



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.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Available online at  
**ScienceDirect**  
[www.sciencedirect.com](http://www.sciencedirect.com)

Elsevier Masson France  
**EM|consulte**  
[www.em-consulte.com/en](http://www.em-consulte.com/en)



## LETTER TO THE EDITOR

### Discontinuation of vascular therapeutics during the COVID-19 pandemic first wave in France



#### KEYWORDS

Vascular medicine;  
 Peripheral artery disease;  
 Venous thromboembolic disease;  
 Thromboprophylaxis;  
 COVID-19;  
 Vascular therapeutics

#### Background

Coronavirus disease 2019 (COVID-19) pandemic led to measures throughout Europe ranging from social distancing to widespread containment [1], which could lead to discontinuation of treatment. In addition, several studies suggest an increased risk of venous thromboembolic disease associated with COVID-19, which has led the French [2] and international [3] societies to propose thromboprophylaxis in the most severe forms. Finally, controversies have emerged on the role of angiotensin-converting enzyme (ACE) inhibitors and angiotensin-2 receptor antagonists (ARB2) [4], which are daily treatments for many patients with peripheral artery disease who are themselves at risk of severe COVID-19 infection [5].

These different elements may have led to changes of vascular therapeutics during the COVID-19 epidemic in France; at the request of the French national agency of drugs this work aims to identify them.

#### Methods

A 6 points questionnaire was proposed to patients during an outpatient consultation by vascular physicians who were members of the French Society of Vascular Medicine (SFMV). Physicians had previously received an e-mail request to participate by completing an online questionnaire (LimeSurvey®

**Table 1** Characteristics of patients.

Variables	Values (n = 297)
Age (year ± sd)	65 ± 14
Female sex (%)	56
Immobilization (lower limb trauma or bed rest) (%)	4
Interruption of usual treatment (%)	5.0
Anticoagulant (%) for VTE	2.0
Anticoagulant (%) for AF	0.0
Anti-platelet agent (%)	0.6
Antihypertensive drugs (%)	0.6
Statin (%)	0.6
Anti-inflammatory (%)	0.6
Antidiabetic (%)	0.3
Other (%)	0.3

%; percentage; sd: standard deviation; VTE: venous thromboembolic disease; AF: atrial fibrillation.

Software, Hamburg). Patients were informed of the objectives of the research and the anonymity of data collected. The estimated time for answering questions was two minutes. Anonymous data were centralized in a database hosted by the SFMV. Participation was unpaid. Quantitative results are expressed in mean ± standard deviation and qualitative in percentage (%).

#### Results

In May 2020, 1936 e-mails were sent to SFMV members. This resulted in the collection of completed questionnaires for 297 patients whose characteristics are show in Table 1. This survey identified 5% of treatment withdrawals. The treatments usually prescribed for chronic diseases, such as anti-platelet or statins for peripheral artery disease, were largely maintained (respectively 0.3% and 1.0% of discontinuation).

<https://doi.org/10.1016/j.jdmv.2021.01.002>

2542-4513/© 2021 Elsevier Masson SAS. All rights reserved.

## Discussion

Other studies have investigated the impact of the pandemic on the management of patients, including a decrease in emergency hospitalizations [6] and immunomodulatory treatment interruptions [7], but to our knowledge this is the first report on vascular therapeutics follow-up during the COVID-19 pandemic. We found that 5% of patients stopped treatments in a sample of 297 patients. The circumstances of these discontinuations are unknown, but it can be assumed that some of them, such as those for VTE anticoagulants, may be secondary to the non-renewal of a prescription or the planned end of a short course of treatment. It should be noted that there has been no interruption of supply or shortage of these drugs in French pharmacies [8]. The initial controversy over ACE or ARB2 does not appear to have led to discontinuation of treatment and should not be further addressed in light of the results of the BRACE CORONA study, which found no significant difference in 30-day survival between discontinuation or continuation of ACE/ARB2 in patients hospitalized for COVID-19 [9]. Finally, it should be noted that the activity of vascular physicians was probably strongly impacted during this pandemic as suggested by a survey during the same period, using an identical questionnaire methodology filled out by volunteer vascular physicians, potentially subject to the same selection bias [10].

Regarding the limitations, this study was not able to evaluate the consequences of these therapeutic changes and the representativeness of patients with chronic vascular disease is not assured. Indeed, patient history was not systematically collected, the reason for consultation was unknown as well as the participation rate.

## Conclusion

This survey did not identify major modification of vascular therapeutics during the COVID-19 pandemic first wave in patients followed by vascular physicians who were members of the SFMV.

## Disclosure of interest

The authors declare that they have no competing interest.

## Funding

The French society of vascular medicine supported this work.

## Permission information

The authors do hereby declare that all illustrations and figures in the manuscript are entirely original and do not require reprint permission.

## Acknowledgements

The authors thank the vascular physicians for their participation in this study.

