



# What We Need to Know and How We Need to Act during the Coronavirus Pandemic as Vascular Surgeons

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“I have no idea what’s awaiting me, or what will happen when this all ends. For the moment I know this: there are sick people and they need curing.”  
- Albert Camus [The Plague] -

In this September issue of *Vascular Specialist International* (VSI), Dr. Tayebi from Iran [1] has reported that vascular surgeons were infected to coronavirus disease (COVID-19) during central vein catheterization. Moreover, another doctor from Italy has written a letter to the editor (unpublished data) reporting a mild course of a COVID-19 patient with comorbidities on long-term low-dose heparin injection and raising a question on the protective effect of heparin on the progression of COVID-19 and the role of early heparin therapy.

Since the first case of COVID-19 in Wuhan, China in December 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is now overwhelming the entire world. The virus is significantly contagious to humans and causes COVID-19 with high mortality, especially in elderly or fragile patients with other medical comorbidities. The first wave of the disease hit China, South Korea, Iran, and Italy, and another waves hit the entire world at a time gap. In South Korea, soon after the first case was diagnosed on January 20, 2020, the first large outbreak developed in Daegu, a southeastern city in Korean Peninsula. The South Korean government and medical professionals exerted their best effort to control the transmission of the virus SARS-CoV-2 by performing the three Ts (test, trace, and treat). With social distancing and wearing of facial masks, the disease was successfully controlled without a lockdown, although small

outbreaks have been observed over time. As of September 2, 2020, a total of 25,624,084 patients were diagnosed with COVID-19, and 854,150 patients died of the disease worldwide. In South Korea, 20,449 patients were diagnosed with COVID-19, and 326 patients died of the disease.

Fortunately, our vascular service at Seoul National University Hospital (SNUH), a tertiary referral center with >1,500 beds in the metropolitan city of Seoul, was not affected by the COVID-19 outbreak, and routine elective or emergent open surgeries and endovascular interventions were performed as usual. However, the situation of each vascular service is different according to the hospital resources and the pandemic status of the city and country. Moreover, several scientists have predicted that the disease would exist for several years. Because vascular surgeons are not directly associated with the diagnosis and treatment of COVID-19, the general principles are not discussed here. Instead, I have discussed regarding the reported specific characteristics of the disease in vascular patients and how to prepare ourselves to safely maintain a regular vascular practice for patients with vascular diseases.

## 1) Prevention of nosocomial infection

In SNUH, all patients undergo COVID-19 testing with nasopharyngeal swabs and sputum samples before admission. Moreover, all visitors are strictly monitored and screened for fever and respiratory symptoms. COVID-19 tests are performed four times a day, and the results are reported in 6 hours. With these efforts, no nosocomial infection has been reported in SNUH thus far. Furthermore, for

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the medical personnel, strict social distancing is ordered, which includes not attending conferences, symposia, or meetings outside the hospital, avoiding drinking/eating during any in-hospital meetings, and prohibiting traveling or social club. Moreover, intensive care unit visits by the family are prohibited, and only one family member can visit the in-patient ward.

In treating vascular diseases of COVID-19 patients by open surgery or endovascular intervention, minimizing the risk of infection to vascular surgeons and healthcare workers is significantly important because it can jeopardize the personal health of these healthcare workers and possibly result in a lockdown of the service owing to inevitable quarantine. Personal protective equipment (PPE) is a key issue for surgeons; extra equipment, including a face shield over a mask and goggles, a surgical coat, and dual gloving with tapes, is required. A temporary change to endovascular intervention first strategy in the care of COVID-19 patients may reduce the number of participating professionals and minimize the risk of infection. Postoperative examinations such as simple X-ray or duplex ultrasonography should be minimized.

