerland	1	1	0	0.0	1	100.0	1	100.0	1	100.0	0	0.0	0	0.0	1	100.0
Turkey	1	1	1	100.0	0	0.0	1	100.0	0	0.0	1	100.0	1	100.0	0	0.0
Total	104	100	44	42.3	74	71.2	81	77.9	83	79.8	59	56.7	22	21.2	28	26.9

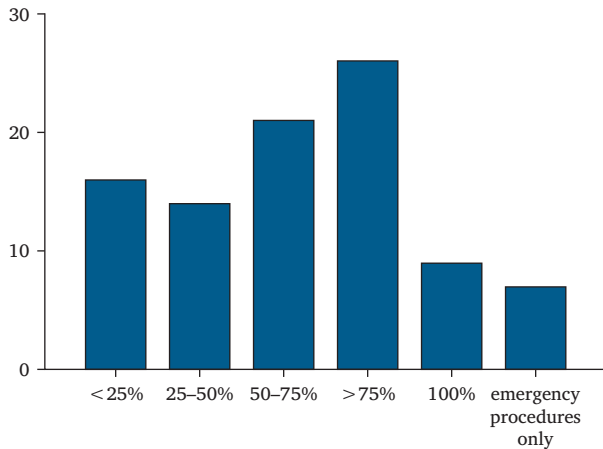


Figure 1. Decrease in surgeries performed and/or assisted.

most common year of residency of the trainees was the fifth ($n = 27$).

Forty-four (42.3%) of the vascular trainees actively participated on the COVID-19 front line (COVID-19 wards [50%, $n = 52$], emergency departments [22.1%, $n = 23$], and intensive care units [17.3%, $n = 18$]). During the pandemic, most trainees continued to work at their home institution; only two trainees (1.9%) were relocated to a different hospital. Regarding the time spent on the front line, 34.8% ($n = 23$) of the responders were less than two weeks, 36.3% ($n = 24$) between two and 12 weeks, and 28.8% ($n = 19$) over 12 weeks. The majority of trainees (77.1%) reported a general reduction of vascular activities; 76.9% ($n = 80$) of them reported a decrease in surgical procedures performed and/or assisted, with 60% ($n = 56$) reporting a reduction $>50\%$. Emergency procedures were the only surgical activities for 7.5% ($n = 7$) of the trainees (Fig. 1).

The previously reported increased risk of thromboembolic complications in COVID-19 patients² led to an eventual effect on daily practice to be explored. However, only 9.4% ($n = 9$) of participants reported an increase in ultrasound examinations performed and only 6.3% ($n = 6$) reported a higher number of vascular access procedures. Regarding anti-thrombotic therapy, 34.4% ($n = 33$) of subjects reported increased prescription vs. 65.6% ($n = 63$) who did not.

Annual or final examinations were re-scheduled or cancelled for 16.3% ($n = 17$) and 10.6% ($n = 11$) of the participants, respectively. Additionally, 7.7% ($n = 8$) of participants had their Fellow of the European Board of Vascular Surgery examination cancelled in 2020. Likewise, internships and fellowships in other countries or in other national centres suffered a reduction, with 21.2% ($n = 22$) of the trainees having an internship cancelled. The majority of the trainees maintained scientific activity ($>70\%$), with 27.1% ($n = 26$) of them investigating COVID-19 related topics. Forty-eight per cent ($n = 45$) of the trainees reported unaltered scientific

workload compared with pre-COVID levels, almost one quarter (23.7%, $n = 22$) were able to increase their scientific activity; nonetheless a significant percentage reported a significant decrease (28%, $n = 26$). With regard to vascular education, 72.6% ($n = 69$) of departments replaced face to face lessons/courses with virtual ones. Only 11.3% ($n = 8$) of the trainees considered these replacements ineffective, with the remaining feeling that the replacement had been partially (64.8%, $n = 46$) or completely (23.9%, $n = 17$) effective.

