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.

Management of venous thromboembolism during the COVID-19 pandemic

Since the coronavirus disease of 2019 (COVID-19) was first identified in December 2019 in Wuhan, China, and declared a pandemic, it has harvested thousands of lives across the globe.[1] Aside from respiratory disease, COVID-19 has been shown to increase risk of thromboembolism.[2] Multiple hemostatic abnormalities, including increased D-dimer and fibrin degradation product levels, prolonged thrombin and prothrombin times and international normalized ratio, shortened activated partial thromboplastin time, and thrombocytopenia, indicating possible disseminated intravascular coagulation, have been reported.[1-5] In addition, other implicated causes include positive antiphospholipid antibodies and sepsis.[4]

With the current recommendations of social distancing and "stay-at-home" orders, most clinical appointments have been changed into virtual visits. Furthermore, patients with potentially serious conditions, such as venous thromboembolism (VTE), might be avoiding hospital visits, which may lead to increased morbidity and mortality. Sedentary lifestyle is expected to increase risk of VTE, especially in patients with underlying risk factors. Consequently, consistent with current evidence,[5] our institution has created management recommendations for VTE (Fig).

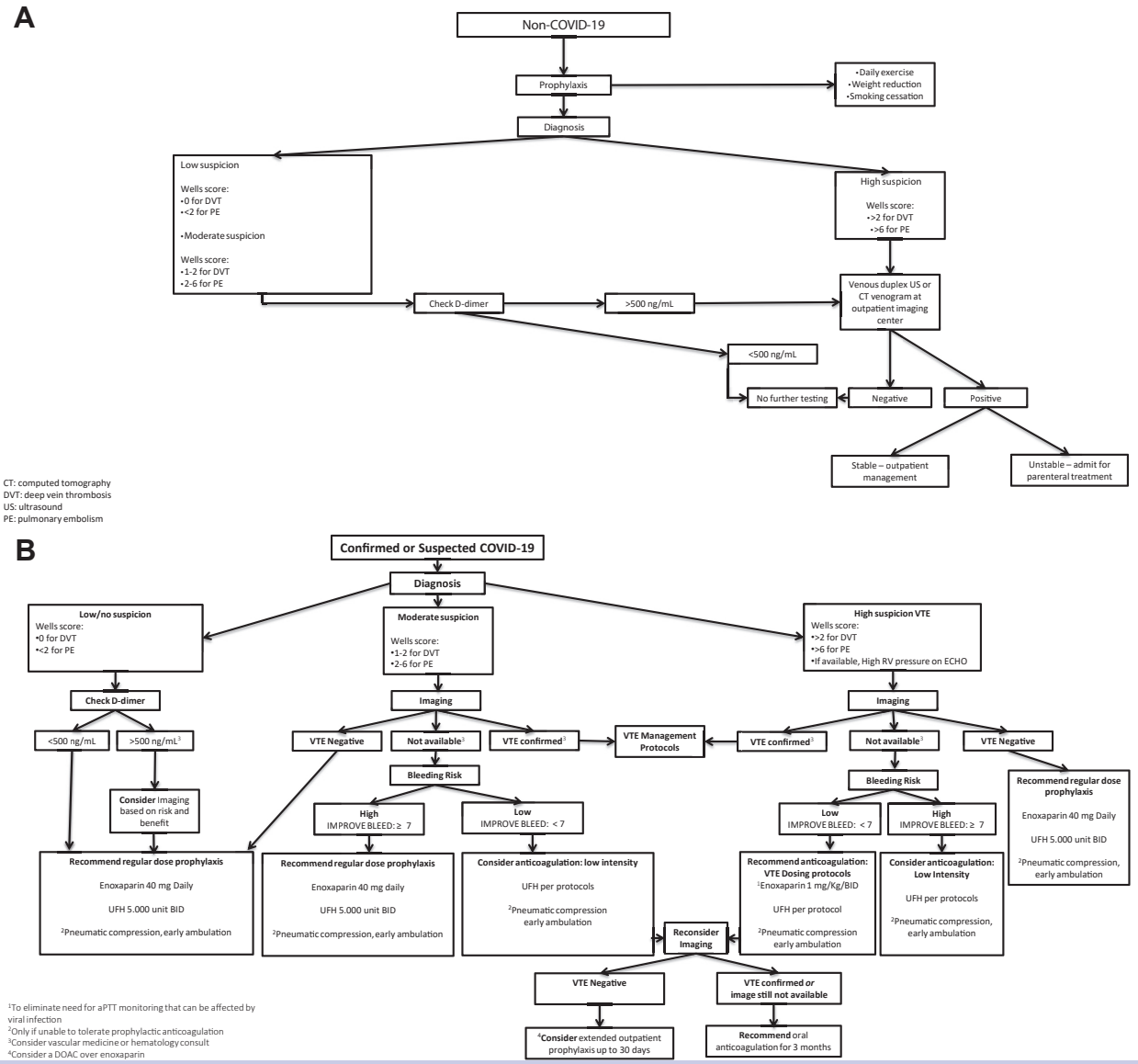

Fig. Management recommendations for venous thromboembolism (*VTE*) of non-COVID patients **(A)** and patients with confirmed or suspected COVID-19 **(B)**. *aPTT,* Activated partial thromboplastin time; *BID,* twice daily; *CT,* computed tomography; *DOAC,* direct-acting oral anticoagulant; *DVT,* deep venous thrombosis; *PE,* pulmonary embolism; *RV,* right ventricle; *UFH,* unfractionated heparin; *US,* ultrasound.

NON-COVID PATIENTS

Prophylaxis. We recommend daily exercise activities, weight reduction, and smoking cessation.

Diagnosis. For outpatients with low risk (Wells score of 0 for deep venous thrombosis [DVT] and <2 for pulmonary embolism [PE]) or moderate risk (Wells score of 1-2 for DVT and 2-6 for PE) and D-dimer level of <500 ng/mL, we recommend no further testing. For moderate-risk patients and D-dimer level of ≥500 ng/mL or high-risk patients (Wells score of >2 for DVT and >6 for PE), we recommend venous duplex ultrasound or computed tomography at an outpatient imaging center.

Management. For stable patients, we recommend outpatient management with direct oral anticoagulants, and inpatient management with parenteral anticoagulation for unstable cases.

COVID-19 PATIENTS

Prophylaxis. In addition to early ambulation, we recommend prophylaxis for all patients, favoring enoxaparin over unfractionated heparin.