## 2) Patient triage and organization of hospital resources

The Society for Vascular Surgery released COVID-19 resources for its members on their website (<https://vascular.org/news-advocacy/covid-19-resources>), including vascular surgery triage by tier class. Several limb- or life-threatening conditions are classified as class 3 (do not postpone) including the following: ruptured or symptomatic abdominal aortic aneurysm (AAA), infected AAA, prosthetic graft infection, aortoenteric fistula, symptomatic peripheral or visceral aneurysm, pseudoaneurysm, symptomatic carotid stenosis, thrombosed or infected dialysis access, symptomatic mesenteric ischemia, acute limb ischemia, limb ischemia with progressive tissue loss, acute iliofemoral deep vein thrombosis with phlegmasia, and amputation for infection/necrosis. They recommend the cancellation of procedures in the following if possible (class 2b): AAA >6.5 cm, revascularization for high-grade restenosis of previous intervention, arteriovenous fistula revision for malfunction/steal, chronic mesenteric ischemia, chronic limb-threatening ischemia with rest pain or tissue loss, thrombolysis, thoracic outlet syndrome with venous/arterial thrombosis, inferior vena cava filter placement, deep debridement of surgical wound infection or necrosis, and toe amputation for infection/necrosis. However, if social distancing is prolonged, we cannot indefinitely delay the performing the abovementioned procedures and we need to decide when to operate according to the patients' conditions and risks.

## 3) Central line catheterization in COVID-19 patients and infection risks

In a study by Tayebi from Iran [1], central venous catheterization increased the risk of infection for vascular surgeons. Therefore, they changed the protocol to insert a femoral catheter instead, which prevented the risk of infection for surgeons. Adequate PPE may prevent this complication, but in cases of PPE shortage, this strategy may help prevent infection.

Ilonzo et al. from New York [2] have reported their experience of central line service in COVID-19 patients. They have created line service teams to assist with central and arterial line placements, and in patients who are at high risk for aerosolizing the infection (nonintubated patients on high-flow nasal cannula or bilevel positive airway pressure) or patients who are unable to lie flat, the femoral vein is preferentially chosen for line placement. Moreover, they found early line thrombosis with saline or low-dose heparin. Thus, they instilled each port of the central line with heparinized saline (5,000 units/mL). Sharing these experiences with other vascular surgeons worldwide is significantly important to minimize the surgeon's risk of infection during future catheterizations.

## 4) Hypercoagulability in COVID-19

Han et al. [3] have reported that the coagulation functions in COVID patients are significantly affected, decreasing the patients' antithrombin level and increasing the D-dimer, fibrin degradation product (FDP), and fibrinogen levels. Additionally, monitoring D-dimer and FDP levels may help early detection of severe cases. Patelis et al. [4] have reported that severe viral pneumonia was frequently followed by septic pulmonary embolism, which could be treated by catheter-directed thrombolysis.

## 5) Social vaccines against discrimination

The virus spreads not only the disease but also hatred and xenophobia. The United Nations have reported that the instances of hate speech, stigma, discrimination, and xenophobia have been increasing [5]. Asians and people of Asian descent worldwide have been subjected to attacks and beatings, violent bullying, threats, racist abuse, and discrimination owing to the pandemic [6]. Therefore, the United Nations Secretary General António Guterres urged governments to "act now to strengthen the immunity of our societies against the virus of hate." Moreover, the use of the term of "Chinese virus" and "Wuhan virus" may have encouraged the use of hate speech [5]. As doctors and

scientists believing in evidence-based medicine, vascular surgeons need to participate in adequate public education, disagree with the fake news, urge the governments to strengthen policies against hate crimes, and offer support to communities victimized by discrimination.

In history, *Homo sapiens* have strived against fatal pandemics and survived. The development of modern medicine and healthcare systems now can help not only the survival of the fittest but also the survival of the fitter with collaboration and symbiosis. Currently, global vascular surgeons need to communicate each other regarding their experiences, new policies, methods to maintain a regular vascular practice, and ways to deal with COVID-19-related problems as limited information is available on this novel fatal dis-

ease. I recommend all the VSI editors, authors, and readers to participate in scientific communications regarding these issues in VSI. Any submissions to VSI are welcome.

## CONFLICTS OF INTEREST

Seung-Kee Min has been the editor-in-chief of *Vasc Specialist Int* since 2019.

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