



Perioperative planning in the COVID-19 pandemic: Vascular issues

COVID-19 pandemisinde perioperatif planlama: Damar hastalıkları

Tankut Akay 

Department of Cardiovascular Surgery, Başkent University Medical Faculty, Ankara, Turkey

The severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2; COVID-19) pandemic has changed not only the paradigm of maintenance of healthcare system for healthcare providers and governments, but also the whole world since December 2019, and there is a growing number of data accumulating from many centers across the globe.^[1,2] Expert opinion reports estimate that the impact of COVID-19 seems to be evident in the following months; therefore, as cardiovascular surgeons, we must be very well prepared in this outbreak period. I have read with great interest the article entitled “Perioperative planning for cardiovascular operations in the COVID-19 pandemic” written by Mavioğlu et al.^[3] In my opinion, this article will be a helpful guide, particularly at this particular moment.^[3] As a proud member of this society, I would like to make humble contributions to this paper.

It has been established that age and underlying cardiovascular diseases such as hypertension, diabetes, and myocardial infarction are the most important risk factors for mortality from COVID-19 pneumonia.^[4-6] Malnutrition and superimposed bacterial infections may also worsen the prognosis and prolong the length of intensive care unit stay. In some cases, multiple organ dysfunction may develop and the most common organ damage is lung, followed by the heart, kidney, and liver. During this outbreak, many reports have been published, mainly focusing on minimizing contamination and protecting the healthcare providers. However, data are still scarce about the management of patients with diseases other than COVID-19 infection, urging us to obtain expert opinions.

In addition to many cardiovascular risk factors listed above which can affect COVID-19 patients, it is also of vital importance to consider a vulnerable group of patients, such as individuals waiting for cardiac transplantation or post-heart transplantation. In China, two heart transplant patients with typical symptoms of COVID-19 have been recently reported.^[7,8] In addition, COVID-19-infected patients seem to be at an increased risk for venous thromboembolism (VTE). Although there are no published case series thus far, there are reports of abnormal coagulation parameters in hospitalized patients with severe COVID-19 disease.^[9,10] In a multi-center, retrospective cohort study from China, elevated D-dimer levels (>1 g/L) were found to be strongly associated with in-hospital mortality, even after multivariable adjustment (OR 18.4, 95% CI 2.6-128.6, p=0.003). In another study comparing COVID-19 survivors to non-survivors, non-survivors had significantly higher D-dimer and fibrin degradation product levels and 71.4% of non-survivors met clinical criteria for disseminated intravascular coagulation during the course of their disease.^[9] The high incidence of VTE in critically ill patients of COVID-19, despite the universal use of guideline-recommended VTE prophylaxis, was similar to sepsis, but markedly higher than published reports in critically ill patients without sepsis, indicating dysregulated hemostasis and coagulation in severe COVID-19. Vascular inflammation may also contribute to the hypercoagulable state and endothelial dysfunction in these patients. In the setting of critically ill COVID-19 patients having clinical deterioration as evidenced by hypoxia or hemodynamic instability, thromboembolic

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Correspondence: Tankut Akay, MD, Başkent Üniversitesi Tıp Fakültesi Kalp ve Damar Cerrahisi Anabilim Dalı, 06490 Bahçelievler, Ankara, Türkiye.
Tel: +90 312 - 203 68 68 / 2560 e-mail: tankutakay@gmail.com

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Table 1. Recommendation about venous procedures and wound

Venous	Acute iliofemoral DVT with phlegmasia	Do not postpone
	Inferior vena cava filter placement	Postpone if possible
	Massive symptomatic iliofemoral DVT in low risk patient	Postpone if possible
	Procedures for ulcerations secondary to venous disease	Consider postponing
	Asymptomatic May-Thurner syndrome	Postpone
	Inferior vena cava filter removal	Postpone
	Varicose veins, GSV ablations	Postpone
Wounds/ Gangrene/ Amputation	Amputations for infection/necrosis (TMA, BKA, AKA)	Do not postpone
	Lower extremity disease with non-salvageable limb (amputation)	Do not postpone
	Deep debridement of surgical wound infection or necrosis	Postpone if possible
	Wounds requiring skin grafts	Postpone if possible
	Amputations for infection/necrosis (toes)	Postpone if possible

DVT: Deep vein thrombosis; GSV: Greater saphenous vein; TMA: Transmetatarsal amputation; BKA: Below-knee amputation; AKA: Above-knee amputation.

disease should be considered. The optimal treatment for patients hospitalized with COVID-19-related illness is still unknown. There are recommendations for deep vein thrombosis (DVT) and VTE. One of the recommendations is given by the American College of Surgeons for all vascular procedures.^[11] In this short communication, only the recommendations for venous procedures and for inoperable patients with wound/gangrene/amputation are given in Table 1. More effective VTE prevention strategies based on an individual assessment of bleeding risks have a vital importance for critically ill patients with COVID-19.^[12] Given the drug-drug interactions between some antiviral treatments and direct oral anticoagulants, low-molecular-weight heparins, or unfractionated heparin with or without mechanical prophylaxis are likely to be preferred in all patients with COVID-19, if possible. All completely immobilized patients would benefit from intermittent pneumatic compression in addition to pharmacological thromboprophylaxis. Mechanical thromboprophylaxis should be used alone, if platelet count is less than 30,000 per microliter or in a bleeding patient.

Critically ill patients with COVID-19 suffer from both a high risk of thrombosis and bleeding. The Padua Prediction Score for Risk of VTE may be a helpful tool for this purpose.^[13] More effective VTE prevention strategies based on an individual assessment of bleeding risks have a vital importance for critically ill patients with COVID-19.

In conclusion, to the best of our current knowledge and understanding, we, as vascular surgeons, should immediately develop certain algorithms for preventing DVT and identify possible treatment approaches to follow during this outbreak.

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