Fifty-nine trainees (56.7%, $n = 59$) said they operated on COVID-19 positive patients at the time of the survey. Twenty-two residents had to enter quarantine; six responders (5.8%) were diagnosed with COVID-19, while 63.5% ($n = 66$) of cases reported having medical staff infected in their department. Only 29.5%, ($n = 28$) of the responders felt adequately protected during daily clinical practice since the beginning of the pandemic, 53.7% ($n = 51$) felt adequately protected but not since the beginning and 16.8% ($n = 16$) felt inadequately protected throughout the pandemic.

According to the survey, 73.5% ($n = 50$) of the responders claimed that the first wave of the COVID-19 pandemic had a negative impact on vascular education and 73.4% ($n = 69$) agreed on the need for “compensation measures” to be taken. Most of the suggestions for compensations were aimed to a tuition fee refund or reduction, extending the period of training and/or virtual surgical training (for instance through simulators). Finally, 46.7% ($n = 21$) of the senior residents experienced a decrease in job opportunities in the immediate future.

DISCUSSION

Vascular surgery activities have been reported to suffer a mean activity reduction of 23.3%, with 53.5% of vascular residents being relocated to other specialties during the first pandemic wave.³ This study has underlined that the first wave of the COVID-19 pandemic negatively affected vascular trainees, and although the relocation rate to work in other hospitals reported in this survey was very low (1.9%), almost half (42.3%) of the responders had to help deal with the pandemic, shifting their daily practice from vascular surgery to COVID-19. Furthermore, the delay or even cancellation of many outpatient visits and elective procedures resulted in a severe decrease in surgical activity for vascular trainees and other vascular activities, resulting in a negative impact on their residency even though they were not on the COVID-19 front line, as stated by three of four responders. Different compensation measures were suggested; however, given the heterogeneity in each country (for instance not all have fees for the internship) and even within each hospital (some trainees were more affected than others even in the same department), probably the solution will not be the same for all, will not be standardised, and will have to be personalised intrahospital

or even interindividual. Furthermore, as a result of several months of limited surgical workload due to COVID-19, it is likely that senior trainees will need surgical training in basic surgical techniques that are usually designated for junior trainees, which could further compromise education later. Educational providers should take all these factors into consideration while finding a solution to this conundrum.

Although web based surveys present several advantages, including fast and low cost data collection of answers, the authors are aware of the limitations associated with this type of online survey and analysis, especially the lack of data regarding the total number of trainees reached by this survey, such as the response rate being unknown, the bias of selective participation, or the lack of sample size calculation. Further, anonymity has its own inherent limitations. Moreover, the cohort analysed is definitely heterogeneous, but on the other hand more than half of the responders came from three of the most COVID-19 affected European countries (Italy, Portugal, and Spain). This brings limitations for internal and external validity.

In summary, the first wave of the COVID-19 pandemic had a significant negative impact on vascular education. Considering the extended pandemic situation, it is believed that compensation measures should be addressed in order to maintain high standards of vascular education and develop new educational tools for future trainees.

FUNDING

None.

CONFLICT OF INTEREST

None.

ACKNOWLEDGEMENTS

The authors would like to express their gratitude to the European Vascular Surgeons in Training (EVST), including the remaining councillors and especially to the project coordinator, Natalie Helene, alongside with the Vascular and Endovascular Research Network (VERN), for helping to spread the survey.

APPENDIX A. SUPPLEMENTARY DATA

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.ejvsvf.2022.01.007>.

REFERENCES

- 1 Glasbey JC, Nepogodiev D, Simoes JFF, Omar O, Li E, Venn ML, et al, COVIDSurg Collaborative. Elective cancer surgery in COVID-19-free surgical pathways during the SARS-CoV-2 pandemic: an international, multicenter, comparative cohort study. *J Clin Oncol* 2021;**39**:66–78.
- 2 Poh KC, Tay VYJ, Lin SH, Chee HL, Suhitharan T. A review of COVID-19-related thrombosis and anticoagulation strategies specific to the Asian population. *Singapore Med J* 2020. <https://doi.org/10.11622/smedj.2020174> [Epub ahead of print].
- 3 Collaborative TVAERNVCS. Global impact of the first coronavirus disease 2019 (COVID-19) pandemic wave on vascular services. *Br J Surg* 2020;**107**:1396–400.