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.

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Letter to the Editor

COVID-19 and anticoagulant based therapeutics: Approach with great promise

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Dear Editor,

Coronavirus disease 2019 (COVID-19, also known as Severe Acute Respiratory Syndrome Coronavirus 2) has been reported as a novel outbreak since December 2019, and had become pandemic. COVID-19 consists of a single standard RNA which primarily enters the host cell by binding the angiotensin - converting enzyme 2 protein, abundantly expressed in the lung alveolar cells. This suggests that respiratory system is the primary target during the COVID-19 infection [1,2]. Although, COVID-19 is not just a respiratory disease, but has been identified in some patient to mimic coagulopathy conditions such as, thrombosis and disseminated intravascular coagulation (DIC). Outcome based clinical observation revealed that about 46% patients with COVID-19 (globally) suffered coagulopathy condition and elevated levels of D-dimer (>0.5 mg/L) [3,4]. Additionally, COVID-19 infected patients have higher risk of thrombotic disease including acute coronary syndrome, venous thromboembolism or pulmonary embolism, or stroke and increase risk of mortality [5]. Furthermore, an elevated D-dimer expression and extended prothrombin time have been observed and is significantly associated with poor prognosis in COVID-19 infected patients. D-dimer could be consider as a potent biomarker of fibrin formation and degradation and also can be used as a risk stratification marker in case of COVID-19 infection [6].

Furthermore, COVID-19 infection is highly critical in those patients who is already predisposed to thrombotic disease or are under the process of antithrombotic treatment [7]. Therefore, it has been assumed that suppressed coagulopathy based approach using anticoagulant could be one of the best options to improve the therapeutic possibilities to control COVID-19 pathogenesis and support the quality of life of patients. Anticoagulants such as lopinavir/ritonavir or their combination with Vitamin K antagonists (apixaban, and betrixaban) could be administered orally (Fig. 1).

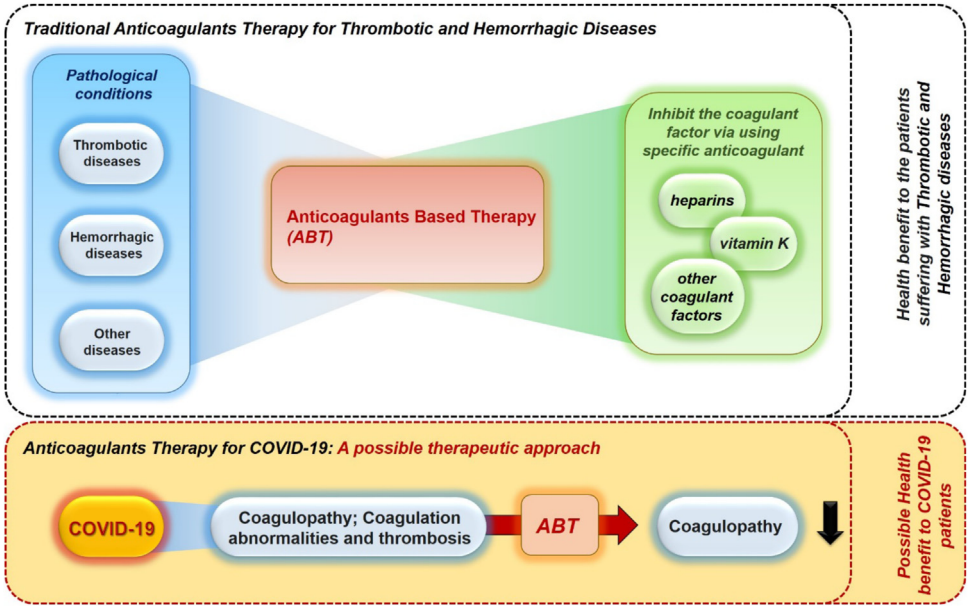

Fig. 1. Anticoagulant based therapeutic could add health benefit to COVID-19 patients via suppressing coagulopathy. Anticoagulant based treatments benefit to the patients suffering from thrombotic and hemorrhagic pathological condition via suppressing the coagulation factors, such as vitamin K antagonists (apixaban, and betrixaban) or anti-heparin or other anticoagulant. Coagulopathy is a most prevalent physiological condition that have been observed in COVID-19 infected patients and is a one of the major causes of mortality around the world. As there are no any specific medication or vaccination strategies evolved to control the COVID-19 infection, the anticoagulant based therapy could be helpful to reduce coagulopathy event and could provide a better therapeutic approach against COVID-19 pathogenesis.

