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EDITORIAL: HOT TOPIC

## Vascular Surgery in Unreal Times

In light of the ongoing coronavirus disease 2019 (COVID-19) pandemic a web conference was held in which a number of leading European vascular surgery specialists shared their experiences and thoughts on the management of vascular patients, during and after the pandemic. This editorial summarises some aspects related to the current pandemic of relevance to vascular surgery.

COVID-19 is an emerging pandemic disease requiring extreme measures against its uncontrolled spread all over the world and to prevent health systems from collapsing. Although currently there is no evidence for direct vascular involvement, vascular surgery services across the world are significantly affected due to the rapid restructuring of health services, with resource allocation to COVID-19 care, particularly intensive care. In addition, a restrictive approach to hospital visits is recommended for vascular surgical patients, all of whom can be more or less considered high risk patients for COVID-19.<sup>1</sup> Also, many clinical research projects have been completely or partially put on hold during the crisis.

All over Europe surgical activities have been reduced to allow crisis management, often involving empty operating rooms (ORs) and hospital beds reserved without any patients. We prepare for the worst, meanwhile waiting to be able to offer our patients the optimal standard of care and having our patients wait for much needed, often long planned treatments. Pandemic hotspots in Italy, Spain, France, and the UK, and probably elsewhere, have been forced to adopt very stringent criteria for surgical and intensive care, sometimes similar to a war situation. Other less affected units may, to some extent, still be able to carry on some normal operations. The pandemic's rapid progress is changing the conditions from one day to another. There are a number of recently published guidelines on prioritisation that can be adapted to local circumstances.

Already however, the practising vascular surgeon must prepare for the time after the most acute phase of the COVID-19 pandemic. Postponed operations need to be optimally triaged and fitted into an already tight daily schedule, and all this with a probable remaining COVID-19 risk to take into account, at least for many months to come.

Possible solutions, to some extent already being tested around Europe with promising results, might be the creation of separate hospital workflow for COVID-19 positive (or suspected) and negative patients with specially designed teams including all healthcare professionals involved in pre-,

peri-, and post-operative care of vascular patients.<sup>2</sup> This strategy addresses the cross contamination concerns during hospitalisation. Even more, these measures might help in preventing secondary infection of patients through medical staff, who are estimated to account for as many as 30% of in hospital infections (based on WHO Guideline: Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected). The ethical and legal requirements of secondary infections during the hospital stay may not be neglected and patients need to be informed about this risk.

A prerequisite for this to work reliably is strict adherence to the WHO's guideline regarding protective equipment and the ability to test patients and staff for ongoing or previous COVID-19 infection in large numbers and quickly. In Austria most hospitals today test all patients on admission, Greece tests 48 h before admission and immediately on any emergency admission, whereas the rest of Europe tests only on positive anamnesis according to the TOCC (Travel, Occupation, Contact and Cluster) questionnaire. What complicates this is the uncertainty of today's test methods, with reported low sensitivity. Even though the virus load may be too low at the given moment to have positive polymerase chain reaction (PCR) test results, the patient may be infected with COVID-19. We have experienced that positive computed tomography (CT) images sometimes may be more reliable in diagnosing COVID-19 than either one or two PCR tests, which may be false negative. Therefore, a routine chest CT is advocated in PCR negative patients with typical COVID-19 symptoms, like fever and respiratory distress, to rule out the disease. For urgent or acute surgery before a SARS-CoV-2 test result is accessible, published guidelines recommend performing the procedure in full PPE (personal protective equipment) with N95/FFP2 masks in labelled COVID-19 operating rooms with negative air pressure and controlled extubation on the intensive care unit to avoid any possible aerosol generation (WHO Guidelines COVID-19). A number of research initiatives regarding the effect of COVID-19 on vascular surgery have been taken, and more are underway.<sup>3</sup> The short and long term effects of delayed management of vascular surgical patients will surely employ epidemiologically interested vascular researchers for a long time to come. Another issue to deal with is how all this affects surgical training.

With respect to vascular surgery specific risk considerations, recent case reports suggest a potential increased rate of thrombo-embolic events in COVID-19 vascular patients. Additionally, case reports of young and physically fit patients with a low cardiovascular risk profile report

fulminant strokes with COVID-19 infection. Moreover, extracorporeal membrane oxygenation (ECMO) patients under COVID-19 treatment seem to exhibit a higher thrombogenic risk with need for very high heparin dosages, with subsequent increased haemorrhagic stroke risk. One possible reason may be the inflammatory burst in virulent, active COVID-19 patients.<sup>4</sup> We believe that this needs urgent attention and that routine administration of therapeutic doses of low molecular weight heparin after vascular surgery in COVID-19 patients in general and specifically for those requiring intensive care treatment should be considered.<sup>5</sup>

In conclusion, the expert panel of this editorial advocates sustaining routine vascular services as long as the local/national situation is stable, clinical and healthcare capacities allow, and general hygiene and pandemic regulations can be followed. An increased capacity to quickly test patients and staff is of great importance in order to be able to take care of vascular surgical patients in the present circumstances. Further analysis may be warranted regarding the possible higher prevalence of thromboembolic events in vascular patients when affected by COVID-19.

#### SUMMARY OF SUGGESTIONS

- We should prepare for the time after the most acute phase of the COVID-19 pandemic
- Separate hospital workflows for COVID-19 positive (or suspected) and negative patients should be considered
- COVID-19 testing of all patients on admission to hospital should be considered
- Routine administration of therapeutic doses of low molecular weight heparin after vascular surgery in COVID-19 patients should be considered due to reported increased rates of thrombo-embolic events

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