Diagnosis. Based on clinical suspicion, and D-dimer level in patients with low risk, we cautiously suggest imaging studies in order to reduce viral transmission and interruption of intensive care.

Management. We recommend prophylaxis, low- or regular-intensity full anticoagulation based on imaging availability and bleeding risk. We favor enoxaparin over unfractionated heparin to reduce the need for monitoring of activated partial thromboplastin time, which can be affected by the viral infection. Direct oral anticoagulants may be considered in patients who do not require a procedure.

Extended prophylaxis. Extended prophylaxis is considered in patients with moderate clinical suspicion and low bleeding risk.

Further research is needed for standardized management recommendations for VTE in the era of COVID-19.

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https://doi.org/10.1016/j.jvsv.2020.05.005

Pulmonary embolism response teams in the challenging era of venous thromboembolism associated with COVID-19

We read with enthusiasm and interest the manuscript written by Obi and colleagues entitled "Practical diagnosis and treatment of suspected venous thromboembolism during the COVID-19 pandemic."[1] The manuscript was based on consensus between a number of vascular experts together with input from intensivists, pulmonologists, and hematologists "for critique and vetting of the algorithms that resulted." This type of consensus work is precisely how and why the evolving concept of pulmonary embolism response teams (PERTs) has become so widely accepted.[2,3]

We believe that multidisciplinary PERTs are invaluable in the care of patients with suspected or proven venous thromboembolism (VTE) associated with severe pneumonic COVID-19. Complex acute pulmonary embolism (PE) cases are particularly likely to benefit.[2,3] During this pandemic, PERTs have been particularly challenged to arrive at practical and effective approaches to the diagnosis and treatment of acute VTE while minimizing exposure to health care staff and other patients. There is clearly a balance that must be achieved between an acceptable diagnostic yield and unnecessary testing as well as offering an acceptable, effective therapy that again minimizes exposure and carefully uses resources. Skill in point-of-care transthoracic ultrasound, for example, may provide valuable clues for ruling in or ruling out PE when we cannot easily do more specific imaging.[4,5]

The guidelines offered by Obi and colleagues are helpful. However, the lack of a strong evidence base in some of these newly found clinical scenarios requires us to fall back on our clinical experience and gestalt! Gestalt has proven useful in the diagnosis of acute PE—witness the interesting receiver operating characteristic curve published by Peñaloza et al[6]; gestalt and consensus with experts are critical in these complex times. The markedly elevated D-dimer