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Anticoagulant therapy, mainly with low molecular weight heparin boost the survival rate of COVID-19 infected patients with coagulopathy [8]. Additionally, a case series reported by Zhang et. Al, suggests that coagulopathy in COVID-19 infected patients is associated with antiphospholipid antibodies which include anti-cardiolipin (aCL) and anti–β2-glycoprotein I (aβ2GPI) [1,2].

Presently, majority of people are in lockdown across the world and no specific drug or vaccine have been developed against COVID-19. Looking at the current crisis, most of the measures taken are inclined towards reducing mortality among COVID-19 patients. However, numerous medical and scientific efforts are also under way aiming at the development of a diagnostic and therapeutic tool to combat COVID-19. Focus on procuring more data on epidemiology, pathogenesis, symptoms, pre-clinical and clinical trial and genomics of COVID-19 would provide a holistic approach to eradicate COVID-19 in near future anticoagulant based therapeutic approaches could be one positive and effective medication strategy for better prognosis in severe COVID-19 patients (Fig. 1) and might greatly improve quality of life of COVID-19 patients.

References

[1] Zhang Y, Xiao M, Zhang S, et al. Coagulopathy and antiphospholipid antibodies in patients with Covid-19. N Engl J Med 2020;382(17):e38, http://dx.doi.org/10.1056/NEJMc2007575.

[2] Zhang H, Penninger JM, Li Y, Zhong N, Slutsky AS. Angiotensin-converting enzyme 2 (ACE2) as a SARS-CoV-2 receptor: molecular mechanisms and potential therapeutic target. Intensive Care Med 2020;46(4):586–90, http://dx.doi.org/10.1007/s00134-020-05985-9.

[3] Levi M, Thachil J, Iba T, Levy JH. Coagulation abnormalities and thrombosis in patients with COVID-19. Lancet Hematology 2020. Published online May 11, doi: 10.1016/S2352-3026(20)30145-9.

[4] Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med 2020;382(18):1708–20, http://dx.doi.org/10.1056/NEJMoa2002032.

[5] Watson RA, Johnson DM, Dharia RN, Merli GJ, Doherty JU. Anticoagulant and anti-platelet therapy in the COVID-19 patient: a best practices quality initiative across a large health system. Hosp Pract 2020, 10.1080/21548331.2020.1772639.

[6] Kollias A, Kyriakoulis KG, Dimakakos E, Poulakou G, Stergiou GS, Syrigos K. Thromboembolic risk and anticoagulant therapy in COVID-19 patients: emerging evidence and call for action [published online ahead of print, 2020 Apr 18]. Br J Haematol 2020, 10.1111/bjh.16727. doi:10.1111/bjh.16727.

[7] Bikdeli B, Madhavan MV, Jimenez D, et al. COVID-19 and thrombotic or thromboembolic disease: implications for prevention, antithrombotic therapy, and follow-up [published online ahead of print, 2020 Apr 15]. J Am Coll Cardiol 2020, http://dx.doi.org/10.1016/j.jacc.2020.04.031. S0735-1097(20)35008-7.

[8] Tang N, Bai H, Chen X, Gong J, Li D, Sun Z. Anticoagulant treatment is associated with decreased mortality in severe coronavirus disease 2019 patients with coagulopathy. J Thromb Haemost 2020;18(5):1094–9, http://dx.doi.org/10.1111/jth.14817.

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