## References

- [1] Guidelines for the implementation of non-pharmaceutical interventions against COVID-19. In: European Center for Disease Prevention and Control. <https://www.ecdc.europa.eu/en/publications-data/covid-19-guidelines-non-pharmaceutical-interventions>. [Accessed 16 Nov 2020].
- [2] Khider L, Soudet S, Laneelle D, Bøge G, Bura-Rivière A, Constans J, et al. Proposal of the French Society of Vascular Medicine for the prevention, diagnosis and treatment of venous thromboembolic disease in outpatients with COVID-19. *J Med Vasc* 2020;45:210–3, <http://dx.doi.org/10.1016/j.jdmv.2020.04.008>.
- [3] Bikdeli B, Madhavan MV, Jimenez D, Chuich T, Dreyfus I, Driggin E, et al. COVID-19 and thrombotic or thromboembolic disease: implications for prevention, antithrombotic therapy, and follow-up: JACC State-of-the-Art Review. *J Am Coll Cardiol* 2020;75:2950–73, <http://dx.doi.org/10.1016/j.jacc.2020.04.031>.
- [4] Sharma RK, Stevens BR, Obukhov AG, Grant MB, Oudit GY, Li Q, et al. ACE2 (Angiotensin-Converting Enzyme 2) in cardiopulmonary diseases. *Hypertension* 2020;76:651–61, <http://dx.doi.org/10.1161/HYPERTENSIONAHA.120.15595>.
- [5] Guzik TJ, Mohiddin SA, Dimarco A, Patel V, Savvatis K, Marelli-Berg FM, et al. COVID-19 and the cardiovascular system: implications for risk assessment, diagnosis, and treatment options. *Cardiovasc Res* 2020;116:1666–87, <http://dx.doi.org/10.1093/cvr/cvaa106>.
- [6] Baum A, Schwartz MD. Admissions to veterans affairs hospitals for emergency conditions during the COVID-19 pandemic. *JAMA* 2020;324:96–9, <http://dx.doi.org/10.1001/jama.2020.9972>.
- [7] Georgakopoulos JR, Mufti A, Vender R, Yeung J. Treatment discontinuation and rate of disease transmission in psoriasis patients receiving biologic therapy during the COVID-19 pandemic: a Canadian multicenter retrospective study. *J Am Acad Dermatol* 2020;83:1212–4, <http://dx.doi.org/10.1016/j.jaad.2020.07.021>.
- [8] Agence nationale de sécurité du médicament et des produits de santé (ANSM). COVID-19 : disponibilité des médicaments et des produits de santé; 2020 <https://ansm.sante.fr/S-informer/Points-d-information-Points-d-information/COVID-19-l-ANSM-mobilisee-pour-assurer-la-disponibilite-des-medicaments-et-des-produits-de-sante-Point-d-information>.
- [9] Lopes R, Van Gelder I, Hindricks G, Parati G. BRACE CORONA: continuing vs. suspending ACE inhibitors and ARBs in COVID-19. In: ESC Congress. 2020. <https://esc365.escardio.org/Congress/ESC-CONGRESS-2020-The-Digital-Experience/Hot-Line-BRACE-CORONA/31202-hot-line-brace-corona>.
- [10] Goffette P. COVID-19 : enquête sur l'activité des médecins vasculaires – Syndicat national des médecins vasculaires (SNMV). In: 19<sup>e</sup> congrès de la Société française de médecine vasculaire. 17–19 septembre 2020, Bordeaux. 2020.

D. Lanéelle<sup>a</sup>

M. Dadon<sup>b</sup>

I. Quere<sup>c</sup>

S. Zuily<sup>d</sup>

J. Emmerich<sup>e</sup>

M.-A. Sevestre<sup>f</sup>

G. Mahé<sup>g,h,\*</sup>, on behalf the SFMV

<sup>a</sup> Department of Vascular Medicine, Inserm UMR 1075, CHU  
Caen Normandie, Caen, France

<sup>b</sup> Vascular Explorations Center, 7, rue Chalgrin, 75116  
Paris, France

<sup>c</sup> Department of Vascular medicine, CHU Saint-Éloi,  
University of Montpellier, Inserm CIC1001, InnoVTE,  
Montpellier, France

<sup>d</sup> University of Lorraine, Inserm UMR 1116, CHRU de Nancy,  
Vascular Medicine Division, Nancy, France

<sup>e</sup> University of Paris, Vascular Medicine, Groupe Hospitalier  
Paris Saint-Joseph, INSERM CRESS UMR 1153, Paris, France

<sup>f</sup> Department of Vascular Medicine, EA Chimère 7516, CHU  
Amiens Picardie, 80054 Amiens cedex 1, France

<sup>g</sup> Department of Vascular Medicine, CHU Rennes, 35033  
Rennes cedex 9, France

<sup>h</sup> Université de Rennes 1, INSERM CIC 1414, 35033 Rennes  
cedex 9, France

\* Corresponding author at: Vascular Medicine and  
Investigation Department, INSERM CIC-1414, Pôle imagerie  
médicale et explorations fonctionnelles, Hôpital  
Pontchaillou, 2, rue Henri-Le-Guilloux, 35033 Rennes,  
France.

E-mail address: [maheguillaume@yahoo.fr](mailto:maheguillaume@yahoo.fr) (G. Mahé)

Available online 16 January 2021